Direct Marketing Meat

A Resource for Direct Market Meat Producers in Wisconsin

April 2003

Developed by the University of Wisconsin Extension,
the Emerging Ag Markets (EAM) Team
and the Wisconsin Department of Agriculture, Trade & Consumer Protection

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Editor's Note

About Direct Marketing Meat

By Greg Lawless, Extension Outreach Specialist, UW Center for Cooperatives

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) received a USDA grant in 2001 to support direct marketing of meat products by Wisconsin producers. This Federal-State Market Improvement Program (FSMIP) grant included funds to support producer education. In that aspect of the grant, DATCP partnered with the Emerging Agricultural Markets (EAM) Team of University of Wisconsin Extension (UWEX).

In 2001-02 DATCP and the EAM Team fulfilled the educational commitments of the grant by putting on four "meat marketing workshops" around the state. These workshops were well attended and received very favorable evaluations from producer participants. At the end of the grant period there was still a modest amount of funds left unspent, and we decided to put those funds toward this publication.

This book is built around information presented at the meat marketing workshops. Articles by UWEX faculty on Market Research, Promotion, Pricing, and Working with Your Processor came directly from those workshops and are published here for the first time. We have also compiled in this book many other articles and publications that relate to direct marketing of meat products.

This book is intended to support producers who direct market beef, pork, lamb and poultry, as well as less traditional meats from bison, ostrich, and other alternative species. In some cases we provided articles specific to one species, but these articles were chosen because they offer information and insights that could benefit all kinds of livestock producers. The four "Facts" sheets from the National Pork Board are a case in point.

Readers should be aware that this booklet represents an aggregation of information from many different sources, some of it reproduced several years after it originally appeared. If there is any contradiction or confusion that arises between the various sources, particularly with respect to the ever-changing regulatory environment, readers are encouraged to contact DATCP directly for the latest and most accurate information.

We are very grateful to Dr. Dennis Buege, Extension Meat Specialist of the University of Wisconsin-Madison. He submitted numerous articles of his own and pointed us toward many other materials from state and industry sources. We also thank Terry Burkhardt and his colleagues at DATCP for providing state statues, brochures and other resources for inclusion in this publication.

Direct Marketing Meat was produced under a very short timeframe, and we are especially grateful to Laurie Lawrence of DATCP for helping us to put it all together in an attractive format.

Introduction

By Rose Skora, UW Extension Agricultural Agent for Racine and Kenosha Counties

Wisconsin's rich agricultural history has many focuses – including our diverse dairy industry, crops, fruit production and livestock production. While livestock production in Wisconsin hasn't gained the notoriety that dairy has, livestock continues to be an important aspect of agriculture in our state.

Challenges with low commodity prices and concentration of livestock production can lead to economic difficulties for livestock producers. Both livestock numbers and the number of livestock farmers are dropping in the state of Wisconsin. Reasons for the loss of farmers is very evident when looking at some of the economic realities related to farming. For example, in 1946, livestock producers received 73 cents of the consumer dollar that was spend on meat products. This number fell to 52 cents in 1956 and only 12 cents of the consumer dollar went to farmers in 1998. Figure 1 shows how pork producers market share has declined over the last forty years.

Despite some of the hardships currently facing Wisconsin's livestock producers, there exists the opportunity for farmers to take back a larger share of the consumer dollar and be paid fairly and adequately for the work that goes into producing high quality meat products. While direct marketing of meat products is not a new concept today more farmers are looking at turning to direct marketing as a means of boosting income and profitability.

The opportunity to direct market meat products is gaining momentum. Many consumers are looking for a connection to the farmer that produces their food. Additionally, concerns about healthy eating and the safety and flavor of meat products are motivating consumers to find the direct link between the food they eat and the farmers who produce it.

While direct marketing of meat faces some unique challenges (issues with processing, finding markets for less desirable cuts, developing meat products that are desirable for a fast-paced quick food society) these challenges can be overcome. Direct marketing can take many forms. Farmers have the opportunity to form co-ops, sell directly to restaurants and grocery stores, and sell at

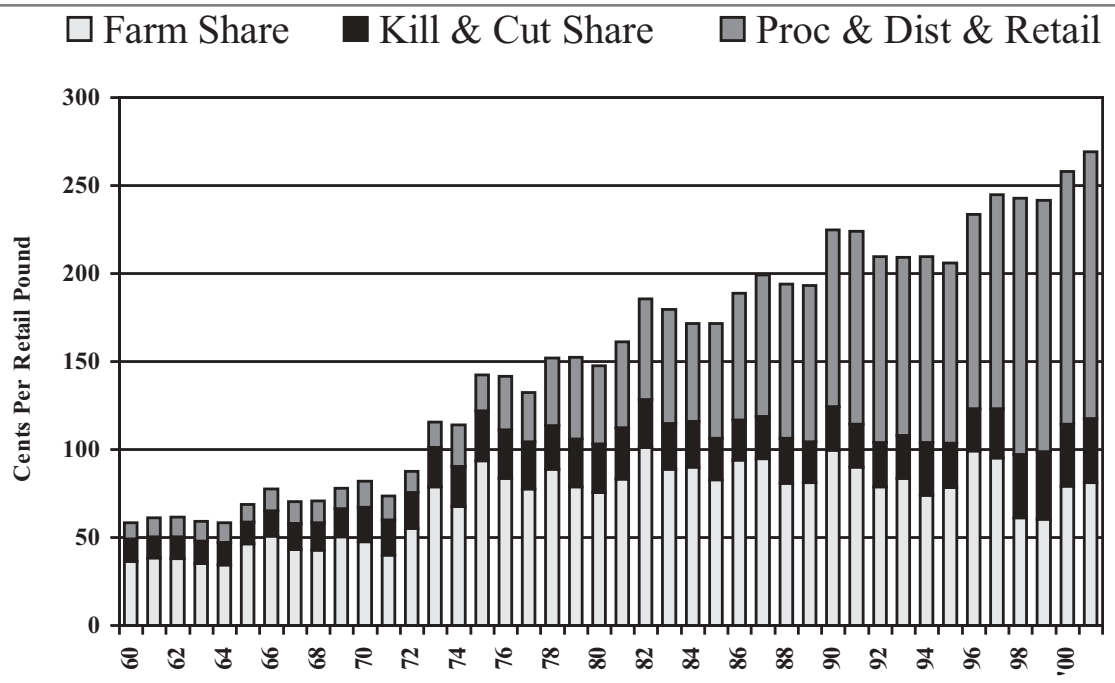

Figure 1: Pork: Retail Price and Shares: 1960-01.
Producers and Packers are losing market share.

Source: Dr. Ron Plain, University of Missouri

farmer's markets or at an on-farm store. The possibilities for direct marketing meat are numerous and continue to expand.

While direct marketing meat can be a successful way for farmers to maintain viable farming operations, it does also mean a different way of doing business. The job doesn't end when animals are shipped to market. In truth, the work just begins. Farmers or family members will need to develop or discover within themselves the skills needed to be a successful marketer. Direct marketing can and will be a means for your farming operation to have a sustainable future. You will be offering your consumers a unique, high-quality product, in addition to great service, and faith in a healthy, safe product.

References:

USDA, ERS Publication FoodReview: Consumer-Driven Agriculture, Vol. 25, No. 1, May 2002.

Marketing of Agricultural Products, 8th edition, Richard L.Kohls and Joseph N. Uhl, Prentice Hall 1998.

Alternative Meat Marketing (Livestock Technical Note): Appropriate Technology Transfer for Rural Areas (ATTRA)

Food Safety and Regulations

In this section we present an assortment of documents related to food safety and state and federal regulations. Two short overviews of these issues by Dr. Dennis Buege (below and next page) are followed by a table of guidelines from DATCP. Then DATCP brochures on direct marketing, meat inspection, and meat labeling are provided, followed by two excerpts from Wisconsin state statutes related to livestock processing and marketing. Two more short pieces about meat labeling are followed by Dr. Larry Borchert's article about controlling chemical residues in livestock and meat. Finally, an article on the safety of cured pork products is offered from the National Pork Producers Council.

Dr. Buege, the Extension Meat Specialist at the UW-Madison, has summarized the complex and extensive safety and regulatory environment this way:

- All meat which is sold must be inspected.
- All fully inspected state and federal plants offer ante and postmortem inspection of animals. This satisfies meat inspection requirements.
- Animals slaughtered and processed for animal owner may be slaughtered without inspection as long as the meat is consumed by the owner, members of the family, and non-paying guests.
- "Custom exempt" plants do not have slaughter inspection. If using one of these plants, animal must be sold live to customer. It is possible for more than one individual to own a live animal.
- It is a good idea to slaughter animals under inspection for protection of customer and producer.
- Ultimately, individual producers shoulder much of responsibility for ensuring the safety of our food system. It is important to remember that safety issues and regulations change over time. To be sure that you have the latest information, contact the Department of Agriculture, Trade and Consumer Protection.
- Of course, producers should always adhere to state and federal regulations. To further protect their liability, all direct marketers should limit their personal liability by securing appropriate liability insurance.

From the ATTRA Project of National Center for Appropriate Technology:

With the increase in concern over food safety, the producer always has a small amount of product liability risk to deal with. Processing livestock increases this risk. The closer you get to the consumer in direct marketing, the higher the liability risk. For example, a ranch was asked to provide proof of $2 million dollars of product liability insurance to be able to sell at a farmers' market (20). It is important to discuss this business consideration with your insurance carrier to see if farm liability insurance coverage is sufficient or if additional coverage is required.

The North America Farmer Direct Marketing Association (NAFDMA) offers its members liability and loss insurance specifically designed for direct-market farmers. Contact:

North American Farmers' Direct Marketing Association (NAFDMA)
62 White Load Road,
Southampton, MA 01073
(413) 529-0386 or (888) 884-9270.
Or visit: http://www.nafdma.com

Rules on Sale of Animals and Meat by Livestock Producers

Overview provided by Dr. Dennis Buege, Extension Meat Specialist, UW-Madison

There is much interest among many farmers in selling their animals (or the meat) directly to consumers, using our state-inspected official or custom exempt plants. Meat inspection regulations are confusing even to those who have been in the industry for awhile, and even more so to livestock producers. The information below was put together by the Wisconsin Meat Safety Bureau in the fall of 2001, to help and explain the regulations as they pertain to sale of animals and meat by livestock producers.

Direct Marketing, Sale of Meat

- Producer to consumer, state statute requires all meat sold to be inspected.
- What is meat? Meat products are the carcasses or any parts of carcasses of animals capable of use as human food: sides, quarters, halves, loins, steaks.
- If meat from animals is being sold, animals cannot be mobile slaughtered.
- If meat from animals is being sold, animals cannot be custom slaughtered.
- Animals are transported to state or federally inspected slaughter plant.
- Animals are inspected (ante and post mortem) at inspected slaughter operation.
- Producers are able to sell this meat to consumers.
- Packages of meat are labeled as Inspected with State or Federal legend.
- If producer is selling meat directly from the farm, meat must be inspected and producer needs a retail food license.
- If producer is distributing meat products to restaurants or stores, meat must be inspected and producer needs distributor registration.

Direct Marketing, Sale of Live Animal

- Producer to consumer— Animal now owned by consumer (can be more than 1 person).
- Must be whole live animal (not portions, sides, quarters, etc.).
- Agree on price with producer, not hanging weight (that is meat).
- Animal cannot be slaughtered on producer' premises.
- Animal can be slaughtered on the owner's premises.
- Animal is transported to slaughtering facility.

Inspected Slaughter, Processing Facility

- Animal is inspected - marked "INSPECTED AND PASSED"
- Inspected products returned to consumer
- Consumer pays processing fees Consume pays processing fees
- Meat products can be sold (portions, sides, quarters, etc.)

Custom Slaughter, Processing Facility

- Animal not inspected— marked "NOT FOR SALE"
- Plant operator completes custom slaughter report, identifies animal owner or owners
- Meat products cannot be sold Meat packages marked "NOT FOR SALE"

Guidelines Regarding: Animal and Carcass Sale, Meat Processing and Sales Restrictions

This is an excerpt from a 1996 article in the UW Extension Direct Marketing Newsletter, written by Chris Lazaneo, Public Information Officer, DATCP Division of Food Safety, in consultation with the DATCP Meat Bureau Staff.

Meat or meat related activity	Restrictions
Live animal sold for slaughter	Producer may legally sell the animal, but the purchaser is responsible for the meat processing. Meat producers may not legally slaughter or process.
Carcass sold to consumer	Only government inspected carcasses may be sold
Meat sales to a restaurant or supermarket	The person or business selling the meat must be state registered as a meat distributor, and the meat must be inspected. After purchase, the store can legally cut, wrap, & sell the meat.
Slaughter of animals by producers or hired licensed "mobile slaughterer"	Meat must be for producer's own use or donated. The meat can not be offered for sale.
Distribution of inspected meat to various WI locations (including retail stores, restaurants, or other institutions).	Shipper and distributor registration required by state.
Sale of beef or pork from a farm freezer	Producer must be state licensed as a "retail food establishment". Meat must be inspected.
Door-to-door meat sales	Must be licensed as a "mobile retail food establishment." Meat must be inspected.
State inspected meat sold across state lines	Not allowed. However, non-Wisconsin residents may come into state and purchase meat from producer if for their own use. Out-of state restaurants and retail outlets can not purchase state inspected meat for resale in another state.
Poultry sales	Producer can process up to 1000 birds without inspection. Birds cannot be sold to groceries, restaurants, or across state lines.
Ethnic ritual slaughter on producer's property	Not legal.
Farmers' market sales of cut and wrapped meat	Must be inspected and processed at a licensed processing plant (except rabbit and poultry under certain situations). Packages must be properly labeled and kept frozen at 10° degrees F., or refrigerated be1ow 40 degrees F.
Rabbit meat sold directly to consumers	Rabbits sold retail are exempt from meat inspection regulations. Rabbit producers may slaughter, process, and sell directly to consumers without a license.
Rabbit meat sales-wholesale	Producers wishing to wholesale rabbit meat must be licensed as "food processors."
Exotic meats: Emu, Ostrich	Exotic meats sold directly to consumers are exempt from meat inspection regulations. These producers may slaughter, process, and sell directly to consumers without a license. Meat sold wholesale must be inspected.

Captive game animals such as farm-raised deer and buffalo

Meat from exotic species may be sold directly to consumers from the farm, provided the animal has been slaughtered under inspection and the meat processed at a state or federally licensed facility.

All meat from captive game animals sold to consumers in any place other than from the owner's premises, including farmers markets, must be inspected and passed at a state or federally inspected facility.

All other requirements for livestock apply to exotic species. A retail food license is required.

Rabbits

Producers may slaughter, process and sell rabbit meat directly to consumers from their premises without inspection or a license.

Rabbit meat sold at any location other than the producer's premises must be slaughtered, processed, packaged and labeled at a licensed facility.

An appropriate license is required for any location, other than a farm / production premise, where rabbits are sold to consumers.

For more specific information or answers to questions about direct marketing meat and poultry products, see Section 97.42 stats. and Ch. ATCP 55 Wis. Adm. Code or contact your regional office (see map on next panel).

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Wisconsin Department of Agriculture,
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Division of Food Safety
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Wisconsin Department of Agriculture, Trade and Consumer Protection

Direct Marketing

Meat AND Poultry

Division of Food Safety

Poultry Requirements

(farm-raised chickens, ducks, geese, guinea hens, squab, turkeys)

Less than 1000 birds per year		
Sold from the producer's premises	**Sold at a farmers market**	**Sold to retail establishments**
Birds are healthy Producer can slaughter and sell birds without inspection or a license Producer maintains custody of birds until sold Birds can only be sold directly to the consumer Birds are labeled "not inspected," have the name and address of producer, and net weight	All birds must be slaughtered and processed at a meat licensed facility Birds are labeled "not inspected," and have the name and address of producer, and net weight A mobile retail food license is required to sell birds at farmers markets, and local ordinances may also apply	Birds are processed at a licensed meat establishment Bird-by-bird inspection is required Birds are fully labeled In addition, the producer must be registered as a meat distributor

More than 1000 birds per year		
Sold from the producer's premises	**Sold at a farmers market**	**Sold to retail establishments**
Bird-by-bird inspection required at a state or USDA licensed facility Birds are fully labeled Producer must have a retail food establishment license	Same requirements as at left Local ordinances may apply at farmers markets	Same requirements as at left In addition, the producer must be registered as a meat distributor

NOTE: If the product is sold over state lines, the processing facility must be under USDA inspection.

Livestock Requirements

(cattle, swine, calves, sheep, goats, ratites)

All meat derived from livestock sold to consumers must be inspected and passed at a state or federally inspected facility.

Products must be properly labeled and include the following:

- Name of the product, e.g. Beef T-bone, ground ostrich, pork spareribs
- List of ingredients if more than one ingredient, such as sausage
- Name and address of the packer, distributor or processor
- Inspection legend (USDA or WI symbol)
- For perishable products, a handling statement, such as "Keep Refrigerated" or "Keep Frozen"
- Raw and uncooked products must have a safe handling label for consumers

Meat must be sold by weight.

Producer selling meat from farm:	**Producer distributing meat from the farm for wholesale sales:**	**Producer selling meat door-to-door or at a farmers market:**
A retail food license is required In addition, The freezer must be inspected to ensure it maintains the meat in a frozen state The freezer must be used exclusively to store meat sold to consumers The freezer must be clean and located in a clean, neat area (house or shed are okay)	*Registration as a distributor is required* In addition, The producer's vehicle must be inspected to ensure that frozen meat and poultry will be maintained in a frozen state and sanitary manner Unfrozen meat and poultry products must be maintained and delivered at internal temperatures of 41°F (5°C)or less Any effective method can be used (freezer, dry ice, cooler, etc.)	*A mobile retail food license is required* In addition, Same requirements as at left

NOTE: Meat slaughtered by the farmer or a mobile slaughterer on the farmers premises cannot be sold.

Bureau of Meat Safety & Inspection

Wisconsin's Bureau of Meat Safety and Inspection regulates meat-processing plants within the state. Plants operating under the state inspection program are able to ship their products anywhere within the borders of the state of Wisconsin (intrastate). Products are marked with an inspection legend in the shape of the Wisconsin outline and contain their assigned number and words "Wis. Dept. Agr. Inspected." State plants have the benefit of excellent customer service and quick response from their inspection program.

Federally inspected plants may ship their products interstate. They are inspected and regulated by USDA's Food Safety and Inspection Service (FSIS) Their products are marked with a round seal.

Who needs inspection?

Any food business that produces products on a wholesale basis which contain meat would need to be inspected. Wholesale products are those that will be sold again to the final customer. A product containing meat such as pizza, eggrolls, sausages or entrees would require inspection. For example, a restaurant selling pepperoni pizza to another business would be considered a wholesale meat processor.

People interested in starting a meat business or wishing to learn more about the Bureau of Meat Safety and Inspection can contact the bureau at the offices listed in this brochure.

DFS Central Administrative Office
Bureau of Meat Safety & Inspection
P.O. Box 8911
Madison, WI 53708
(608) 224-4700

Northwest Regional Office
3610 Oakwood Hills Parkway
Eau Claire, WI 54701-7754
(715) 839-3844

Northeast Regional Office
200 N. Jefferson Street, Suite 146-A
Green Bay, WI 54301-5100
(920) 448-5120

Southern Regional Office
2811 Agriculture Drive
Madison, WI 53718-6777
(608) 224-4661

Division of Food Safety
Wisconsin Department of Agriculture,
Trade & Consumer Protection
P.O. Box 8911
Madison, WI 53708-8911
(608) 224-4700

By electronic mail at ***food@datcp.state.wi.us***
On the Internet at ***Wisconsin.gov***

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Wisconsin's State Meat Inspection Program

From farm to table...

Wisconsin Division of *Food Safety*

Wisconsin's State Meat Inspection Program

Cleanliness. Wholesomeness. Safety. These are the standards of quality found in State of Wisconsin-inspected meat plants and products.

The State of Wisconsin meat inspection program and meat establishments ensure that meat products produced in the state and sold to consumers comply with required standards for safety, purity and wholesomeness set by the state and federal governments. In fact, all products produced in a state-inspected plant must meet or exceed standards set by the U.S. Department of Agriculture.

The Division of Food Safety's Bureau of Meat Safety and Inspection provides many services to its clientele. Those services include:

- **Antemortem inspection** - All live animals sent to slaughter are examined to determine if they have any disease or condition that would make them unfit for human consumption. Animals which show signs of disease are not allowed to be used for food unless checked by a Division veterinarian and passed. Humane handling and slaughter of all animals is required.

- **Postmortem inspection** State meat inspectors conduct a careful postmortem examination and inspection of the carcasses and parts of all animals slaughtered at state-inspected meat establishments.

After the inspection, the Bureau's inspectors and veterinarians may pass, retain or condemn a whole carcass or any of its parts. More detailed information about this procedure is available from the Division.

- **Sanitary operation of facilities** - The Division regularly inspects meat establishments to make sure the premises are clean and meet state and federal standards for sanitation. Foodborne illness is less likely to occur when the meat plant is clean and has an approved sanitation plan in place.

- **Structure of the facility** - All plants must meet Division construction standards. Plant owners must maintain their buildings to provide for the production of safe and wholesome food. A properly constructed plant facilitates good sanitation, reduces cross contamination and helps ensure a safe food supply.

- **Food labeling** - The Division audits meat labels to make sure they contain appropriate information and comply with labeling laws. Meat and poultry products must meet government standards of identity. Review of product formulas and methods assure that all ingredients are wholesome and used in acceptable proportions, and that the production process is safe.

- **HACCP** - All official meat plants are required to operate in a HACCP system. HACCP (Hazard analysis and critical control points) is a system of food safety procedures designed in the mid-70's to produce safe food for NASA. In HACCP, the production of the meat product from start to finish is analyzed. Points in the process that are considered critical to food safety are identified and monitored to ensure potential problems are prevented.

- **Sampling program** - The extensive sampling program routinely tests meat and meat products for the presence of the pathogenic bacteria, *Salmonella, Listeria* and other pathogens. DFS inspectors also check fat and moisture levels, shelf stability in some in ready-to-eat products, and for the presence of illegal drug residues.

- **Voluntary inspection program** - At the owner's request, DFS inspects emu, ostrich, farm-raised venison, buffalo and other "exotic" animals. For more information about this service, contact the nearest regional office.

Performance based inspection system (PBIS)

The Division implemented this inspection method in 1995. PBIS is based on risk to consumers. Inspectors focus on tasks that may have an impact on public health. The intent is to conduct fewer inspections in plants that have high sanitation and facility standards and control over their production process, and more intense inspections in plants that have sanitation, facility or process control problems.

Ritual slaughter

DFS inspectors work with people who perform ritual slaughter to ensure their practices comply with state and federal standards for cleanliness, wholesomeness and safety while respecting the traditions of their culture. For more information about this program, call the Meat Safety and Inspection Bureau at 608-224-4700.

Brochures

DATCP Brochure: Wisconsin Retail Meat Label Requirements

Wisconsin Retail Meat Label Requirements

Raw and Ground Pork

Breaded raw pork, such as cutlets and chops, **must** be "Certified Pork." Certified pork is pork that has been treated to destroy any possible live *Trichinae.* This may only be done under state or federal meat inspection.

Some retail stores blend and sell ground pork and other meats in bulk packages or patties. These blends are often labeled "Meatloaf Mix," "Breakfast Sausage," or "Sausage for Pizza."

The United States Department of Agriculture requires that when ground meat mixtures contain pork and beef, veal, lamb, mutton or goat meat, and are prepared in such a way that they might be eaten rare or with inadequate cooking, they must be treated to destroy *Trichinae.* Stores have three ways they can satisfy the law:

- Purchase "certified" pork that has been treated to destroy possible live *Trichinae.*
- Reformulate the products to contain **only** pork.
- Reformulate the products so they contain **no** pork.

Ground meat mixtures stuffed in casings and which have a fresh appearance do not need to be treated for *Trichinae.* Customers easily identify the need for further cooking these products.

Products such as "mock chicken legs" which contain mixtures of pork and other meats or ground pork alone must be made with certified pork if they are sold "breaded."

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For more information, call:

Wisconsin Department of Agriculture, Trade and Consumer Protection
Division of Food Safety
8911 Agriculture Drive
P.O. Box 8911
Madison, WI 53708-8911
608-224-4700
http://datcp.state.wi.us

Labeling laws according to package type

Full service cases from bulk lots

All products must have a proper counter card that can be seen clearly and read easily by the customer. The card must include:

- The true name of the product
- An accurate ingredient list in descending order of predominance.

Example:

"Pork Sausage - Ingredients: Pork, water, salt, sugar, spices, BHA, BHT, citric acid"

Deli cases

An ingredient list for all meat products must be kept on file. They must be available on request for customers to read and inspect.

Self-service, prepackaged foods

Every package must have a label that contains:

- The true name of the product and contingent statement.
- The word "Ingredients" followed by an accurate list of ingredients contained in the product in descending order of predominance.
- The principal place of business or where the product was made, including address and zip code.
- An accurate statement of the product's net weight unless weighed at time of sale.
- A handling statement, such as "Keep Refrigerated," if it is perishable.

Sample meat label

Qualifying Statements

All products must be labeled the same as they come in from the federal- or state-inspected plant.

If you slice or repackage state- or federally-inspected products, you must transfer the information from those products to your label. The state or federal legend may not be transferred to products that are repackaged or further processed (sliced).

Ham and Picnic Products

Ham products must be identified as one of the four following products:

- Ham
- Ham, with natural juices
- Ham, water added
- Ham and water product, ( )% of weight added ingredients

Pork shoulder picnics must be identified as one of the three following products:

- Picnic
- Picnic, water added
- Picnic and water product, ( )% of weight added ingredients

Examples:

"Ham and water product (true name), ( )% of weight added ingredients (qualifying statement)"

"Ham (true name), water added (qualifying statement).

"Picnic and water product (true name), ( )% of weight added ingredients (qualifying statement)"

"Picnic (true name), water added (qualifying statement)"

Lean or Extra Lean Ground Beef

USDA regulations regarding ground beef labeling fall into one of the following three categories:

Terms like "Lean" and "Extra Lean" have nutrient requirements attached to them. They may only be used in labeling if the product meets the nutrient requirements.

Example:

- "Lean" claim – the product contains less than 10 grams of fat and less than 4.5 grams of saturated fat per 100 grams of the product.
- "Extra Lean" claim – the product contains less than 5 grams of fat and less than 2 grams of saturated fat per 100 grams of the product.

In addition, full nutritional labeling must be provided on the package.

Retailers may label different grades of ground beef, and indicate percentages of lean and fat, if the product is not described as "lean ground beef," "extra lean ground beef," "low fat," etc.

Example: Ground beef
85% lean and 15% fat

Please note that nutrition labels may not be used if ground beef is labeled this way.

Alternatively, retailers may still use the following terms in relation to grades of ground beef provided the products are ground from the beef chuck or beef round.

Example:

- Ground Beef Chuck
- Ground Beef Round

Department of Agriculture, Trade & Consumer Protection (DATCP) Rules and Regulations

Terry Burkhardt of DATCP recommended including in this publication two sections from state law. Readers should refer to the associated web pages for the most up-to-date status of these regulations. Section 42 of State statute 97 largely concerns inspection and licensing of meat plants. It is printed below and can also be found at: http://www.legis.state.wi.us/statutes/01Stat0097.pdf

Following 97.42 is the DATCP "administrative code" for meat and meat food products, Chapter ACTP 55. It is printed here in full and can also be found at: http://www.legis.state.wi.us/rsb/code/atcp/atcp055.pdf

Chapter 97 Food Regulation

97.42 Compulsory inspection of animals, poultry and carcasses. (1) DEFINITIONS. In this section:

(a) "Animal" means cattle, sheep, swine, goats, farm–raised deer, horses, mules, and other equines.

(b) "Capable of use as human food" applies to any carcass or part of a carcass of any animal or poultry or animal or poultry product unless it is denatured or otherwise identified as required by department rules, or is naturally inedible by humans.

(c) "Carcass" means all parts, including the viscera, of slaughtered animals and poultry that are capable of being used for human food.

(d) "Establishment" means a plant or premises, including retail premises, where animals or poultry are slaughtered for human consumption, or a plant or premises, including retail premises, where meat or poultry products or meat food products are processed, but shall not include:

1. Establishments subject to 21 USC 451 to 695.

2. Establishments subject to county or municipal meat and poultry inspection if such inspection is conducted pursuant to ordinances and regulations which are substantially equivalent to this section and which are enforced with equal effectiveness, and the inspection service is specifically approved by the department; however, sub. (2) shall apply to establishments subject to county or municipal meat and poultry inspection.

3. Premises of a person who is the owner of the animals to be slaughtered or of carcasses to be processed, and the resulting product is for exclusive use by him or her and members of his or her household and his or her nonpaying guests and employees.

(dm) "Farm–raised deer" has the meaning given in s. 95.001

(1) (ag).

(e) "Inspector" means any person employed by the department or any cooperating agency who is authorized by the department to do any work or perform any duty in connection with the department's meat and poultry inspection program.

(f) "Meat broker" means any person engaged in the business of buying or selling meat and poultry products, or meat and poultry food products on commission, or otherwise negotiating purchases or sales of such articles other than for the person's own account or as an employee of another person.

(fm) "Meat distributor" means a person who is engaged in the business of distributing in this state meat and poultry products at wholesale.

(g) "Meat food products" means any article capable of use as human food which is derived or prepared in whole or in substantial and definite part from meat products or poultry products.

(h) "Meat products" and "poultry products" means the carcasses or any parts of carcasses of animals and poultry capable of use as human food.

(i) "Mobile processor" means a person who provides a meat processing service to the general public for compensation other than the

trading of services on an exchange basis, and conducts the meat processing at the premises of the owner of the carcasses being processed.

(j) “Mobile slaughterer” means a person who provides a slaughtering service to the general public for compensation other than the trading of services on an exchange basis, and conducts such slaughtering at the premises of the owners of the animals being slaughtered.

(k) “Official inspection mark” means the symbol formulated under the rules of the department to state that the meat, poultry or product was inspected pursuant to such rules.

(L) “Poultry” means any domesticated fowl, including but not limited to chickens, turkeys, geese, ducks or guineas, but shall not include commercially produced game birds.

(m) “Unwholesome” means:

1. Unsound, injurious to health or otherwise rendered unfit for human food.

2. Consisting in whole or in part of any filthy, putrid or decomposed substance.

3. Processed, prepared, packed or held under unsanitary conditions whereby a carcass or parts thereof, or any meat or poultry product, may have become contaminated with filth or become injurious to human health.

4. Produced in whole or in part from diseased animals or poultry, except when such disease does not ordinarily render the carcasses of such animals or poultry unfit for human consumption, or from animals or poultry which have died otherwise than by slaughter.

(n) “Veterinarian” means a graduate veterinarian of an accredited school of veterinary medicine who is qualified on the basis of training and experience, as determined by the department.

(o) “Wholesome” means sound, healthful, clean and otherwise fit for human food.

(2) LICENSE; CERTIFICATE OF REGISTRATION.
(a) No person may operate an establishment as defined in sub. (1) (d) without a valid license issued by the department for each such establishment. That license expires on June 30 annually. No license may be issued unless the applicant has complied with the requirements of this section. The annual license fee is $200, except the annual license fee shall be $80 for those establishments engaged only in slaughtering uninspected animals or poultry or processing uninspected meat as a custom service, and not in other operations subject to a license under this section. No person may be required to obtain a license under s. 97.29 or 97.30 for activities licensed under this section or which is inspected under 21 USC 451 to 695.

(b) Paragraph (a) does not apply to any person operating an establishment that only processes meat or poultry products, or meat or poultry food products, for sale directly to consumers at retail on the premises where the products were processed if only inspected meat is permitted on the premises and sales to restaurants and institutions are restricted to 25% of the volume of meat sales or $28,800 annually, whichever is less. No person exempt from licensure under this paragraph may sell any cured, smoked, seasoned, canned or cooked meat food products produced by that person to restaurants or institutions.

(c) No person may operate as a mobile slaughterer or as a mobile processor without an annual registration certificate issued by the department, except that no registration certificate is required for a mobile slaughterer or a mobile processor who holds a license issued under par. (a). A registration certificate expires on June 30, annually. An application for an annual registration certificate shall be submitted on a form provided by the department and shall include information reasonably required by the department for registration purposes. The department shall promulgate rules regulating mobile slaughterers and mobile processors, including rules related to facilities, sanitation, identification of carcasses and record keeping.

(d) No person may operate as a meat broker or meat distributor without an annual registration certificate issued by the department, except that no registration certificate is required for a meat broker or a meat distributor who holds a license issued under par.

(a). A registration certificate expires on June 30, annually. An application for an annual registration certificate shall be made on a form provided by the department and shall include information reasonably required by the department for registration purposes.

(3) STATE INSPECTION.
(a) Examination before slaughter. For the purpose of preventing the sale and use in this state of meat products and poultry products which are unwholesome or otherwise unfit for human food, the department shall cause to be made, by inspectors who may be veterinarians on either a full–time or part–time basis under supervision of the department, examination and inspection of all animals and poultry before they are slaughtered in any establishment, except as provided in pars. (d) and (em). All animals and poultry found on such inspection to show symptoms of disease shall be condemned or set apart and slaughtered separately from all other animals and poultry, and when so slaughtered the carcasses thereof shall be subject to careful examination, inspection and disposition, in accordance with rules issued by the department.

(b) *Examination after slaughter*. For the purpose stated in par.

(a), the department shall cause to be made, by inspectors under supervision of the department, who may be veterinarians on either a full–time or part–time basis, an examination and inspection of the carcasses and parts thereof of all animals and poultry slaughtered at any establishment, except as provided in pars. (d) and (em). The carcasses and parts thereof of all animals and poultry found to be wholesome and fit for human food shall be marked, stamped, tagged or labeled by inspectors as “Wis. Inspected and passed”. Inspectors shall mark, stamp, tag or label as “Wis. Inspected and condemned” all carcasses and parts thereof of animals and poultry found to be unwholesome or otherwise unfit for human food, and all carcasses and parts thereof so inspected and condemned shall be destroyed, in accordance with rules issued by the department. Inspection marks, stamps, tags and labels shall be prescribed by the department and shall include thereon the identification number of the establishment assigned by the department.

(c) *Reexaminations.* Inspectors shall, when deemed advisable, reinspect carcasses, parts thereof or meat food products to determine whether the same have become unwholesome or in any other way unfit for human food. If any carcasses, parts thereof or meat food products, upon a reexamination, are found to be unwholesome or otherwise unfit for human food, they shall be destroyed, in accordance with rules issued by the department.

(d) *Custom service slaughtering.* This subsection shall not apply to animals and poultry slaughtered as a custom service for the owner exclusively for use by the owner and members of the owner’s household and the owner’s nonpaying guests and employees, unless department inspection is specifically requested and performed at establishments where examinations before and after slaughter are required. The rules of the department shall make provision for the furnishing of such inspection service, subject to availability of inspector personnel, and for the identification of all animals and poultry custom slaughtered for the owners thereof without department inspection.

(e) *Periodic inspections.* The department shall make periodic inspections of construction, operation, facilities, equipment, labeling, sanitation and wholesomeness of meat and poultry products, and meat food products at establishments or any other premises, including vehicles engaged in transportation of such products. Inspection of products and plant operations shall cover such operations as cutting and boning, curing and smoking, grinding and fabrication, manufacturing, packaging, labeling, storage and transportation. Periodic inspections of processing operations shall be conducted as uniformly as possible among establishments subject to overtime inspection under sub. (4) (f) to avoid the imposition of undue inspection fees against any establishment. Inspections at overtime rates shall only be held where necessary to assure wholesomeness and safety of products and compliance with the requirements of this section and rules of the department.

(em) *Slaughter of farm - raised deer*. The requirements of pars.

(a) and (b) do not apply to the slaughter of a farm–raised deer if its meat food products are not sold by a person holding a restaurant permit under s. 254.64 or by an operator of a retail food establishment, as defined under s. 97.30 (1) (c). The operator of an establishment in which farm–raised deer, their carcasses or their meat food products are examined and inspected under this subsection shall pay the department for the cost of the department's examination and inspection.

(f) *Label requirements.* In addition to label requirements otherwise provided by law, meat food products shall bear a label, stamp, mark or tag including thereon the official inspection mark and identification number of the establishment where processed. Meat and poultry products processed and sold at retail to household consumers on the premises shall not require official inspection marks and identification numbers.

(4) RULES. The department may issue reasonable rules requiring or prescribing any of the following:

(a) The inspection before and after slaughter of all animals and poultry killed or dressed for human consumption at any establishment.

(b) The inspection and marking of carcasses or parts thereof intended for human consumption, and prohibiting the unauthorized use of any official inspection mark or simulation or counterfeit thereof.

(c) The use of the official inspection mark by county and municipal inspection services approved by the department.

(d) The seizure, retention and destruction for human consumption of any animal or poultry, carcasses, parts thereof, or meat food products which have not been inspected or passed or are unwholesome or adulterated or misbranded.

(e) The hours and days in each week when slaughtering or processing may be conducted in any establishment subject to a license under sub. (2). The schedules so fixed shall be as nearly as possible in accord with existing industry standards of establishments subject to inspection. However, in order to avoid excessive costs for inspection and stay within the limit of appropriations, the schedules may require that:

1. Slaughtering or processing be conducted continuously during successive days and hours of the regular workweek for state employees;

2. The rate of slaughter for the different classes of animals and poultry conform to reasonable minimums per hour;

3. Inspection of animals and poultry slaughtered as a custom service be restricted to the time of the regular slaughter schedule fixed for the establishment. When inspection is provided for custom slaughtering and custom processing the inspection shall be conducted in accordance with sub. (3) (a) to (c) and rules prescribed under this subsection; and

4. The department be notified a reasonable time in advance of any deviation from existing schedules or when slaughtering or processing is to be conducted at times other than those specified under regularly established schedules.

(em) The rate at which an operator of an establishment that slaughters farm–raised deer or processes the meat products of farm–raised deer shall pay the costs of examination and inspection under sub. (3) (em) and the manner in which the department shall collect those amounts.

(f) Overtime agreements with the department whereby the operator of any establishment subject to a license under sub. (2), agrees to pay the cost for salaries, at overtime rates, and other expenses of department inspectors whenever slaughtering, carcass preparation, or the processing of meat or poultry products or meat food products is conducted beyond hours or days limited under par. (e), or on Saturdays, Sundays or holidays for state employees under s. 230.35 (4), or before 6 a.m. or after 6 p.m., or in excess of 40 hours in any week. Overtime charges for periodic inspections under sub. (3) (e) shall, insofar as possible, be limited to the minimum number of hours reasonably required for the conduct of such inspections. The department may assess overtime charges under this paragraph even though the department provides compensatory time in lieu of overtime compensation under s. 103.025.

(g) Specifications and standards for location, construction, operation, facilities, equipment and sanitation for any premises, establishment or mobile facility where slaughter or processing is carried on, including custom slaughtering of animals or poultry and custom or retail processing of meat and poultry products.

(h) Conditions of sanitation under which carcasses, parts of carcasses, poultry and meat and poultry products shall be stored, transported or otherwise handled by any person engaged in the business of buying, selling, freezing, storing, transporting or processing such products.

(i) Record–keeping requirements for persons engaged in slaughtering or processing operations, or in the storage or transportation of meat, poultry, or meat food products, including record–keeping requirements for meat brokers and the registration of meat brokers with the department.

(j) Any other rules reasonably necessary to the administration and enforcement of this section.

(4m) FEDERAL REQUIREMENTS. Except as provided in rules promulgated under sub. (4), the operator of an establishment that is required to be licensed under this section shall comply with 9 CFR parts 307 to 311, 313 to 315, 317 to 319, 416 and 417 and part 381 subparts G, H, I, J, K, L, O and P as they apply to federally licensed establishments.

(5) COUNTY AND MUNICIPAL INSPECTIONS.
(a) The department may enter into cooperative agreements with counties and municipalities for inspection and enforcement services required by this section and by approved meat and poultry inspection ordinances and regulations. Employees of counties and municipalities while performing such inspection and enforcement work shall have the same enforcement authority, within such counties or municipalities, as that granted to the department and its authorized agents.

(b) No county or municipality may collect any fees or charges for meat or poultry inspection or enforcement from any licensee under this section, except for overtime inspection work and the inspection of farm–raised deer. Charges for overtime or for the inspection of farm–raised deer shall be on the same basis as and shall not exceed charges for overtime work or for the inspection of farm–raised deer prescribed by this section or by the rules of the department.

(6) PROHIBITIONS.
(a) No person shall slaughter any animals or poultry for the purpose of selling the meat products or poultry products thereof for human food, or sell, offer for sale or have in his or her possession with intent to sell such meat products or poultry products for human food, unless such animals and poultry and the carcasses thereof have been first inspected and approved as provided by any of the following:

1. This section and the rules issued thereunder.
2. The federal meat inspection act.
3. The federal poultry products inspection act.
4. County or municipal ordinances or regulations which are substantially equivalent to this section and which are enforced with equal effectiveness, if the inspection service is specifically approved by the department.

(b) No person shall sell, offer for sale or have in possession with intent to sell any meat or poultry products, or meat food products unless they have been processed in accordance with this section, the federal meat inspection act, or county or municipal ordinances approved by the department.

(c) No person shall slaughter horses, mules or other equines or process equine carcasses or meat at establishments where other animals or poultry are slaughtered or where other meat or poultry products are processed.

(d) No county or municipality shall prohibit the sale of any meat products or poultry products if such meat products or poultry products are inspected and passed by the department, or by the U.S. department of agriculture, or by a county or municipal inspection service approved by the department, provided such meat products and poultry products are wholesome and not misbranded at the time of sale.

(7) RIGHT OF ACCESS. No person shall prevent or attempt to prevent an inspector or other officer or agent of the department from

entering, at any time, any establishment or any other place where meat products or poultry products, or foods derived therefrom, are processed, sold or held for sale, for the purpose of any examination, inquiry or inspection in connection with the administration and enforcement of this section. The examination, inquiry or inspection may include taking samples, pictures and documentary and physical evidence pertinent to enforcement of this section.

(8) INTERFERENCE WITH INSPECTION. Any person who forcibly assaults, threatens, obstructs, impedes, intimidates or interferes with any person while engaged in the performance of his or her official duties under this section shall be fined not more than $5,000 or imprisoned in the county jail not to exceed one year or both.

(9) TAGGING OF FACILITIES, EQUIPMENT AND PRODUCT.
(a) When in the opinion of the department, the use of any equipment, compartment, room or facilities which is unclean or unsanitary or improperly constructed could lead to contamination of the product, the department may attach a "Rejected" tag to it. No equipment, utensil, container, compartment, room or facility so tagged may be used until made acceptable and released by a department representative, or until such equipment is replaced with acceptable equipment.

(b) 1. When in the opinion of the department any carcass, meat or poultry product, meat food product, or supplies or ingredients used in the processing thereof may be unwholesome, adulterated or misbranded, or otherwise fail to meet standards or requirements of this section or rules adopted under this section, the department may tag them with a "Retained" tag to hold them for further inspection, analysis or examination. No carcass, meat or poultry product, meat food product, or supplies or ingredients so tagged may be used, removed from the premises or otherwise disposed of unless released by a department representative. Such products may not be retained for more than 30 days without prior notice to the owner or custodian and the right to an immediate hearing.

2. When in the opinion of the department any carcass, meat or poultry product, or supplies or ingredients used in the processing thereof is unwholesome, adulterated or misbranded, or otherwise fail to meet standards or requirements of this section or rules adopted under this section, the department may tag them with a "Detained" tag to hold them for destruction or other disposition. No carcass, meat or poultry product, meat food product, or supplies or ingredients so tagged may be used, removed from the premises or otherwise disposed of unless released by a department representative. Such products may not be destroyed or detained for more than 30 days without prior notice to the owner or custodian and the right to an immediate hearing.

(c) No person may alter, deface or remove any tag from facilities, equipment, products or supplies to which it has been attached by a department inspector without the express consent or approval of the inspector or other department representative.

(10) SUSPENSION. The department may, upon written notice, summarily suspend the operations in whole or in part at any establishment for substantial violations of this section or rules issued hereunder when, in the opinion of the department, a continuation of the operation would constitute an imminent danger to public health. The department may summarily suspend inspection at any establishment for acts punishable under sub. (8) where such acts substantially impair an inspector's ability to conduct an orderly inspection. Upon suspension of operations or inspection, the operator of the establishment may demand a hearing to determine whether the suspension should be vacated. The department shall, within 5 days after receipt of such demand, hold a hearing and adjudicate the issues as provided in ch. 227. A demand for hearing shall not, however, operate to stay the suspension pending the hearing.

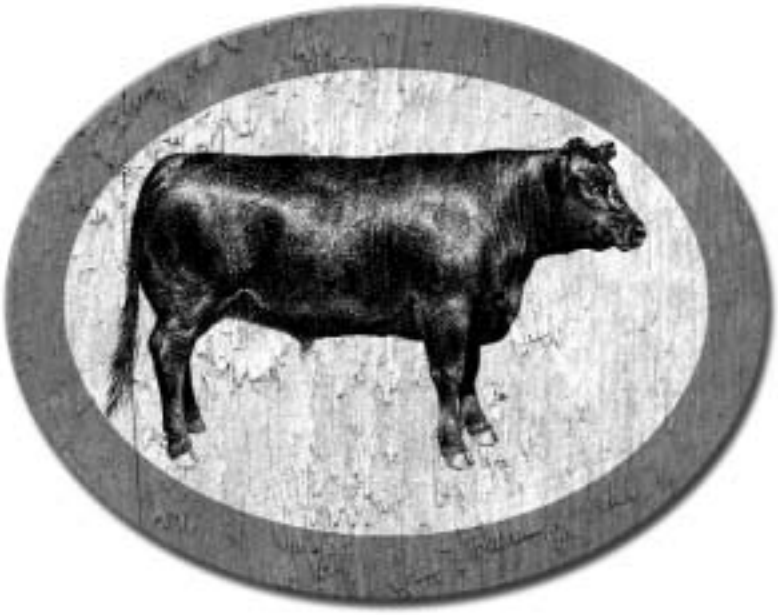
(11) EXEMPTION. This section shall not apply to owners of poultry with respect to poultry produced on the owner's farm, provided his or her sales do not exceed 1,000 fowl annually, and the birds are labeled and tagged to identify the name and address of the producer and are marked "NOT INSPECTED". Persons

processing more than 1,000 fowl but less than 20,000 fowl shall be fully subject to the provisions of this section relating to licensing, sanitation, facilities and wholesomeness of product. If the department determines that the protection of consumers from unwholesome poultry products will not be impaired, it may exempt such persons from sub. (3) (a) and (b) provided the birds are labeled or tagged to identify the name and address of the producer and are marked “NOT INSPECTED”.

(12) SUBSTANTIAL OR REPEATED VIOLATIONS. The department may deny, revoke or suspend the license of any person for substantial or repeated violations of this section.

History: 1971 c. 270 s. 104; 1973 c. 206; 1975 c. 308, 421; 1977 c. 196 s. 131; 1977 c. 216, 365; 1979 c. 110, 154; 1981 c. 314; 1983 a. 189, 261; 1983 a. 500 s. 44; 1985 a. 29; 1987 a. 399; 1989 a. 174; 1991 a. 39, 175, 269; 1993 a. 16, 27, 144, 492; 1995 a. 79, 225; 1999 a. 9, 185; 2001 a. 56.

Cross Reference: See also chs. ATCP 55, 56, and 57, Wis. Adm. Code.



Chapter ACTP 55

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Chapter ATCP 55

MEAT AND MEAT FOOD PRODUCTS

ATCP 55.01 Scope.
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ATCP 55.10 Meat labels and formulas.
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Note: Chapter ATCP 55 as it existed on March 31, 2002 was repealed and a new chapter ATCP 55 was created, Register March 2002 No. 555, effective April 1, 2002.

Note: Chapter Ag 47 as it existed on September 30, 1971 was repealed and a new ch. Ag 47 was created, Register, September, 1971, No. 189, effective October 1, 1971; chapter Ag 47 was renumbered ch. ATCP 55 under s. 13.93 (2m) (b) 1., Stats., Register, March, 1993, No. 447.

ATCP 55.01 Scope. (1) GENERAL. Except as provided in sub. (2), this chapter applies to persons who slaughter food animals for human consumption, who submit food animals for slaughter for human consumption, or who process, store, transport, sell or distribute meat or meat food products for human consumption. This chapter applies to slaughter and processing establishments, mobile custom slaughterers and processors, food warehouses and locker plants, meat distributors and transporters, meat brokers, food retailers and central restaurant commissaries that engage in activities covered by this chapter.

(2) EXEMPTIONS. This chapter does not apply to any of the following:

(a) A restaurant, vending machine commissary or catering establishment licensed and inspected by the department of health and family services or its agent, provided that the following apply:

1. The establishment processes no meat other than state or federally inspected meat.

2. The establishment sells meat only as part of a meal.

3. Meat processing is confined to the premises where the meat is served as part of a meal or, in the case of a vending machine commissary or catering establishment, to the premises where meals are prepared for catered service or vending machine service to individual consumers.

(b) Establishments inspected by the United States department of agriculture under 21 USC 451 to 695.

(c) An individual slaughtering or transporting his or her own animals, or processing or transporting his or her own meat, for his or her own consumption. An individual's own consumption may include consumption by the individual's immediate family, immediate household and nonpaying guests.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.02 Definitions. In this chapter:

(1) "Ante mortem inspection" means a pre–slaughter inspection of a live food animal.

(2) "Captive game animals" means bison, white–tail deer and other animals of a normally wild type that are produced in captivity for slaughter and consumption. "Captive game animals" does not include farm–raised deer, ratites, captive game birds, fish, or animals kept solely for hunting purposes at a hunting preserve.

(3) "Captive game birds" means birds of a normally wild type, such as pheasants, quail, wild turkeys, migratory wildfowl and exotic birds, that are produced in captivity for slaughter and consumption. "Captive game birds" does not include poultry, ratites, or birds kept solely for hunting purposes in a hunting preserve.

(4) "Carcass" means all edible parts of a slaughtered animal, including edible viscera.

(5) "Custom processing" means processing meat as a custom service for an individual who owns that meat, and who uses all the resulting meat or meat food products for his or her own consumption. An individual's own consumption may include consumption by the individual's immediate family, immediate household and nonpaying guests. "Custom processing" includes mobile custom processing.

Note: A provider of custom processing services does not "sell" the slaughtered food animal or the resulting meat, but merely provides a service to the meat owner.

(6) "Custom slaughter" means slaughtering a food animal as a custom service for an individual who owns that animal, and who uses all the resulting meat or meat food products for his or her own consumption. An individual's own consumption may include consumption by the individual's immediate family, immediate household and nonpaying guests. "Custom slaughter" includes mobile custom slaughter.

Note: A provider of custom slaughtering services does not "sell" the slaughtered food animal or the resulting meat, but merely provides a service to the animal owner.

(7) "Department" means the state of Wisconsin department of agriculture, trade and consumer protection.

(8) "Diseased animal" means an animal that has been diagnosed with a disease not known to be cured, or that has exhibited signs or symptoms of a disease not known to be cured. "Diseased animal" does not include an otherwise healthy animal that suffers only from injuries such as fractures, cuts or bruises.

(9) "Domesticated food animal" means any of the following:

(a) Cattle.

(b) Swine.

(c) Poultry.

(d) Sheep.

(e) Goats.

(f) Farm–raised deer.

(g) Horses, mules and other equines.

(10) "Edible" means edible by humans.

(11) "Farm–raised deer" has the meaning given in s. 95.001 (1) (a), Stats. "Farm–raised deer" does not include captive white–tail deer.

(12) "Food animals" means domesticated food animals, ratites, captive game animals and captive game birds.

(13) "Individual" means a natural person.

(14) "Livestock" means domesticated food animals other than poultry.

(15) "Meat" means the edible muscle and other edible parts of a food animal, including edible skeletal muscle, edible organs, and edible muscle found in the tongue, diaphragm, heart or esophagus. "Meat" includes edible fat, bone, skin, sinew, nerve or blood vessel that normally accompanies meat and is not ordinarily removed in processing.

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(16) "Meat broker" means a person who, without taking title to meat or meat food products, arranges the purchase or sale of meat or meat food products.

(17) "Meat distributor" means a person who distributes meat or meat food products at wholesale.

(18) "Meat establishment" means a plant or fixed premises used to slaughter food animals for human consumption, or to process meat or meat food products for human consumption.

(19) "Meat food product" means any edible product derived in whole or in substantial and definite part from meat.

(20) "Mobile custom processing" means custom processing meat for another person at that person's premises.

(21) "Mobile custom slaughter" means custom slaughtering a food animal for another person at that person's premises.

(22) "Person" means an individual, corporation, partnership, cooperative association, limited liability company, trust, or other organization or entity.

(23) "Post mortem inspection" means the post–slaughter inspection of a slaughtered food animal's carcass.

(24) "Poultry" means domesticated fowl commonly used for human food, including domesticated chickens, turkeys, geese, ducks, guinea fowl and squab. "Poultry" does not include ratites or captive game birds.

(25) "Process" means to cut, grind, manufacture, compound, intermix or prepare meat or meat food products.

(26) "Ratite" means a member of the group of flightless birds that includes the ostrich, emu, cassowary, kiwi and rhea.

(27) "Sanitize" means to destroy pathogens and other microorganisms, to the maximum practicable extent, by applying an approved sanitizer or sanitizing method to food contact surfaces of equipment, utensils or food packages that are otherwise clean.

(28) "Sell" means to transfer ownership for a price, or to advertise, offer, hold or distribute for sale.

(29) "Unwholesome" has the meaning given in s. 97.42 (1) (m), Stats.

(30) "Veterinarian" has the meaning given in s. 97.42 (1) (n), Stats.

(31) "Wholesome" has the meaning given in s. 97.42 (1) (o), Stats.

(32) "Wild game" means edible wild animals other than fish. "Wild game" does not include any of the following:

(a) Captive game animals or captive game birds.

(b) Farm–raised deer.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.03 Meat establishment license. **(1)** ANNUAL LICENSE REQUIRED. Except as provided in sub. (2), no person may operate a meat establishment without a current annual license from the department. A license expires on June 30 of each year. A person who operates more than one meat establishment shall hold a current annual license for each meat establishment. A license may not be transferred between persons or meat establishments.

(2) LICENSE EXEMPTIONS. The license requirement under sub. (1) does not apply to any of the following:

(a) Slaughter or processing operations inspected by the United States department of agriculture under 21 USC 451 to 695.

(b) Mobile custom slaughter or mobile custom processing operations.

(c) The custom slaughter or custom processing of captive game animals or captive game birds.

Note: Under s. 97.42 (3), Stats., the department provides ante mortem and post mortem inspection services only to licensed meat establishments. According to federal law and s. ATCP 55.04, captive game animals and captive game birds must be slaughtered subject to ante mortem and post mortem inspection if they are slaughtered *for sale* for human consumption. This slaughter inspection requirement does not apply to the custom slaughter of captive game animals or captive game birds.

(d) A person slaughtering and processing poultry produced on that person's farm, provided that all the following apply:

1. The person slaughters and processes no more than 1,000 poultry per year.

2. The person slaughters, processes and sells the poultry at the farm where they are produced.

3. The person clearly and conspicuously labels each package or container of poultry meat with the person's name and address and the words "NOT INSPECTED."

Note: See s. 97.42 (11), Stats.

(e) A retail establishment that processes meat or meat food products primarily for sale to individual consumers at the retail establishment, provided that all the following apply:

1. The retail establishment is not engaged in slaughter operations.

2. The retail establishment sells the processed meat and meat food products only to individual consumers at the retail establishment, or to restaurants or institutions for use in meals served at those restaurants or institutions.

3. The retail establishment's sales of its processed meat and meat food products to restaurants or institutions do not exceed $28,800 annually, or 25% by dollar volume of all meat sales from the retail establishment, whichever is less.

Note: The scope of the federal exemption under 7 CFR 303.1 does not affect the scope of the state licensing exemption under this paragraph.

4. The retail establishment receives meat only from meat establishments licensed under this section or inspected by the United States department of agriculture under 21 USC 451 to 695.

5. The operator of the retail establishment does not sell, to any person other than an individual consumer, any meat or meat food product that is cured, smoked, seasoned, canned or cooked at the retail establishment.

6. The operator of the retail establishment does not sell, to any person other than an individual consumer, any meat food product made by combining meat from different animal species at the retail establishment.

(3) LICENSE APPLICATION. A person shall apply for a meat establishment license on a form provided by the department. The application shall include all the following:

(a) The applicant's correct legal name, and any trade name under which the applicant proposes to operate a meat establishment.

(b) The applicant's social security number if the applicant is an individual.

Note: See s. 93.135 (1) (im), Stats.

(c) The address of each meat establishment.

(d) For each meat establishment, a proposed slaughter and processing schedule under sub. (12) (a).

(e) Other relevant information required by the department.

(f) The fees required under sub. (4).

(4) LICENSE FEES. A person shall pay a $200 annual license fee for each licensed meat establishment, except that the person shall pay an annual license fee of $80 if the person is solely engaged in custom slaughtering or custom processing operations at that meat establishment.

(5) PRE–LICENSE INSPECTION. Before the department issues a license for a new meat establishment, or issues a license to a new operator of an existing meat establishment, the department shall inspect that meat establishment. The department shall perform the inspection within 30 days after the operator applies for the license, unless the applicant agrees to a later inspection date.

Note: The department may inspect any meat establishment, regardless of whether an inspection is required under sub. (5).

(6) ACTION ON LICENSE APPLICATION. (a) Except as provided in par. (b), the department shall grant or deny an annual meat establishment license application within 30 days after the department receives a complete application.

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(b) If sub. (5) requires a pre- license inspection, the department shall grant or deny the license application within 30 days after the department performs that inspection.

(c) If the department denies a meat establishment license application, the department shall give the applicant written notice of the reasons for that denial.

(7) DENYING, SUSPENDING OR REVOKING A LICENSE. The department may deny, suspend or revoke a meat establishment license for cause, as provided in ss. 93.06 (7), 97.42 (10) and 97.42 (12), Stats. Cause may include a violation of this chapter.

Note: The procedure for suspending or revoking a license, or for contesting a license denial, is set forth in ch. ATCP 1.

(8) CONDITIONAL LICENSE. The department may issue a meat establishment license subject to conditions, or may impose conditions on an existing license, as provided in s. 93.06 (8), Stats.

Note: The procedure for imposing conditions on an existing license, or for contesting license conditions, is set forth in ch. ATCP 1.

(9) LICENSE DISPLAYED. A person holding a meat establishment license shall display that license in a prominent location at the licensed meat establishment.

(10) MEAT ESTABLISHMENT NUMBER. The department shall assign, to each licensed meat establishment, a meat establishment number that uniquely identifies that meat establishment.

(11) PROCESSING WILD GAME. (a) Except as provided in par. (b), no person may slaughter or process any animals other than food animals at a meat establishment.

(b) A meat establishment operator may custom process legally harvested wild game at a meat establishment if all the following apply:

1. The operator notifies the department that the operator plans to custom process wild game at that meat establishment. Notice shall specify the type of wild game to be processed. The department may restrict wild game processing that is incompatible with the slaughter or processing of food animals.

2. The operator accepts only clean and apparently wholesome wild game carcasses for custom processing.

3. The operator, when custom processing wild game, complies with processing, labeling and record keeping requirements applicable to the custom processing of food animals under s. ATCP 55.08.

4. The operator custom processes wild game only at times when the operator is not engaged in slaughtering or processing food animals. The operator shall thoroughly clean and sanitize equipment and utensils used to process wild game before using the same equipment or utensils to slaughter or process food animals or the meat of food animals.

5. The operator keeps wild game and wild game products separate from all other meat and meat food products in the meat establishment.

6. The operator clearly labels wild game products, so they cannot be confused with other meat or meat food products. Wild game products shall be clearly identified by species.

7. The operator handles, processes and stores wild game and wild game products in a manner that prevents contamination of other meat and meat food products.

(12) SLAUGHTER AND PROCESSING SCHEDULE. (a) A person applying for a meat establishment license shall include, with the license application, a proposed slaughter and processing schedule. A meat establishment operator need not include a schedule with a license renewal application if there has been no change in the schedule last established for the meat establishment under this subsection.

(b) A schedule under par. (a) shall specify the days of each week, and the hours of each day, during which the applicant proposes to engage in each of the following activities at the meat establishment:

1. Slaughter food animals to produce meat or meat food products for sale.

2. Process meat or meat food products for sale.

3. Custom slaughter food animals, or custom process meat or meat food products.

4. Custom process wild game, as provided in sub. (11).

(c) The department may require a change in a slaughtering and processing schedule under this subsection if any of the following apply:

1. A change is needed in order to make slaughter inspection services available, or to make efficient use of the department's slaughter inspection staff.

2. The operator proposes to process wild game during times also scheduled for the slaughter or processing of food animals.

Note: Sub. (11) (b) 4. prohibits simultaneous processing of wild game and food animals.

3. The operator proposes to engage in custom slaughter or processing operations during times also scheduled for the slaughter of food animals for sale, or the processing of meat for sale.

Note: A meat establishment operator may not engage in custom slaughter or custom processing operations while the operator is simultaneously slaughtering food animals for sale, or simultaneously processing the meat of food animals for sale. There are exceptions for *inspected* custom operations, and for simultaneous operations that are physically separated to prevent cross-contamination and commingling. The department may disapprove a simultaneous schedule if these exceptions do not apply. See s. ATCP 55.08 (3).

(d) A meat establishment operator may not deviate from a schedule established under this subsection, without prior department approval.

History: CR 01-042: cr. Register March 2002 No. 555, eff. 4-1-02.

ATCP 55.04 Slaughter inspection; general. **(1)** SLAUGHTER INSPECTION REQUIRED. (a) Except as provided in par. (b) or (c), no person may sell any meat from any food animal for human consumption unless the department or the United States department of agriculture has conducted a slaughter inspection of that food animal. The slaughter inspection shall include an ante mortem inspection of the live food animal, and a post mortem inspection of the food animal carcass.

Note: Slaughter inspection is not required for custom slaughtered animals, because there is no sale of meat. Federal law prohibits the interstate sale of meat from animals slaughtered under state (rather than federal) inspection. But this federal prohibition does not apply to meat from farm raised deer, captive game animals or captive game birds.

(b) Paragraph (a) does not apply to a person selling meat from a captive game animal or captive game bird if neither the department nor the United States department of agriculture has established ante mortem or post mortem inspection procedures for that type of captive game animal or captive game bird.

Note: The exemption under par. (b) is very limited, because the department and USDA *have established* inspection standards for most captive game animals and game birds.

(c) Paragraph (a) does not apply to a person selling meat from not more than 1,000 poultry per year, provided that all the following apply:

1. The person produces all of those poultry on his or her farm.

2. The person slaughters, processes and sells the poultry at the farm where they are produced, or has them slaughtered and processed at a licensed meat establishment.

3. The person clearly and conspicuously labels each package or container of poultry meat with the person's name and address and the words "NOT INSPECTED."

Note: See s. 97.42 (11), Stats.

(2) SLAUGHTER INSPECTION PROVIDED TO LICENSED MEAT ESTABLISHMENTS. (a) The department shall provide ante mortem and post mortem slaughter inspection services to operators of meat establishments licensed under s. ATCP 55.03. The department may not provide slaughter inspection services to other persons.

(b) A meat establishment operator requesting slaughter inspection services shall submit the request to the department in

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writing, and shall specify a proposed slaughter schedule according to s. ATCP 55.03 (12) (b). The department may require a different schedule, as provided in s. ATCP 55.03 (12) (c). The meat establishment operator may not deviate from the specified schedule without prior department approval, as provided in s. ATCP 55.03 (12) (d).

(3) SLAUGHTER INSPECTION SITE. (a) The department may not perform a slaughter inspection at any place other than a meat establishment licensed under s. ATCP 55.03, except that the department may agree to perform field ante mortem inspections on any of the following:

1. Apparently healthy farm–raised deer or captive game animals that cannot be safely or humanely transported to a licensed meat establishment for ante mortem inspection.

2. Apparently healthy domesticated food animals, if special circumstances prevent the transportation of those animals to a licensed meat establishment for ante mortem inspection.

(b) The department may not perform field ante mortem inspections under par. (a) on diseased animals, or on animals that cannot stand or walk.

(c) If an animal passes a field ante mortem inspection under par. (a), the operator of a meat establishment licensed under s. ATCP 55.03 may stun and bleed the animal in the field. The operator shall bleed the animal immediately after stunning, and shall immediately transport the carcass to the meat establishment for skinning, post mortem inspection and processing. The operator shall transport the carcass in compliance with s. ATCP 55.11. The inspector shall identify the carcass and monitor the carcass shipment, as necessary, to ensure compliance with this paragraph.

(4) SLAUGHTER INSPECTION CHARGES, WHEN REQUIRED. The department shall provide slaughter inspection services under subs. (2) and (3) without charge, except that the department shall charge a meat establishment operator for slaughter inspection services if any of the following apply:

(a) The inspection pertains to a captive game animal or captive game bird.

(b) The department performs the inspection on any of the following days, or at any of the following times:

1. Days or times not included in the normal slaughter schedule under sub. (2).

2. Before 6:00 a.m. or after 6:00 p.m.

3. Any time in excess of 40 hours in any calendar week.

4. Saturday or Sunday.

5. The holidays of New Year's Eve, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Eve or Christmas Day. If any of these holidays falls on Sunday, the following Monday is considered the holiday.

6. Any day that is an official holiday for state employees.

(5) SLAUGHTER INSPECTION CHARGES; AMOUNT. (a) If sub. (4) requires a meat establishment operator to pay for slaughter inspection services, the department shall bill and the operator shall pay uniform hourly charges for those services. The department shall establish uniform hourly charges based on the department's statewide average cost to provide inspection services. The department may establish higher hourly charges for inspections that must be provided by veterinarians.

Note: A veterinarian must inspect animals that cannot stand or walk, and animals found to be suspect on ante mortem examination. See ss. ATCP 55.07 (8) and 55.05 (2).

(b) The department shall notify a meat establishment operator of the applicable hourly charge before providing an inspection service requiring a charge under sub. (4). The department shall give at least 30 days prior written notice before increasing hourly charges under an ongoing inspection agreement.

(6) SLAUGHTER INSPECTION PROCEDURES. Slaughter inspection procedures shall comply with this chapter, including ss. ATCP 55.05 to 55.07.

(7) INSPECTOR ABSENCE. A meat establishment operator shall immediately notify the department if a department inspector fails to appear for a scheduled ante mortem or post mortem inspection required under sub. (1). The department shall provide an inspector as soon as possible, so that slaughter may proceed in a timely manner.

(8) WITHDRAWING SLAUGHTER INSPECTION. The department may withdraw slaughter inspection for cause, including violations of this chapter. No person may conduct slaughter operations for which department inspection is required under this chapter while those services are withdrawn.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.05 Ante mortem inspection. (1) GENERAL. Ante mortem inspections shall comply with applicable standards under s. ATCP 55.07.

(2) SUSPECT ANIMALS. If a department inspector performing an ante mortem inspection suspects that a food animal is affected by a disease or condition that may cause all or part of the animal's carcass to be condemned after post mortem inspection, the inspector shall cause the animal to be held for ante mortem inspection by a department veterinarian. The animal shall be segregated from other food animals, and shall be placed in a holding area marked with a "WIS. SUSPECT" tag or placard until a department veterinarian performs an ante mortem inspection.

(3) ANIMALS THAT CANNOT STAND OR WALK. If the department performs an ante mortem inspection on an animal that cannot stand or walk, a department veterinarian shall perform the inspection. The department veterinarian may order the animal held for up to 24 hours for further observation. If the animal has been treated with drugs for which the prescribed withdrawal time has not elapsed, the department veterinarian shall condemn the animal or order the animal held until the withdrawal time elapses.

(4) CONDEMNED ANIMALS. Except as provided in sub. (5), if a department veterinarian performing an ante mortem inspection finds that a food animal is affected by a disease or condition that would cause the animal's carcass to be condemned in its entirety after post mortem inspection, the veterinarian shall condemn the animal. The condemned animal shall be segregated from other live food animals. The veterinarian shall supervise the humane slaughter and disposal of the animal.

(5) TREATABLE ANIMALS. If a department veterinarian performing an ante mortem inspection finds that a food animal is affected by a treatable disease or condition, the veterinarian may order the animal withheld from slaughter pending specified treatment. A food animal held for treatment may not be slaughtered for human consumption until a department veterinarian performs another ante mortem inspection after the animal is treated. A diseased animal may not be held for treatment in a manner that threatens the health of other animals.

(6) FIELD ANTE MORTEM INSPECTION. An inspector or veterinarian conducting a field ante mortem inspection under s. ATCP 55.04 (3) shall observe the live animal in the field, in motion and at rest. The inspector or veterinarian may specify other procedures, as necessary, to ensure a safe and effective field ante mortem examination.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.06 Post mortem inspection. (1) GENERAL. Post mortem inspections shall comply with applicable standards under s. ATCP 55.07.

(2) DOMESTICATED FOOD ANIMALS. Post mortem inspections of domesticated food animals, other than poultry, shall comply

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with 9 CFR 310. Post mortem procedures for farm raised deer shall be the same as for sheep.

(3) POULTRY AND CAPTIVE GAME BIRDS. Post mortem inspections of poultry and captive game birds shall comply with 9 CFR 381.

(4) CAPTIVE GAME ANIMALS. (a) The department may specify post mortem inspection procedures for captive game animals. Post mortem inspections of captive game animals shall comply with 9 CFR 310, as applicable. Post mortem inspection procedures for bison shall be the same as for cattle.

(5) SLAUGHTER INSPECTION MARKS. (a) The department shall apply official inspection marks to each carcass that the department finds, after post mortem inspection, to be wholesome and fit for human food. The department shall mark each primal part of the carcass, each detached organ and each detached part that the department finds to be wholesome and fit for use as human food.

(b) Except as provided in par. (c), an official inspection mark under par. (a) shall consist of an outline map of Wisconsin enclosing the words "WIS. INSPECTED & PASSED," the department inspector number and the meat establishment license number assigned under s. ATCP 55.03 (10). If space is limited, the phrase "WIS. INSPECTED AND PASSED" may be abbreviated by the phrase "WIS. INSP'D & P'S'D."

Note: The following is an illustration of the official inspection mark under par. (b):

(c) For farm–raised deer, captive game animals and captive game birds, an official inspection mark under par. (a) shall consist of a triangle enclosing the words "WIS. INSPECTED & PASSED" and the meat establishment license number assigned under s. ATCP 55.03 (10). If space is limited, the phrase "WIS. INSPECTED AND PASSED" may be abbreviated by the phrase "WIS. INSP'D & P'S'D."

Note: The following is an illustration of the official inspection mark under par. (c):

(d) If the department finds upon post mortem inspection that any part of a carcass is fit for human food only after cooking, the department shall mark that part "PASSED FOR COOKING." The department shall use applicable standards in 9 CFR 315.2 to determine if any part of a carcass is fit for human consumption only after cooking. No person may process or sell any of the affected meat for human consumption without cooking, as required by the department.

(e) If the department finds upon post mortem inspection that any part of a carcass is unwholesome or unfit for human food, the department shall mark that part "WIS. INSPECTED AND CONDEMNED." If space is limited, the phrase may be abbreviated "WIS. INSP'D AND CONDEMNED."

(f) If the department finds that further inspection is needed to determine whether any part of a carcass is wholesome and fit for human food, the department may tag that part "WIS. RETAINED." The tagged part is deemed to be covered by a department holding order under s. ATCP 55.14 (2). The department may specify retention conditions, including refrigeration requirements. No person may process or sell any of the affected meat for human consumption unless the department completes its inspection and passes the meat.

(g) The department may stamp carcass parts with the appropriate marks under pars. (a) to (e). If an organ or other carcass part is not susceptible to stamping, the department may apply the mark by other means such as tagging.

(h) An authorized department inspector may apply inspection marks under this subsection on behalf of the department. No non–department personnel may apply inspection marks, except under the direct personal supervision of an authorized department inspector. When a department inspector is not using or personally supervising the use of a marking device at a licensed meat establishment, the inspector shall keep the device in a secure locked compartment or in the inspector's possession. A marking device kept in a locked compartment shall be accessible only by the inspector and other authorized department personnel.

(i) The department shall order all of the marking devices that the department uses to apply inspection marks under this subsection. A meat establishment operator shall pay for the marking devices that the department uses at the operator's meat establishment. A meat establishment operator may not order or create any marking device used to apply department inspection marks under this subsection.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.07 Slaughter and processing standards; general. (1) SLAUGHTER AND PROCESSING STANDARDS; DOMESTICATED FOOD ANIMALS. (a) A meat establishment operator who does any of the following shall comply with applicable federal standards under 9 CFR parts 307 to 311, 313 to 315, 317, 319, 416 and 417:

1. Slaughters domesticated food animals, other than poultry, for human consumption.

2. Processes the meat of domesticated food animals, other than poultry, for human consumption.

(b) Paragraph (a) does not apply to mobile custom slaughter or mobile custom processing.

Note: See s. 97.42 (4m), Stats.

(2) SLAUGHTER AND PROCESSING STANDARDS; POULTRY AND CAPTIVE GAME BIRDS. (a) A meat establishment operator who does any of the following shall comply with applicable requirements under 9 CFR 416 and 417, and subparts G, H, I, J, K, L, O and P of 9 CFR 381:

1. Slaughters poultry or captive game birds for human consumption.

2. Processes the meat of poultry or captive game birds for human consumption.

(b) Paragraph (a) does not apply to mobile custom slaughter or mobile custom processing.

(c) Paragraph (a) does not apply to a person slaughtering and processing not more than 1,000 poultry per year, provided that all the following apply:

1. The person produces all of those poultry on his or her farm.

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2. The person slaughters, processes and sells the poultry at the farm where they are produced.

3. The person clearly and conspicuously marks each package or container of poultry meat with the person's name and address and the words "NOT INSPECTED."

Note: See ss. 97.42 (4m) and 97.42 (11), Stats.

(3) SLAUGHTER AND PROCESSING STANDARDS; RATITES. (a) A meat establishment operator who does any of the following shall comply with applicable requirements under 9 CFR parts 307 to 311, 313 to 315, 317, 319, 416 and 417:

1. Slaughters ratites for human consumption.

2. Processes the meat of ratites for human consumption.

(b) Paragraph (a) does not apply to mobile custom slaughter or mobile custom processing.

Note: See s. 97.42 (4m), Stats.

(4) SLAUGHTER AND PROCESSING STANDARDS; CAPTIVE GAME ANIMALS. (a) A person slaughtering a captive game animal for human consumption shall do so in a humane and sanitary manner. If the department provides ante mortem and post mortem slaughter inspection, the person shall comply with procedures specified by the department. The procedures shall be consistent with procedures specified by the United States department of agriculture.

(5) CUSTOM SLAUGHTER AND PROCESSING; STANDARDS. Custom slaughter and custom processing operations shall comply with applicable requirements under this section and ss. ATCP 55.08 and 55.09.

(6) DISEASED OR INJURED ANIMALS; GENERAL. No person may slaughter a food animal for human consumption, or submit a food animal for slaughter for human consumption, if the person knows or has reason to know that the animal is diseased or injured. This does not prohibit any of the following:

(a) A slaughter that is subject to ante mortem and post mortem inspection by the department or the United States department of agriculture.

(b) The custom slaughter of an animal injured within 24 hours prior to slaughter, provided the animal is not diseased.

(c) The custom slaughter of an animal injured more than 24 hours prior to slaughter if all the following apply:

1. The animal is not diseased.

2. A licensed practicing veterinarian performs an ante mortem and post mortem inspection on the slaughtered animal.

(7) DISEASED OR INJURED ANIMALS; OWNER CERTIFICATION. If a person submitting a food animal for slaughter for human consumption knows or has reason to know the animal is diseased or injured; that person shall, prior to the animal's slaughter, sign and deliver a written statement to the person who will perform the slaughter. The statement shall certify all the following:

(a) The name and address of every person who has had custody of the animal within 30 days prior to the slaughter submission date.

(b) The nature of each known or suspected disease or injury.

(c) The date on which each injury occurred, if known.

(d) The cause of each injury, if known.

(e) The date on which the animal became incapable of standing or walking, if the animal is incapable of standing or walking.

(f) All drugs administered to the animal as treatments or feed additives within 30 days prior to the slaughter submission date, and the last date each drug was administered.

Note: The certification requirement under sub. (7) applies to inspected slaughters as well as uninspected custom slaughters.

(8) ANIMALS THAT CANNOT STAND OR WALK. No person may slaughter a food animal for human consumption or submit a food animal for slaughter for human consumption if that animal cannot stand or walk without assistance. This prohibition does not apply to any of the following:

(a) An animal slaughtered at a meat establishment licensed under s. ATCP 55.03 if all the following apply:

1. The meat establishment has adequate facilities to handle the animal in a humane manner, including facilities required under sub. (11) (c).

2. A department veterinarian performs an ante mortem and post mortem inspection on the animal.

(b) An animal slaughtered at a meat establishment inspected by the United States department of agriculture under 21 USC 451 to 695.

(c) The mobile custom slaughter of an animal injured within 24 hours prior to slaughter, provided the animal is not diseased.

(d) The mobile custom slaughter of an animal injured more than 24 hours prior to slaughter if all the following apply:

1. The animal is not diseased.

2. A licensed practicing veterinarian performs an ante mortem and post mortem inspection on the slaughtered animal.

Note: See subs. (6) and (7). A mobile custom slaughter must comply with ss. ATCP 55.08 and 55.09.

(9) CARCASSES AND MEAT RECEIVED FOR PROCESSING. (a) A meat establishment operator shall examine all carcasses and meat received for processing at that meat establishment. The operator shall examine the carcasses and meat before receiving them into any processing or storage area.

(b) A meat establishment operator may not receive, into any processing or storage area, any unclean or apparently unwholesome carcass or meat. The operator shall handle, store and prepare carcasses and meat to prevent contamination of other carcasses, meat and food.

(c) Except as provided in par. (d) or (e), a meat establishment operator may not process any carcass or meat produced by the custom slaughter of a diseased or injured animal.

(d) A meat establishment operator may custom process the carcass or meat produced by the slaughter of a food animal injured within 24 hours prior to slaughter, provided the animal was not diseased.

(e) A meat establishment operator may custom process the carcass or meat produced by the slaughter of a food animal injured more than 24 hours prior to slaughter if all the following apply:

1. The animal was not diseased.

2. A licensed practicing veterinarian performed an ante mortem and post mortem inspection on the slaughtered animal, and certified in writing that the carcass was wholesome and free of disease.

Note: The department may retain or condemn unwholesome, adulterated or misbranded meat or meat food products, including those produced by custom slaughter or processing (see ATCP 55.14). If the department inspects a custom slaughter, the department will follow applicable inspection procedures under this chapter.

(10) CONDEMNED ANIMALS AND MEAT. (a) If the department condemns a food animal on ante mortem inspection, the meat establishment operator shall kill the animal, inject it with a denaturant, and dispose of it as directed by the department. The denaturant shall consist of a 10% solution of carbolic or cresylic acid. A meat establishment operator may use another denaturant if the department pre-approves that denaturant. The meat establishment operator, acting under direct department supervision, shall inject at least 40 ml. of the denaturant into the heavy musculature of each carcass quarter and into each of the abdominal and thoracic cavities.

(b) No person may slaughter, for human consumption, any food animal that the department has condemned as being unwholesome or unfit for human consumption. The animal owner or meat establishment operator shall dispose of the condemned animal in a manner directed by the department.

(c) An animal condemned on ante mortem inspection may not be skinned or eviscerated at a meat establishment. This does not

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prohibit the recovery, under department supervision, of animal parts needed for diagnostic testing required by the department.

(d) No person may process for human consumption, or sell or distribute for human consumption, any meat that the department has condemned as being unwholesome or unfit for human consumption. The meat establishment operator shall denature or decharacterize the condemned meat so that the meat is no longer naturally edible by humans. Containers used for condemned meat shall be conspicuously marked "INEDIBLE."

(e) If the department orders a meat establishment operator to trim any carcass to remove unfit or unwholesome meat, the operator shall complete the trimming before placing the carcass in a cooler.

(f) A meat establishment operator shall clean and sanitize facilities, equipment and utensils that have come in contact with any condemned animal or meat before using the facilities, equipment or utensils in any other slaughter or processing operations.

(11) HUMANE SLAUGHTER AND TREATMENT. (a) Persons slaughtering food animals shall use humane methods. Humane methods include any of the following:

1. Captive bolt devices.
2. Electrical stunning.
3. CO2 gas chamber.
4. Gun shot.
5. Established religious dietary law procedures, such as rabbinical (kosher) procedures.

(b) Persons receiving, transporting or holding food animals for slaughter shall do so in a humane manner.

(c) If a meat establishment receives food animals that cannot stand or walk, the meat establishment operator shall do all the following:

1. Maintain separate holding pens for those animals, and protect them from physical contact with other animals.

2. Maintain skids, mats or other department-approved conveyances for moving those animals humanely. A meat establishment operator may not drag an animal that cannot stand or walk, but shall move the animal by means of an approved conveyance.

(d) Meat establishment operators shall construct and maintain livestock pens, driveways and ramps to prevent injury to animals.

(e) Persons moving food animals to slaughter shall do so in a manner that minimizes animal excitement and discomfort. Persons driving food animals to slaughter shall avoid excessive use of driving implements that may cause unnecessary excitement, pain or injury to the animals. Persons driving food animals to slaughter may not stab or prod the animals with sharp driving implements.

(f) Food animals held at meat establishments pending slaughter shall have access to drinking water. If they are held for more than 24 hours, they shall also have access to feed.

(g) No livestock, ratites or captive game animals may be shackled, hoisted, stuck or cut for slaughter, except according to rabbinical (kosher) or other established religious dietary practices, until the livestock are rendered insensible to pain.

Note: See s. 95.80, Stats.

(h) If a bullet, bolt or other slaughter projectile penetrates the brain of a slaughtered food animal, that brain may not be used for human food.

(i) No head, head meat or cheek meet from a food animal slaughtered by gunshot may be used for human food. This paragraph does not prohibit the use of the animal's tongue for human food.

(12) HORSES AND HORSE MEAT. No person may slaughter or process equines at a meat establishment where other domesticated food animals are slaughtered or processed. Equine carcasses, equine meat and equine meat food products shall be conspicuously labeled "HORSE MEAT" or "HORSE MEAT PRODUCT" in a manner approved by the department.

(13) RECORDS. (a) Except as provided in par. (b), a person who slaughters a food animal for human consumption, or who processes the meat of a food animal for human consumption, shall make a record of that slaughter or processing. The record shall include all the following:

1. The date and time of slaughter or processing.
2. The number and type of animals slaughtered, and the disposition of the carcasses.
3. The type and amount of meat processed, and the disposition of that meat.
4. Any certificates required under sub. (7).
5. Other relevant information required by the department.

(b) Paragraph (a) does not require a meat establishment operator to duplicate slaughter records kept by the department's inspector.

(c) A person required to make a record under par. (a) shall keep that record for at least 3 years, and shall make the record available to the department for inspection and copying upon request.

History: CR 01-042: cr. Register March 2002 No. 555, eff. 4-1-02.

ATCP 55.08 Custom slaughter and processing. **(1)** GENERAL. A person providing a custom slaughter or custom processing service shall do all the following:

(a) Hold a current annual license if required under s. ATCP 55.03.

(b) Hold a current annual registration certificate if required under s. ATCP 55.09 (2).

(c) Comply with applicable requirements under s. ATCP 55.07.

(d) Mark or label all the resulting meat and meat food products "NOT FOR SALE," as provided in sub. (2). A person providing a custom slaughter or custom processing service shall keep the service recipient's meat and meat food products separate from all other food that the service provider holds for others or offers for sale. The person may not sell any of the service recipient's meat or meat food products, or commingle them with any food that the person holds for others or sells.

Note: For example, a person providing custom slaughter or custom processing services may not combine usual carcass parts, such as head meat, tongues, hearts, fat or trimmings, with meat or meat food products processed for other service recipients or purchasers.

(e) Return all of the resulting meat and meat food products to the service recipient. The service recipient may use them only for the service recipient's personal consumption, which may include consumption by the service recipient's immediate family, immediate household and nonpaying guests.

(f) Comply with s. ATCP 55.09 if the person engages in mobile custom slaughter or mobile custom processing.

(g) Conduct custom slaughter and processing operations in a sanitary manner.

(h) Keep complete and accurate records of all custom slaughter and processing transactions. The service provider shall keep the records for at least 3 years, and shall make the records available to the department for inspection and copying upon request.

(2) MARKING OR LABELING MEAT. (a) A person providing a custom slaughter or custom processing service shall mark or label the resulting meat and meat food products with all the following information:

1. The words "NOT FOR SALE" in block letters at least $^{3}/_{8}$" high.

2. The name or commonly recognized trade name of the person providing the custom slaughter or custom processing service. If the person performs the service at a meat establishment licensed under s. ATCP 55.03, the person may use the meat establishment number assigned under s. ATCP 55.03(10) instead of the person's name. If the person provides the service as a mobile custom

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slaughter or mobile custom processing service, the person may use the registration number assigned under s. ATCP 55.09 (2) (g) instead of the person's name.

Note: The following examples illustrate possible label formats under par. (a):

NOT FOR SALE	**NOT FOR SALE**
XYZ Market	**WIS 000**

(b) A person providing a custom slaughter service shall mark the carcass of each custom slaughtered animal with the information required under par. (a). The person shall mark each side, quarter, detached organ and other part of the carcass. The person shall mark the carcass immediately after slaughter, before the carcass leaves the slaughter site.

(c) A person providing a custom processing service shall apply the label under par. (a) to all packages and containers of custom processed meat and meat food products when that meat or those meat food products are packaged or placed in those containers. The person shall individually label sausages that have a diameter of more than 1 $^1/_2$" if those sausages are individually packaged, or if they are shipped or stored in unsealed containers.

(3) CUSTOM SLAUGHTER AND PROCESSING SCHEDULE. (a) Except as provided in par. (b), a meat establishment operator may not engage in custom slaughter or custom processing operations at a meat establishment while the operator is simultaneously doing any of the following at that establishment:

1. Slaughtering food animals for sale.

2. Processing the meat of food animals for sale.

(b) Paragraph (a) does not apply to any of the following:

1. A department–inspected custom slaughter, or the custom processing of meat from a department–inspected custom slaughter.

2. Simultaneous operations conducted in separate rooms or areas, if approved by the department. The department may approve simultaneous operations that are adequately separated and controlled to prevent cross–contamination or commingling of meat from the separated operations.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.09 Mobile custom slaughter and processing. (1) GENERAL. A person engaged in mobile custom slaughter or mobile custom processing shall comply with s. ATCP 55.08 and this section.

(2) ANNUAL REGISTRATION CERTIFICATE. (a) No person may receive any compensation, other than bartered services, for providing mobile custom slaughter or mobile custom processing services unless that person holds a current annual registration certificate from the department. No registration certificate is required if the person holds a meat establishment license under s. ATCP 55.03.

(b) A registration certificate under par. (a) expires on June 30 annually.

(c) A person shall apply for a registration certificate under par. (a) on a form provided by the department. No fee is required. The application shall include all the following:

1. The applicant's correct legal name, and any trade name under which the applicant does business.

2. The applicant's business address.

3. The applicant's social security number if the applicant is an individual.

Note: See s. 93.135 (1) (intr), Stats.

4. Other relevant information required by the department.

(d) The department shall grant or deny an application under par. (c) within 30 days after the department receives a complete application.

(e) The department may deny, suspend or revoke a registration certificate under par. (a) for cause, as provided in s. 93.06 (7), Stats. Cause may include a violation of this chapter.

Note: The procedure for suspending or revoking a registration certificate, or for contesting the denial of a registration certificate, is set forth in ch. ATCP 1.

(f) The department may issue a registration certificate under par. (a) subject to conditions, or may impose conditions on an existing registration certificate, as provided in s. 93.06 (8), Stats.

Note: The procedure for imposing conditions on an existing registration certificate, or for contesting conditions imposed by the department, is set forth in ch. ATCP 1.

(g) The department shall assign, to each person holding a registration certificate under par. (a), a registration number that uniquely identifies that person.

(3) FACILITIES AND SANITATION. (a) Mobile custom slaughter and mobile custom processing operations shall be conducted under clean and sanitary conditions.

(b) Vehicles and facilities used in mobile custom slaughter and mobile custom processing operations shall be designed and constructed so they can be kept clean and sanitary.

(c) Facilities shall be available, at every mobile custom slaughter and mobile custom processing site, to clean and sanitize equipment and utensils.

(4) EQUIPMENT AND UTENSILS. Equipment and utensils used in mobile custom slaughter and mobile custom processing operations shall be of sanitary design and construction, and shall be kept clean and sanitary. Meat contact surfaces of equipment and utensils shall be cleaned and sanitized after each use, and more frequently as necessary, to keep them clean and sanitary.

(5) PERSONNEL. Personnel engaged in mobile custom slaughter or mobile custom processing operations shall wear clean and washable outer clothing, and shall wash and rinse their hands sufficiently during the operations to prevent contamination of carcasses, meat and meat food products.

(6) WATER SUPPLY. Potable water shall be available for all mobile custom slaughter and mobile custom processing operations. There shall be enough water for thorough cleaning of all carcasses, equipment and utensils. Water shall be available during all slaughtering, processing and cleanup operations.

(7) CARCASS TRANSPORTED TO MEAT ESTABLISHMENT FOR CUSTOM PROCESSING. (a) A person performing a mobile custom slaughter service shall return the resulting meat to the service recipient at the slaughter site, except that the service provider may transport a carcass to a meat establishment licensed under s. ATCP 55.03 for custom processing. The custom processor shall return the resulting meat to the service recipient.

Note: See s. ATCP 55.07 (9).

(b) Carcasses transported under par. (a) shall be transported according to s. ATCP 55.11. Inedible slaughter products, if transported on the same vehicle with meat, shall be transported in tightly covered waterproof containers or in separate waterproof compartments to prevent spillage of inedible products and contamination of meat.

(8) MOBILE CUSTOM SLAUGHTER; MONTHLY REPORT. A person holding a registration certificate under sub. (2) or a license under s. ATCP 55.03 shall file a report with the department for each month in which that person performs any mobile custom slaughter. The person shall file the report by the 10th day of the following month on a form provided by the department. The report shall include all the following information:

(a) The name and address of each individual for whom the person provided mobile custom slaughter services.

(b) The number and type of animals slaughtered for each service recipient.

(c) The date of each slaughter.

(d) The disposition of each carcass. The report shall indicate whether a carcass was transported to another location for processing and, if so, the location to which it was transported.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.10 Meat labels and formulas. (1) GENERAL. Meat and meat food products sold in this state shall be labeled according to this chapter and ch. ATCP 90. No person may sell any misbranded meat or meat food products, or make any false,

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deceptive or misleading representation in connection with the sale of meat or meat food products.

Note: See ss. 97.03, 100.18 and 100.183, Stats. Chapter ATCP 90 (fair packaging and labeling) contains general requirements for the packaging and labeling of food and other consumer commodities.

(2) MEAT LABELS, GENERAL. No person may sell any meat or meat food product unless that meat or meat food product is clearly labeled with all the following:

(a) The name of the meat or meat food product.

(b) The net weight of the meat or meat food product.

(c) The name and address of the person who last processed the meat, or the name and address of the legally responsible distributor for whom the meat was last processed.

(d) An inspection legend if required under sub. (3) or 9 CFR 317.2.

(e) An ingredient statement if the product contains 2 or more ingredients. The ingredient statement shall contain the word "INGREDIENTS:" followed by a listing of ingredients in order of weight.

(f) Safe handling instructions if required under 9 CFR 317.2(l).

(g) One of the following statements if the meat or meat food product is being sold at retail and is perishable:

1. "Perishable."
2. "Keep refrigerated."
3. "Keep under refrigeration."
4. "Keep frozen."

(3) INSPECTION LEGEND. (a) Except as provided in par. (b), a license holder under s. ATCP 55.03 who processes meat or meat food products from meat inspected and passed by the department shall label that processed meat and those processed meat food products with a state inspection legend. The legend shall appear on all packages and containers of processed meat and meat food products, so that it is clearly visible to prospective purchasers.

(b) Paragraph (a) does not apply to meat and meat food products processed at a retail establishment and sold only to individual consumers at that establishment.

(c) Except as provided in par. (d), the state inspection legend under par. (a) shall consist of an outline map of Wisconsin enclosing the words "WIS. DEPT. AGR. INSPECTED" and the meat establishment number assigned under s. ATCP 55.03 (10).

Note: Federal law prohibits the sale, in other states, of state-inspected meat that is required to bear the Wisconsin inspection under par. (c). The following is an illustration of the Wisconsin inspection legend described in par. (c):

(d) The inspection legend under par. (a) shall consist of an equilateral or isosceles triangle enclosing the words "WIS. DEPT. AGR. INSPECTED" and the meat establishment number assigned under s. ATCP 55.03 (10) if all the following apply:

1. The meat or meat food product contains meat from farm-raised deer, captive game animals or captive game birds.

2. Meat from domesticated food animals and ratites constitutes less than 3% of the product by weight.

3. Meat fat from domesticated food animals and ratites constitutes less than 30% of the product by weight.

Note: Federal law does not prohibit the sale, in other states, of state-inspected meat from *farm-raised deer, captive game animals or captive game birds* (meat required to bear a triangular inspection legend under par. (d)). The following is an illustration of the state inspection legend described in par. (d):

(e) If space is limited, the word "INSPECTED" in the state inspection legend under par. (c) or (d) may be abbreviated as "INSP'D."

(4) STANDARDS OF IDENTITY. Labeling of meat and meat food products shall comply with applicable standards of identity in 9 CFR 319. No person may misrepresent the identity of any meat or meat food product.

(5) FORMULA APPROVAL. (a) No person may manufacture any meat food product in a meat establishment licensed under s. ATCP 55.03 unless the department first approves the product formula for compliance with applicable labeling and food safety requirements, including applicable standards of identity under sub. (4).

(b) To obtain the department's approval under par. (a), a person shall submit the product formula on a form provided by the department. The form shall identify the meat, chemical and other ingredients in the product, and shall include any other information required by the department.

(c) The department shall approve or disapprove a product formula within 30 days after the department receives a complete application under par. (b). The department shall give the applicant written notice of its action. If the department does not approve the formula, the notice shall state the department's reasons.

(6) LABEL APPROVAL. No person may sell any of the following meat or meat food products unless the department first approves the labeling of that meat or those meat food products:

(a) Meat or meat food products bearing labels that make health, quality or nutritional claims.

(b) Meat from farm-raised deer, captive game animals or captive game birds, or meat food products made from that meat.

(c) Meat or meat food products bearing labels that make claims related to organizational membership or organizational standards.

(7) PROHIBITED LABELING PRACTICES. (a) No person may apply, to any meat or meat food product, any mark, legend or label that is false, deceptive or misleading.

(b) No person may misrepresent that the department has inspected meat, or misrepresent the department's inspection findings related to meat.

(c) No person may misrepresent that any meat or meat food product has been processed at a licensed meat establishment, or is derived from meat inspected and passed by the department.

(d) No person may counterfeit or use without proper authority any inspection mark, label or marking device under this subsection.

(e) No person may wrongfully alter or remove any mark or label applied under this section.

(f) No person may sell, transport or store any meat or meat food product that is not marked, labeled or identified according to this chapter.

History: CR 01-042: cr. Register March 2002 No. 555, eff. 4-1-02.

ATCP 55.11 Transporting meat. (1) GENERAL. A person transporting meat for human consumption shall do so in a

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manner that keeps the meat wholesome and unadulterated. Meat and meat food products for human consumption shall be refrigerated during transport if they are perishable, or if they are labeled "Keep Refrigerated" or "Keep Frozen." The internal temperature of the refrigerated products may not exceed 5° C (41° F) at the time of delivery.

(2) VEHICLES AND FACILITIES. Vehicles and facilities used to transport meat and meat food products shall be constructed and maintained to ensure that the meat and meat food products arrive at their destination in a wholesome and unadulterated condition. Vehicles and facilities shall be adequately equipped to ensure compliance with sub. (1).

(3) UNWRAPPED MEAT. Unwrapped meat and meat food products shall be transported in enclosed vehicles equipped with tight fitting doors, and shall be protected from contamination from the vehicle.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.12 Meat brokers and meat distributors; registration. (1) ANNUAL REGISTRATION CERTIFICATE. No person may operate as a meat broker or meat distributor without an annual registration certificate from the department, except that no registration certificate is required for a meat broker or meat distributor who holds a current annual meat establishment license under s. ATCP 55.03. A registration certificate expires on June 30 annually. No fee is required.

(2) APPLYING FOR A REGISTRATION CERTIFICATE. To obtain a registration certificate under sub. (1), a person shall apply on a form provided by the department. The application shall include all the following:

(a) The applicant's correct legal name, and any trade name under which the applicant does business.

(b) The applicant's business address.

(c) The applicant's social security number if the applicant is an individual.

Note: See s. 93.135 (1) (am), Stats.

(d) Other relevant information required by the department.

(3) ACTION ON APPLICATION. The department shall grant or deny an application under sub. (2) within 30 days after the department receives a complete application.

(4) DENYING, SUSPENDING OR REVOKING A REGISTRATION CERTIFICATE. The department may deny, suspend or revoke a registration certificate under sub. (1) for cause, as provided in s. 93.06(7), Stats. Cause may include a violation of this chapter.

Note: The procedure for suspending or revoking a registration certificate, or for contesting the denial of a registration certificate, is set forth in ch. ATCP 1.

(5) CONDITIONAL REGISTRATION CERTIFICATE. The department may issue a registration certificate under sub. (1) subject to conditions, or may impose conditions on an existing registration certificate, as provided in s. 93.06 (8), Stats.

Note: The procedure for imposing conditions on an existing registration certificate, or for contesting conditions imposed by the department, is set forth in ch. ATCP 1.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.13 Prohibited practices. No person may do any of the following:

(1) Process or sell, for human consumption, any unwholesome, adulterated or misbranded meat.

(2) Slaughter any food animal, for human consumption, under unsanitary conditions.

(3) Process, store, handle, transport or sell, under unsanitary conditions, meat or meat food products for human consumption.

(4) Slaughter any food animal for human consumption, or process any meat or meat food products for human consumption, at a place other than a meat establishment licensed under s. ATCP 55.03. This prohibition does not apply to slaughter or processing operations that are exempted from licensing under s. ATCP 55.03 (2).

(5) Make any false, deceptive or misleading statement, when submitting a food animal for slaughter, related to any of the following:

(a) The ownership, identity, origin or health status of the animal.

(b) The administration of any drug to the animal.

(c) The intended use of meat from the animal.

(6) Obstruct a department employee performing his or her duties. Obstruction includes any of the following:

(a) Physical interference.

(b) Verbal or physical assault or abuse.

(c) Threatening behavior or communications.

(d) Refusal to carry out legitimate directives.

(e) Intentional acts that impede the full, effective and efficient performance of the employee's duties.

Note: See s. 97.42(8), Stats.

(7) Wrongfully alter, deface or remove any department tag or mark applied under this chapter.

(8) Wrongfully alter, deface or remove any label or inspection legend required under s. ATCP 55.10.

(9) Custom slaughter a food animal, or custom process the meat of a slaughtered food animal, if the person knows or has reason to know all the following:

(a) That the slaughter was not inspected by the department or the United States department of agriculture.

(b) That the recipient of the custom slaughter or processing service will sell the meat of that animal for human consumption, in violation of s. ATCP 55.04 (1).

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.14 Enforcement. (1) INVESTIGATIONS. The department may conduct inspections and other investigations to determine compliance with this chapter and ch. 97, Stats. The department may exercise its authority under chs. 93 and 97, Stats., in support of its inspections and investigations.

Note: Under chs. 93 and 97, Stats., the department may inspect meat slaughtering, processing, selling and distributing facilities and practices, regardless of whether those practices occur at meat establishments licensed under s. ATCP 55.03. The department will provide ante mortem and post mortem slaughter inspection only for persons licensed under s. ATCP 55.03.

(2) MEAT HOLDING ORDER. (a) The department may issue a holding order to prohibit the sale or movement of any meat or meat food product if the department has reasonable grounds to suspect that the meat or meat food product is unwholesome, adulterated or misbranded. The department may issue a holding order pending further examination or analysis to determine whether the meat or meat food product is unwholesome, adulterated or misbranded.

(b) The department shall serve a holding order by delivering a copy to the owner or custodian of the meat or meat food products, or by placing a copy in a conspicuous place on or near the meat or meat food products. A "WIS. RETAINED" tag applied under s. ATCP 55.06 (5) (f) has the effect of a holding order served under this subsection.

(c) A holding order remains in effect for 14 days unless the department withdraws it earlier. The department may extend a holding order for one additional 14–day period by re-serving the order or by leaving the "WIS. RETAINED" tag on the meat.

(d) No person may sell, move or alter any meat or meat food product under holding order, except with the department's permission. The department may authorize the owner or custodian to take appropriate corrective action.

(e) The department may release a holding order if the department finds that the suspect meat or meat food product is not unwholesome, adulterated or misbranded, or that the violation has been corrected.

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(3) MEAT CONDEMNATION ORDER. (a) If the department finds that meat or a meat food product is unwholesome, adulterated or misbranded, the department may order the owner or custodian to do any of the following:

1. Correct the violation within a reasonable time period specified by the department.

2. Dispose of the meat or meat food product, in a manner specified by the department. The department may order disposal of meat or a meat food product if a violation cannot be corrected, or if the owner or custodian fails to correct the violation within the time specified under subd. 1. Returning meat to the recipient of a custom slaughter or custom processing service does not correct a violation.

(b) The department shall serve an order under par. (a) by delivering a copy to the owner or custodian of the meat or meat food products, or placing a copy in a conspicuous place on or near the meat or meat food products. An order takes effect when served. A "WIS. INSP'D and CONDEMNED" mark applied under s. ATCP 55.06 (5) (c) has the effect of a meat condemnation order served under this subsection.

(c) No person may sell, move or alter any meat or meat food product covered by the department's order except as directed by this chapter or by the department.

(4) ORDER TO CORRECT VIOLATION. The department may order a person to correct a violation of this chapter or ch. 97, Stats. The department may specify a deadline for correcting the violation.

(5) REJECTED FACILITIES, EQUIPMENT OR UTENSILS. The department may issue an order prohibiting the use of unsanitary facilities, equipment or utensils that may contaminate meat or meat food products. The department may issue an order under this subsection by applying a "REJECTED" tag to the facilities, equipment or utensils. A person may not use the equipment or utensils until the violation is corrected and the department withdraws its order.

(6) MEAT INSPECTION STAFF AUTHORIZED TO ISSUE ORDERS. An authorized department employee may issue orders under this section.

Note: Under ss. 93.06 and 97.42, Stats., the department may deny, suspend or revoke a license or permit for violations of this chapter. The department may also pursue court enforcement under ss. 93.21, 97.72 and 97.73, Stats., and other applicable laws.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

ATCP 55.15 Appeals. (1) A person directly affected by any of the following department actions under this chapter may ask the department to reconsider that action:

(a) The denial of any application for a license or registration certificate.

(b) Ante mortem or post mortem inspection findings affecting the disposition of animals, carcasses or meat.

(c) Any order issued under s. ATCP 55.14.

(d) Decisions denying, limiting or withdrawing slaughter inspection services.

(e) Slaughter inspection billings.

(2) Whenever the department receives a request for reconsideration under sub. (1), the department shall schedule a prompt informal conference with the requester. If the matter concerns an ante mortem or post mortem inspection finding by an inspector who is not a veterinarian, the department may have a veterinarian review the inspector's findings.

(3) If a requester's dispute is not resolved by informal action under sub. (2), a requester may request a contested case hearing under ch. 227, Stats., and ch. ATCP 1.

(4) A request for reconsideration or hearing does not stay a department action under this chapter.

(5) This section does not limit a person's rights under ch. 227, Stats., or other applicable law.

History: CR 01–042: cr. Register March 2002 No. 555, eff. 4–1–02.

Meat Labeling

This is an excerpt from a 1996 article in the UW Extension Direct Marketing Newsletter, written by Chris Lazaneo, Public Information Officer, DATCP Division of Food Safety, in consultation with the DATCP Meat Bureau Staff.

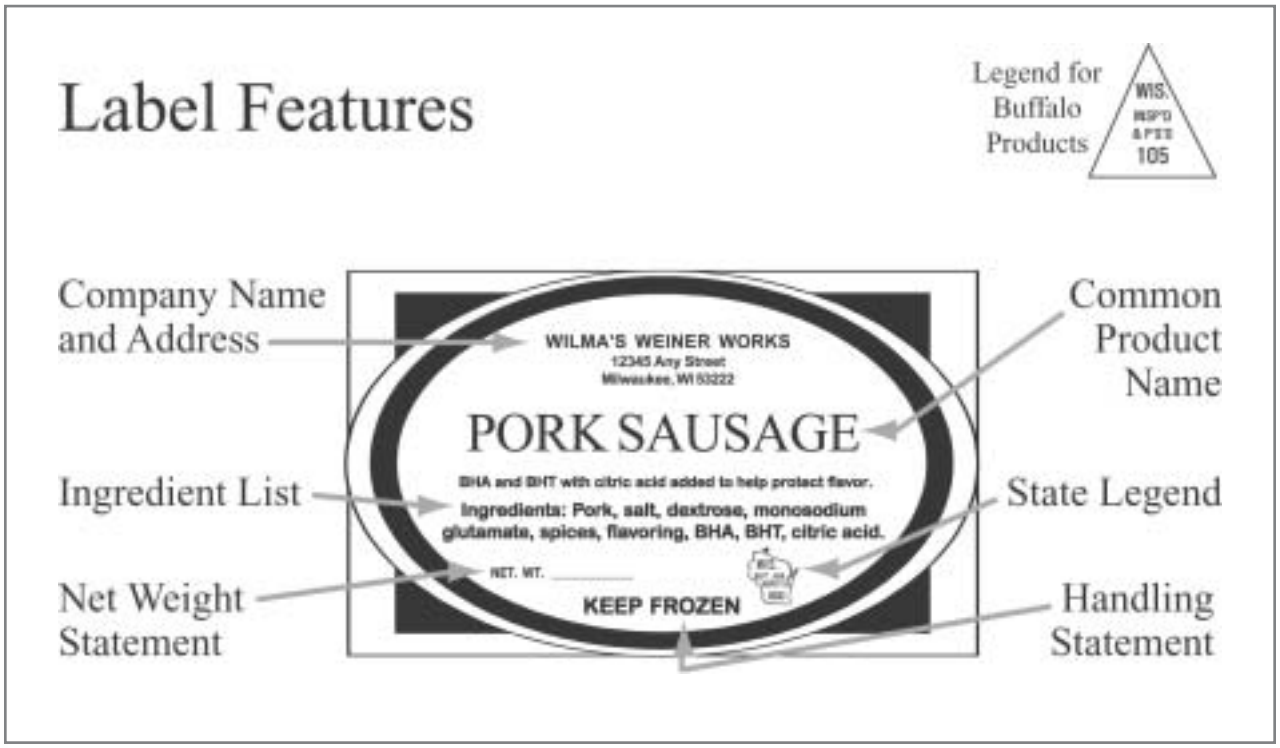
Meat products processed by others - Products sold by you, but manufactured by someone else must be labeled by the licensed manufacturer. If you wish to be listed on the label as the distributor, use of phrasing like "distributed by," "packed for," or "manufactured for" followed by your name can appear on the label.

Wisconsin rules requires that labels state specific information in a specific manner. Every package must have a label listing:

- The name of the product, such as "Lamb Chop," "Leg of Lamb."
- The word "ingredients" followed by an accurate list of ingredients contained in the product in descending order of predominance by weight.
- The name and address of the business where the product was made (cut and wrapped), including zip code.
- The product's net weight.

A handling statement, such as "Keep Refrigerated."

- Inspection legend indicating the facility's establishment identification number.
- Safe handling labeling for raw products.



Labeling requirements for uninspected poultry - Uninspected poultry may be offered for sale directly to consumers and must be labeled: "Not inspected-exempt from Wisconsin Statute 97.42," the weight, and the producer's name, address, and zip code.

Labeling requirements for any other uninspected meat (i.e., rabbit, emu, ostrich) - These products may be offered for sale directly to consumers and must be labeled with the weight, the producer's name, address, and zip code, and a handling statement, such as "Keep Refrigerated."

Nutrient claims - Meat items with nutrient statements on the label, such as "Lean," "Extra Lean," or "Low Fat," must meet specific nutrient labeling requirements. If your product falls into this category, contact the DFS office nearest you for additional information.

Safe handling labels - Labels for raw products must state that meat may contain bacteria that can cause illness if mishandled or improperly cooked. The label must instruct consumers to keep raw meat and poultry refrigerated or frozen, to thaw in the refrigerator, or microwave, to keep it separate from other foods and working surfaces, to wash utensils and hands after contact with raw meat, to cook it thoroughly, and to refrigerate immediately or throw out leftovers after the meal has been eaten. For more information about specific labeling requirements, contact the DFS regional office serving your area.

Bulk sales labeling - If you are selling in bulk, such as a half a lamb, it is permissible to put one label listing your name, address, zip code and contents - "half lamb" on the box containing the meat. However, individual packages of meat for sale must be individually labeled. And individual cuts wrapped separately must carry a net weight statement on their individual label. For half carcasses, you simply need to provide an invoice showing the "hanging weight" (weight of the dressed carcass).

For more information
on safe food handling, call
USDA's Meat and Poultry Hotline

800-535-4555

10-4 weekdays, Eastern Time
Washington, D.C. area residents
call **202-720-3333**

Wisconsin Livestock & Meat Council

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U.S. Department of Agriculture
Food Safety and Inspection Service

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact the USDA Office of Communications at (202) 720-5881 (voice) or (202) 720-7808 (TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C., 20250, or call (202) 720-7327 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

A Quick Consumer Guide to Safe Food Handling Labels

Even experienced shoppers and cooks can use a little **extra** help handling perishable meat and poultry products.

But if you know more about HOW to refrigerate, prepare, cook and store these foods, you and your family can stay healthy.

READ THE NEW SAFE FOOD HANDLING LABELS

- *You'll be a smarter consumer.*
- *You'll learn to make safe food handling part of regular meal preparation and*
- *You'll be protecting everyone who enjoys your food.*

Our New Safe Food Handling Labels Cover

- Storing meat and poultry
- Preventing the spread of bacteria from one food to another
- Cooking meat and poultry thoroughly—this means all the way through, and
- Handling leftovers.

LOOK FOR the New Safe Food Handling Labels on

All raw and partially pre-cooked meat and poultry products. This means any product that is not ready to eat when you buy it.

- Raw products like chicken legs, hamburger, roasts, whole turkey and frozen chicken breasts will have safe handling labels.
- Partially cooked or char-marked items like hamburger patties with grill marks, breaded chopped steaks and pork patties will have these labels too.

Look inside for more information on how to use the new "Safe Handling Instructions" label.

The "Whys" Behind the Safe Food Handling Label

Store & Thaw Safely

Refrigerate or freeze meat and poultry the minute you get home from the store. Most foodborne bacteria can only grow slowly if at all at 40° F, a safe refrigerator temperature. Freezer temperatures of 0° F *stop* bacterial growth.

Thawing food on the counter is risky because foodborne bacteria can multiply rapidly at room temperatures. Thaw in the refrigerator or microwave. When you thaw food in the microwave, cook it right away.

Safe Handling Instructions

This product was prepared from inspected and passed meat and/or poultry. Some food products may contain bacteria that could cause illness if the product is mishandled or cooked improperly. For your protection, follow these safe handling instructions.

- Keep refrigerated or frozen. Thaw in refrigerator or microwave.
- Keep raw meat and poultry separate from other foods. Wash working surfaces (including cutting boards), utensils, and hands after touching raw meat or poultry.
- Cook thoroughly.
- Keep hot foods hot. Refrigerate leftovers immediately or discard.

Don't Spread Bacteria In the Kitchen!

Keep raw meat, poultry and their juices away from other food.

- For example, don't chop salad vegetables on a cutting board where you've just trimmed raw meat or poultry.
- At the grill, take a clean platter out to serve cooked meat, not the "bloody" platter you took them out to the grill on.

ALWAYS wash your cutting board, utensils, counter, sink and hands with hot, soapy water after contact with raw meat or poultry.

Cook Thoroughly

Cooking food all the way through is the single best protection you have against foodborne illness. Of course, you don't want tough, dried-out meat.

Use the temperatures in the chart (right) for safe, juicy results.

When you're not using a thermometer, look carefully at meat products before you serve them. Ground meat and poultry should be gray in the middle. For whole birds and poultry pieces, the juices should run clear.

For larger sized red meats like roasts, the surface should be well browned, but they may look slightly pink in the middle. However, if you have cut into the meat with a knife (scoring) or poked it with a fork to tenderize it, exposing the interior to bacteria, cook the meat to medium or well done.

Why can larger, unpierced cuts of red meat be pink in the center while ground meats can't? Ground meats receive so much grinding that surface bacteria can get mixed into the center. Therefore they must be cooked all the way through. Larger cuts of red meat do not usually present those risks.

Handling Leftovers

Bacteria and other pathogens are always ready to endanger your food. Perishable food must be kept HOT (140° F and above) or COLD (40° F or lower) to keep them from taking over.

Refrigerate leftovers within 2 hours after cooking or serving. Divide leftovers into small refrigerator dishes for safe, quick cooling. Discard anything left out too long.

COOKING TEMPERATURES

Product	Fahrenheit
Fresh Beef, Veal, Lamb	
Ground products like hamburger (Prepared as patties, meat loaf, meatballs, etc.)	160
Roasts, steaks and chops	
Medium Rare	145
Medium	160
Well done	170
Fresh Pork	
All cuts including ground product	
Medium	160
Well done	170
Poultry	
Ground chicken, turkey	165
Whole chicken, turkey	
Medium, unstuffed	170
Well done	180
Whole bird with stuffing (Stuffing must reach 165°)	180
Poultry breasts, roasts	170
Thighs, wings	Cook until juices run clear
Ham	
Fresh (raw)	160
Fully cooked, to reheat	140

Controlling Chemical Residues in Livestock and Meat

Dr. Larry Borchert
Meat Science and Muscle Biology Laboratory
University of Wisconsin, Madison

Introduction

The food industry recognizes that a key to consumer confidence is providing products that are considered healthful and safe. The healthy aspect of foods is generally apparent yet subject to constant revision in an environment of dynamic research and media exposure. The perception of safety, also, changes. In the decades following World War II consumer concern about food safety centered on unacceptable residues from pesticides, animal drugs, and potentially hazardous chemicals in the food supply. As a result of producer awareness and rigorous enforcement the incidence of violative residues in the meat supply has dropped markedly and the primary food safety concern shifted to microbiological safety because highly publicized foodborne disease outbreaks have been linked to the animal sources.

The traditional meat industry has learned from experience that adverse publicity surrounding contaminated meat can be devastating. Headlines such as: FSIS Has IBP Subsidiary On The Hot Seat In DES Beef Probe"[8] and "Dioxin Scare Spurs U.S. To Block E.U. Pork, Poultry Imports"[7] create what has been termed the "drip, drip" effect. That is, a continual, small "drip" of information through various media sources creates a larger than real perception of a problem with consumers.

The Food Safety and Inspection Service (FSIS) oversees industry's responsibility to ensure that meat, poultry, and egg products are safe, wholesome, free of adulterating residues, and accurately labeled. As part of FSIS regulatory oversight of industry, the agency conducts annually the National Residue Program (NRP). This program tests meat, poultry, and egg products for unacceptable (violative) residues from pesticides, animal drugs, or potentially hazardous chemicals. Under the 1996 Hazard Analysis and Critical Control Point (HACCP) regulation, industry is responsible for preventing violative residues in its products. When residue violations are determined to be reasonably likely to occur, industry must address it in their HACCP plan.

Violative levels of animal drugs and pesticides can have adverse health effects. A vigilant chemical residue prevention program is essential in preventing illnesses and fostering the prudent use of drugs and pesticides in animals that enter the human food supply.

The NRP is designed to provide: (1) a structured process for identifying and evaluating compounds of concern by production class; (2) the capability to analyze for compounds of concern; (3) appropriate regulatory follow-up of reports of violative tissue residues; and (4) collection, statistical analysis, and reporting of the results of these activities.

Under the NRP, FSIS inspectors collect samples of meat, poultry, and egg products at federally inspected domestic slaughter establishments immediately following slaughter or processing. State inspectors collect samples at state-inspected plants. Depending upon the sampling plan under which collection takes place the samples are either sent directly to an official laboratory for analysis for violative residue concentrations, or first tested on-site by inspectors using rapid screening tests. A carcass with any violative residue detected that exceeds its specified safe level, or contains a compound banned from use in food producing animals, is considered to be adulterated and is removed from the food chain.

Residue violations are followed-up in multiple ways. When violative residues are detected in food-producing animals, by any component of the NRP, FSIS currently notifies the producer whose animals are then subject to repeated follow-up enforcement testing when presented for slaughter until compliance is demonstrated. Slaughter plants are notified of violations so that plants better prevent them in their HACCP plans.[4]

Several vertically integrated meat processors and species trade associations have created animal quality control programs to primarily assure that their products are truly wholesome but also to reduce to the lowest level any

possibility of a problem occurring in order to avert any negative publicity.

In 1980 the turkey industry was rapidly growing because the meat of this specie was found to be a highly functional component in further processed meat products. The industry enjoyed the reputation of wholesomeness until it was discovered that a chlorinated hydrocarbon herbicide, dieldrin, had, through contaminated surface water consumed by the birds, gained entry to the meat supply. A national recall of processed turkey products resulted. Because of the nature of the industry at the time, the grower/processor immediately initiated a rigorous pre-slaughter monitoring program that proved to be highly effective. Six randomly selected birds from every flock (20 thousand birds) are sacrificed less than 14 days before the flock is to be slaughtered. Abdominal fat samples from each bird are subjected to a comprehensive chemical analysis for part per million (ppm) levels of 68 pesticides and polychlorinated biphenyls. In addition, breeder flocks are analyzed for sulfa compounds. If the analytical residue levels are below predetermined tolerance levels the flock can be moved to market. If violative levels of any of the compounds are indicated a resampling program is initiated which could lead to the prohibition of the flock for food use. That program has been enhanced and adopted by most major grower/processors and has been very effective in averting residue problem and enhancing the reputation of the turkey industry.[6]

The pork industry, through the National Pork Producers Council, in 1989, introduced an industry wide Pork Quality Assurance (PQA) program as a way for U.S. pork producers to address their role in providing a safe, wholesome product to consumers.[10] The plan incorporates the following Good Production Practices (GPP):

GPP#1. Identify and track all treated animals.

GPP #2. Maintain medication and treatment records.

GPP#3. Properly store, label and account for all drug products and medicated feeds.

GPP#4. Obtain and use veterinary prescription drugs only based on a valid veterinarian/client/patient relationship.

GPP#5. Educate all employees and family members on proper administration techniques and withdrawal times.

GPP#6. Use drug residue tests when appropriate.

CPP#7. Complete a quality assurance checklist annually, and recertify every two years.

In the decade of its existence, the PQA program has been extremely effective in gaining and holding consumer confidence in pork.

Similarly, the National Cattlemen's Beef Association, in July 1999, finalized their Beef Quality Assurance, National Guidelines.[9] This plan, to be implemented by all beef cattle producers, emphasizes control of all routes of pesticide, herbicide, drug and antibiotic entry into the meat supply. Key elements of the Guidelines are:

Feedstuffs:

- Maintain records of any pesticide/herbicide use on pasture or crops that could potentially lead to violative residues in grazing cattle or feedlot cattle.
- Adequate quality control program(s) are in place for incoming feedstuffs. The program should be designed to eliminate contamination from molds, mycotoxins or chemicals of incoming feed ingredients. Supplier assurance of feed ingredients quality is recommended.
- Suspect feedstuffs should be analyzed prior to use.
- Ruminant-derived protein sources cannot be fed per FDA regulations.
- Feeding by-product ingredients should be supported with sound science.

Feed Additives and Medications:

- Only FDA approved medicated feed additives will be used in rations.
- Medicated feed additives will be used in accordance with the FDA Good Manufacturing Practices regulation.
- Extra-label use of feed additives is illegal and strictly prohibited.
- To avoid violative residues, withdrawal times must be strictly adhered to.
- Where applicable, complete records must be kept when formulation or feeding medicated feed rations.
- Records are to be kept a minimum of two years.
- Operators will assure that all additives are withdrawn at the proper time to avoid violative residues.

Processing/Treatment and Records:

- Follow all FDA/USDA/EPA guidelines for product(s) utilized.
- All products are to be used per label directions.
- Strict adherence to extended withdrawal periods shall be employed.
- Treatment records will be maintained.
- All cattle shipped to slaughter will be checked by appropriate personnel to assure that animals that have been treated meet or exceed label or prescription withdrawal times for all animal health products administered.
- All processing and treatment records should be transferred with the cattle to next production level. Prospective buyers must be informed of any cattle that have not met withdrawal times.

More recently the dairy beef industry, in spite of preemptive producers programs, has had concern about problems with antibiotic residues.[12,11] The resulting publicity has undermined consumer confidence in products derived from this meat source. As a result, a cooperative industry and government effort to revise ante- and postmortem inspection procedures and sampling plans to better detect and control violative residue producers is underway. Preliminary versions of this program put most of the economic burden on the livestock producers. If it had been voluntarily initiated by the livestock producers before a problem arose, the cost would have been lower and adverse publicity, nonexistent.

The U.S.D.A. Food Safety and Inspection Service in April 1999 proposed the "Conceptual Framework for Risk-Free Meat, Poultry and Egg Products" which would encompass agricultural products from the farm to the table.[3] While many would debate the practicality of foods being 100% free of any risks, consumers are beginning to expect it. As stated in its title, the program is only conceptual but it clearly indicates that the agency is moving toward a perceived risk free meat supply. The burden is clearly on livestock producers and processors to forestall onerous regulations by initiation self-monitoring programs.

The FSIS-NRP for domestically produced products has four residue sampling components:[4]

Monitoring Plan - the random sampling of specified animal populations at time of slaughter to provide more information about the occurrence of residue violations on an annual, national basis.

Special Projects - information-gathering studies that do not meet the criteria for inclusion in the monitoring plan, e.g. when sampling will not be conducted over a full 12-month period, or when there is a lack of precise slaughter volume data on the production classes to be sampled. This designation is also used when it is not possible to define a "violation rate" for a compound because the violative level has not been defined. For example, when trace metals, such as cadmium or lead, are detected in edible tissues, a Special Project may be initiated to develop information on the frequency and concentration at which the residues occur.

Surveillance Sampling - targeted sampling designed to distinguish components of livestock, poultry, and egg products in which residue problems exist, measure the extent of problems, and evaluate the impact of actions taken to reduce the occurrence of residues. Surveillance Sampling is considered to be a

subset of Special Projects except that, unlike Special Projects, Surveillance Sampling sometimes employs on-site rapid screening tests.

Enforcement Testing - the analysis of specimens collected from individual animals or lots that appear suspicious to FSIS in-plant inspectors, based on herd history or antemortem or postmortem inspection. Enforcement Testing is also used to follow up on animals marketed by producers that have a history of presenting animals with violative concentrations of residues, to determine if the non-compliance has been corrected or to verify industry's HACCP system.

Each year approximately 40,000 samples are taken and analyzed on animal based products on the domestic monitoring plan and special projects.[5] The chemical residue classes that are monitored and the number of samples targeted for the year 2000 are:

Antibiotics - Bioassay	8930
Arsenicals	4420
Avermectins	4900
Beta Agonists	900
Carbadox	300
Chloramphnicol	710
Chlorinated Hydrocarbons	8450
DES/Zeronol	TBD
Dexamethasone	300
Florfenicol	300
Flunixin	300
Fluoroquinolones	900
Lead	TBD
Melengesterol	500
Nitroimidazoles	260
Organophosphates	TBD
Ractopamine	300
Spectinomycin	TBD
Sulfonamides	7640
Tilmicosin	840
Tranquilizers	300
Total	40250

In addition, at the time of slaughter, enforcement testing is conducted using the following rapid on-site screening tests:

SOS (Sulfa-On-Site) - tests swine urine for sulfonamide residues.

CAST (Calf Antibiotic & Sulfonamide Test) - swab test on kidney or liver tissue of bob veal calves (less than 3 weeks of age and under 150 lbs).

STOP (Swab Test on Premises) - tests for antibiotic residues in kidney tissue in all production classes of cows, chicken, hogs, turkeys and sheep.

FAST (Fast Antimicrobial Screen Test) - swab test on kidney or liver tissue of cows and bob veal for antibiotic and sulfonamide residues.

The rapid on-site screen tests consists of picking up tissue fluids in a swab, and then placing the swab onto a petri plate containing agar (growth medium) and an inoculum of various types of non-pathogenic bacteria. The swab-containing plate is then incubated at a favorable growth temperature. Failure of the bacteria to grow around the area of the added swab is an indicator that some type of antimicrobial compounds are present in the animal tissue.

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5 FSIS. 2000. 2000 FSIS National Residue Program Summary Tables. FSIS, USDA, Washington, D.C.

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(May 2000)

Safety of Cured Pork Products

Facts

National Pork Producers Council

PORK SAFETY

American Meat Science Association

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Safety of Cured Pork Products

The process for curing meat is enormously important to the pork industry. While portions of the carcass are used fresh, such as in pork chops or fresh breakfast sausage, most of it is cured to make ham and bacon, or as an ingredient in wieners or other luncheon meats. In fact, about seventy percent of the carcass is utilized in cured, value-added products.

Methods & Results of Curing

The key ingredient used to cure meat is nitrite. In addition, salt, spices and flavorings, and other functional components such as reducing agents and phosphates are normally used. These ingredients are distributed uniformly in the meat by grinding, chopping and mixing or by injecting a water solution of them into whole pieces of meat. The meat is heat processed and often smoked.

The most recognizable result of curing is the production of a typical cured pink color. In addition cured meat has a characteristic flavor and texture. From a preservation standpoint cured meat is more stable than fresh meat. Not only is it essentially pasteurized during the heat processing, but ingredients such as the salt make it more resistant to spoilage. Nitrite is especially important in this regard because it has inhibitory action against microorganisms and specifically against spores of Clostridium botulinum should they be present. Nitrite is an antioxidant thereby maintaining an attractive appearance and fresh flavor throughout the distribution/ refrigeration chain.

A Proven Historical Record

The salting and curing of meat can be traced into antiquity, but already by the close of the 19th Century scientists had discovered that nitrite was the required component and that it reacted with the meat pigment myoglobin to produce the characteristic cured color.

At the beginning of this Century there was a movement to have the Government ensure that our food supply be as safe as possible. One result was the Federal Meat Inspection Act in 1906. The regulations governing curing were issued in 1926, following a good deal of experimentation by USDA into the methods and results of curing ham. Basically, it was allowed to add one-quarter ounce (156 ppm) of nitrite to one hundred pounds of meat.

Interestingly and with the exception of some changes in the bacon regulations, the same rules are in force today, some seventy years later. This fact alone substantiates the strong safety record for cured meat.

Cured Meat Crisis of the 1970's

A strong tide of concern by consumers developed during the 1960's, and it was directed at environmental issues, against technology and especially at food safety issues. A major crisis developed around the issue of safety of cured meat, and it reached the point that the use of nitrite for curing was almost banned during the 1970's.

Fear centered on the suggestion that there might be preformed nitrosamines, which are carcinogens, in cured meat. Additionally, the nitrite remaining in cured meat, known as residual nitrite, was suspected as also being a health risk.

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pork Facts

Definition of Residual Nitrite

When nitrite is added to meat in the curing process it is "used'. It reacts with or is bound to various constituents of the meat such as the protein pigment responsible for color. For example, if 156 ppm is added only about ten to twenty percent of it is analytically detectable following the heat processing. It continues to decline with time. During the 1970's the residual nitrite content of cured meat was determined to be about 50 ppm, but there was a large range, for example, in wieners of 0 to 195 ppm.

Resolution of the Problem

By the close of the decade of the 1970's the National Academy of Sciences issued two reports which in essence indicated that nitrite cured meat was safe for humans. The detection of nitrosamines was found to be extremely low, and the government started a monitoring program which is still ongoing today. The industry has the option of lowering the amount of ingoing nitrite, thereby decreasing the potential for formation of nitrosamines. The use of reducing agents such as ascorbates was also shown to greatly reduce the risk, and they were used to the maximum. Other work demonstrated that the residual nitrite in cured meat contributed only a fraction to the total body burden of nitrite in humans. It is discovered that nitrite is generated in human saliva, for example, and that nitrate, such as found in green or root vegetables, contributed to the nitrite burden. As a matter of fact it is now known that nitric oxide is generated in and important to the human body.

Recent Evidence Indicating Safety of Cured Meat

The epidemiological studies used a residual nitrite of about 50 ppm to calculate the contribution of wiener consumption to total intake of nitrite. Recent work (Cassens, 1997) has shown that modern cured meats contain about 10 ppm of nitrite, a substantial reduction from the previously quoted 50 ppm. Also, considerable ascorbates remain in cured meats, and this offers strong protection against nitrosation reactions.

Cured Meat Implicated in Childhood Cancer

Epidemiological studies in 1994 and again in 1996 implicated wiener consumption with childhood cancer, and gave as the reason the residual nitrite content of the wieners. These studies have been criticized because they were based on recall data of what the individuals consumed.

Conclusion

The process of curing meat is an integral and important part of the pork industry. The use of nitrite for curing has been challenged as a potential health risk to humans, but changes made by the industry and research by scientists has led to the conclusion that consumption of cured meat does not pose a health risk. The new generation of cured meat has lower residual nitrite and higher ascorbates making them, in fact, safer.

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Meat Processing

This chapter begins by identifying all of the smaller scale slaughter and processing plants in Wisconsin. A direct marketer may need to contract with one plant to slaughter an animal and another plant to process the meat into retail cuts and value-added products. A producer may also direct their customers toward the custom exempt plants, if the customers are willing to pay a live animal weight, take ownership of the animal, and then pay the exempt plant to slaughter and process it on their behalf.

Paul Dietmann, the Sauk County Extension Agricultural Agent, then writes about the importance of establishing a good relationship with your local processors. Your business depends in large part on their service to you. You should pick your processor carefully, and once you find a good one, treat them right!

Some DATCP statistics on page 50 reveal slaughter data across many species in 2000-01. The next article about processing yields from beef, pork and lamb includes an explanation of common meat processing terms. Then two articles cover the nutrient composition of cuts of traditional and alternative red and white meats.An article from the National Pork Board on nutritional influences on pork quality is included because it gives an indication how diets and other production practices affect the ultimate quality of processed meats. While focused on pork, it's worthwhile reading for all species, if only because it reveals some of the "science" behind meat production.

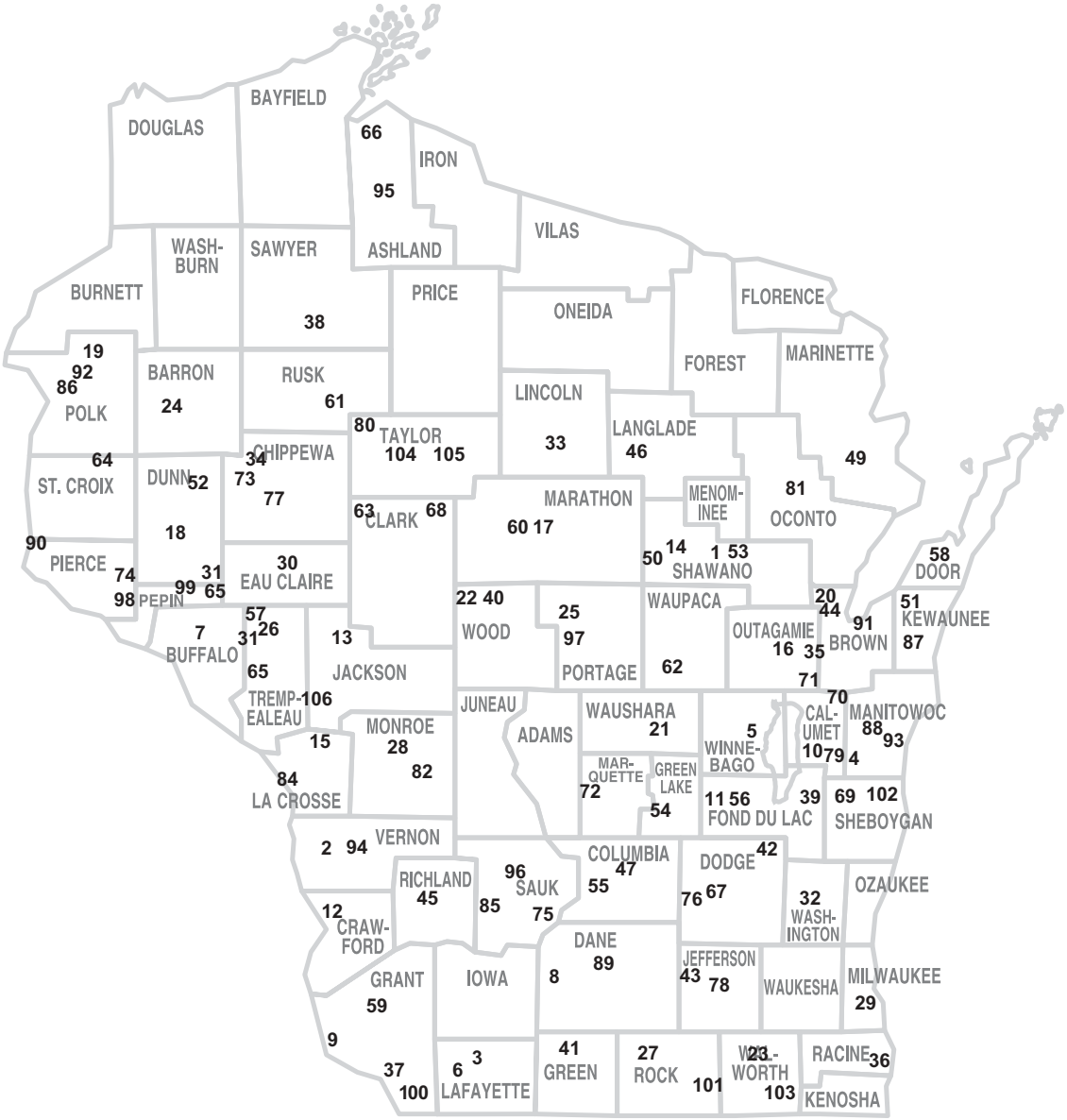
Next, brochures from the National Pork Producers Council and the National Cattlemen's Beef Association describe different cuts of pork and beef. Similar descriptions of cuts may be available from trade associations for other species, listed in the "Contacts" section on page 130. A short piece on aging beef, also from NCBA, may offer some insights for other species as well.

Finally, the chapter ends with an excellent article by Dr. Dennis Buege that provides information on sausage processing. The article concludes with several recipes for pork and beef sausage, which again might be adapted for other species.

Directory of Smaller Scale State-Inspected and USDA-Inspected Slaughter Plants in Wisconsin

Below are the state-inspected and USDA-inspected slaughter plants identified on the accompanying map. By law, any meat which is to be sold must be processed under inspection. State inspection is designated to be "equal to" USDA inspection, but meat from state-inspected plants cannot be sold outside of the state of Wisconsin (out-of-state people can purchase state-inspected meat within Wisconsin, and take it home for their own private use). Meat from USDA inspected plants can be sold out-of-state. Because meat from farm-raised bison, deer and elk was not included in early meat inspection laws, such meat processed in state-inspected plants can be sold out-of-state. While many plants are licensed to process (cut-up) poultry, at the current time only 2 plants (Nos. 101 and 102) are conducting inspected poultry slaughter. All plants are state-inspected except for Nos. 103-106, which are federally inspected.

Smaller Scale State-Inspected and USDA-Inspected Slaughter Plants in Wisconsin



Plant #.	Plant Name - Address (County)	Phone Number
1	Adams Meats - W10947 Riverside Rd., Pella 54950 (Shawano)	715-754-5136
2	Westby Locker & Meats - 406 N. Main, Westby 54667 (Vernon)	608-634-4515
3	Avon Locker - 12026 Hwy 23, Darlington 53530 (Lafayette)	608-776-2336
4	Brost Foods - 12115 Marken Rd., Kiel 53042 (Manitowoc)	920-693-8711
5	Beck's Meat Processing - 519 Clairville Rd., Oshkosh 54904 (Winnebago)	920-589-2104
6	Belmont Fresh Meats - 115 Mound Ave., Belmont 53510 (Lafayette)	608-765-6992
7	Butch's Country Market - W5823 State Road 85, Durand 54736 (Pepin)	715-672-8073
8	Black Earth Meats - 1345 Mill St., Black Earth 53515 (Dane)	608-767-3940
9	Bloomington Meats - 413 Canal St., Bloomington 53804 (Grant)	608-994-2867
10	Blue Ribbon Meats LLC - 435 S. 8th St., Hilbert 54129 (Calumet)	920-853-3234
11	Brandon Meats & Sausage Inc - 117 S. Commercial St., Brandon 53919 (Fond du Lac)	920-346-2227
12	Kickapoo Locker Service - Main St., Gays Mills 54631 (Crawford)	608-735-4531
13	Herb's Meats - 110 N. Church St., Alma Center 54611 (Jackson)	715-964-5781
14	Country Fresh Meats - 356 County Hwy Y, Hatley 54440 (Shawano)	715-446-3467
15	Craig's Meats & Catering - N9064 State Hwy 162 North, Mindoro 54644 (La Crosse)	608-486-2212
16	Custom Meat Industries - 3220 E. Northland Ave., Appleton 54915 (Outagamie)	920-734-3504
17	Custom Meats of Marathon - 1300 S. Hwy 107, Box 456, Marathon 54448 (Marathon)	715-443-3734
18	Downsville Meat Processors - N2615 451st St., Downsville 54735 (Dunn)	715-664-8327
19	Daeffler's Quality Meats Inc - 315 Oak St. W., Frederic 54837 (Polk)	715-327-4456
20	Dalebroux Meats - Rt. 3, 3348 Kewaunee Rd., Green Bay 54311 (Brown)	920-468-8658
21	Pine River Processing - W2575 Aspen Dr., Pine River 54965 (Waushara)	920-987-5191
22	Northern Processing - M211 Staadt Ave., Marshfield 54449 (Wood)	715-384-5868
23	Elkhorn Locker - 406 S. Wis St., Elkhorn 53121 (Walworth)	262-723-2919
24	Prairie Farm Locker - Box 12, 200 River St., Prairie Farm 54762 (Barron)	715-455-1541
25	People's Meat Market - 1765 Cty Hwy J, Stevens Point 54481 (Portage)	715-592-6328
26	Falls Meat Service Inc - 13212 Main St., Pigeon Falls 54760 (Trempealeau)	715-983-2211
27	Footville Meat Market - 280 N. Gilbert, Footville 53537 (Rock)	608-876-6323
28	Foss Fine Meats Inc - 325 W. Wisconsin St., Sparta 54656 (Monroe)	608-269-6456
29	Franklin Meats - 9431 W. Oakwood Rd., Franklin 53132 (Milwaukee)	414-425-0800
30	Frase's Locker - 136 S. Stone St., Augusta 54722 (Eau Claire)	715-286-2920
31	Indee Meats & Locker Service - 23553 Adams, Independence 54747 (Trempealeau)	715-985-3712
32	Gehring's Meat Market - 5618 Hwy K, Hartford 53027 (Washington)	262-644-6273

Plant #.	Plant Name - Address (County)	Phone Number
33	Geiss Meat Service - W4490 Pope Rd., Merrill 54452 (Lincoln)	715-536-5283
34	Grimm's Sausage & Meat Proc - 400 Main St., Box 1, New Auburn 54757 (Chippewa)	715-237-2234
35	Haen Meat Packing - W1910 Cty Hwy KK, Kaukauna 54130 (Outagamie)	920-766-3239
36	Harry Hansen Meat Service - 10407 Hwy K, Franksville 53126 (Racine)	262-835-4495
37	Hauber Processing Plant - Box 227, Dickeyville 53808 (Grant)	608-568-7579
38	Whiskey Ridge Processing - Hwy 27-70, Radisson 54867 (Sawyer)	715-945-2425
39	Salchert's Meats Inc - 1305 Main St., St. Cloud 53079 (Fond du Lac)	920-999-2651
40	Hewitt's Meat Processing Inc - 8300 Cty V, Marshfield 54449 (Wood)	715-676-3654
41	Hoesly Meats - 219 Industrial Dr., New Glarus 53574 (Green)	608-527-2513
42	Hoff's Red Owl - 617 Main St., Brownsville 53006 (Dodge)	920-583-3734
43	Lake Mills Locker - N6775 Hwy A, Lake Mills 53551 (Jefferson)	920-648-5514
44	Hujet Meats - 3787 New Franken Rd., New Franken 54229 (Brown)	920-866-2411
45	Richland Locker Co Inc - 590 S. Main, Richland Center 53581 (Richland)	608-647-4577
46	Highway 45 Locker Plant LLC - N2220 Hwy 45 South, Antigo 54409 (Langlade)	715-623-3554
47	Johnson's Sausage Shoppe - 425 Lowville Rd., Rio 53960 (Columbia)	920-992-6328
48	Kewaskum Frozen Foods - 118 Forest Ave., Kewaskum 53040 (Washington)	262-626-2181
49	Kinziger Meats LLC - 4069 Hwy 141, Pound 54161 (Marinette)	920-897-3108
50	Pond-Hill Processing - W16257 Co Hwy Q, Wittenberg 54499 (Shawano)	715-253-2491
51	Otto's Meats Inc - N5674 Adams St., Luxemburg 54217 (Kewaukee)	920-845-2612
52	Bri's Processing - N8084 State Road 40, Colfax 54730 (Dunn)	715-962-3825
53	Kropf's Meat Processing - N7666 Kolpack Rd., Bowler 54416 (Shawano)	715-793-4675
54	Ran's Meat Processing - N1130 Sunrise Lane, Dalton 53926 (Green Lake)	920-394-3805
55	Lodi Locker Market - 150 S. Main St., Lodi 53555 (Columbia)	608-592-3534
56	Loehr's Meat Service - 523 E. Main St., Box 233, Campbellsport 53010 (Fond du Lac)	920-533-4513
57	Strum Locker Plant - 128 5th Ave., Strum 54770 (Trempealeau)	715-695-2914
58	Marchants Foods - 9674 Hwy 57, Brussels 54204 (Door)	920-825-1244
59	Butcher Shop - 4391 Hwy 18, Fennimore 53809 (Grant)	608-822-6712
60	Mekong Fresh Meats Inc - 924 Locker Rd., Mosinee 54455 (Marathon)	715-693-1341
61	Mincoff's Meat Market - N2559 Market Rd., Conrath 54731 (Rusk)	715-532-5063
62	Niemuth's Steak & Chop Shop - 715 Redfield St., Waupaca 54981 (Waupaca)	715-258-2666
63	Nolechek Meats - 104 N. Washington St., Thorpe 54771 (Clark)	715-669-5580
64	Olson's Woodville Meats - 124 E. River St., Woodville 54028 (St. Croix)	715-698-2482

Plant #.	Plant Name - Address (County)	Phone Number
65	Pat's Country Market - 310 S. Nelson Dr., Arcadia 54612 (Trempealeau)	608-323-2131
66	Pearce's Sausage Kitchen - Rt. 4, Box 67, Ashland 54806 (Ashland)	715-682-3742
67	Pernat-Haase Meats - N4202 Hwy M, Juneau 53039 (Dodge)	920-386-3340
68	Pinter's Packing Plant - 193 Front St., Dorchester 54425 (Clark)	715-654-5444
69	Quality Cut Meats - 125A Milwaukee Ave., Cascade 53011 (Sheboygan)	414-528-8424
70	Roehrborn Meats - 640 W. Ryan St., Brillion 54110 (Calumet)	920-756-2400
71	Roskom Meat Packing - W803 Hwy S, Kaukauna 54130 (Outagamie)	920-766-1657
72	Russel Meat Processing - W8675 County Hwy I, Oxford 53952 (Marquette)	608-586-5589
73	Bob's Processing - 2430 S. Main St., Bloomer 54724 (Chippewa)	715-568-2887
74	Sailer's Meat Processing Inc - 117 S. Main St., PO Box 35, Elmwood 54740 (Pierce)	715-639-2191
75	Sauk Prairie Meat Service - 819 Phillips Blvd., Sauk City 53583 (Sauk)	608-643-3752
76	Country Meat Cutters - W9851 Cty G & GG, Reeseville 53579 (Dodge)	920-927-5577
77	Cooks Valley Processing - 14694 20th St., Colfax 54730 (Chippewa)	715-962-3026
78	Schroedl Market - N3705 Hwy 89, Jefferson 53549 (Jefferson)	920-674-3760
79	Bill & Lisa's Processing - W3445 Hickory Hills Rd., Chilton 53014 (Calumet)	920-849-2618
80	Jump River Slaughter & Smokehouse - PO Box 143, Jump River 54434 (Taylor)	715-668-5233
81	Gillett Meats - 214 E. Railroad, Gillett 54124 (Oconto)	920-855-2898
82	J.D.'s Country Meats - 26549 Locust Ave., Wilton 54670 (Monroe)	608-435-6720
83	Sorg Farm Packing Inc - N4290 US Hwy 14, Darien 53114 (Walworth)	262-724-5554
84	Holmen Locker & Meat Market - 412 S. Main St., Holmen 54636 (La Crosse)	608-526-3112
85	Straka Meats - Cedar St., Box 257, Plain 53577 (Sauk)	608-546-3301
86	Swank's Old Fashioned Meats - Hwy 8 & Country Rd. Y, St. Croix Falls 54024 (Polk)	715-483-3386
87	Theys Butchering - E1829 River Rd., Casco 54205 (Kewaunee)	920-845-5209
88	Tuschel's Fresh Country Meats LLC - 202 N. Calumet, Valders 54245 (Manitowoc)	920-775-4323
89	UW Meat Lab - 1805 Linden Dr, Madison 53706 (Dane)	608-262-1793
90	UW River Falls - Ag Science Bldg., River Falls 54022 (Pierce)	715-425-3704
91	Maplewood Packing Inc - 4663 Milltown Rd., Green Bay 54313 (Brown)	920-865-7901
92	Van Meter Meats, Inc - 407 S. Main St., Luck 54853 (Polk)	715-472-2141
93	Newton Meats & Sausage Inc - 5616 Cty Trunk U, Newton 53063 (Manitowoc)	920-726-4455
94	Vern's Butchering Service - 56036 Patterson Rd., Viroqua 54665 (Vernon)	608-632-0048
95	O'dovero And Flesia - Rt. 1, Box 65, Mellen 54546 (Ashland)	715-274-2094
96	The Meat Market - 700 Lincoln Ave., Baraboo 53913 (Sauk)	608-356-5574

Plant #.	Plant Name - Address (County)	Phone Number
97	Waller's Market - Box 8, Nelsonville 54458 (Portage)	715-824-2628
98	Watkins Locker Inc - 130 Pine, Plum City 54761 (Pierce)	715-647-2554
99	Gunderson Food Service - 847 E. Main St., Mondovi 54755 (Buffalo)	715-926-4903
100	Webers Processing Plant Inc - 725 N. Jackson St., Cuba City 53807 (Grant)	608-744-2159
101	Twin Cities Packing Co - 5607 E. Co J, Clinton 53525 (Rock)	608-676-4428
102	Dowty's Poultry Processing - N2434 State Hwy 57, Waldo 53093 (Sheboygan)	920-994-4758
103 *	Lake Geneva Country Meats - 5907 State Road 50 East, Lake Geneva 53147 (Walworth)	262-248-3339
104 *	Armbrust Meats - 224 S. Main St., Medford 54451 (Taylor)	715-748-3102
105 *	Little Black Pack - W5663 Gravel Rd., Medford 54451 (Taylor)	715-748-2141
106 *	North Bend Processing - N587 N. Bend Dr., Melrose (Jackson)	608-488-2029

** Federally-inspected plants.*

Directory of State Custom-Exempt

Slaughter Plants in Wisconsin

Below are the custom-exempt slaughter plants in Wisconsin. They do not have antemortem and postmortem inspection of the animals they slaughter, but their facilities are inspected by the Wisconsin State Meat Inspection Program. Meat inspection regulations allow animal owners the option to have their animals slaughtered and processed without inspection, either on the owner's premises or in a custom-exempt plant. However, such non-inspected meat is not

allowed to be sold. Packages of meat from carcasses processed in a custom-exempt plant must be marked "Not for Sale." If a producer is direct marketing their animal to a consumer using a custom-exempt plant, the transaction must be based upon the live animal weight (not the meat). Then the purchasing customer, as the animal owner, may choose to slaughter and process his/her animal through a custom-exempt plant. All of these exempt plants are state-inspected, (i.e., not federally-inspected.)

Plant #.	Plant Name - Address (County)	Phone Number
1	Blue Ribbon Meats and Groc. LLC - 109 E Main St., Butternut 54514 (Ashland)	715-769-3746
2	Linwood Meats - 1827 S. Hwy P, Stevens Point 54481 (Portage)	715-344-7622
3	Ecker Brothers - N3360 Lakeshore Dr., Chilton 53014 (Calumet)	920-439-1030
4	Ron's Meat Processing - 239 Edgewood Dr., Oxford 53952 (Marquette)	608-584-5655
5	Johnny's Market - W11124 Hwy 64, Pound 54161 (Marinette)	920-897-3329
6	Eastman Locker - Box 110, Eastman 54626 (Crawford)	608-874-4331
7	Martin's Meat Processing - N14558 Cty Hwy O, Withee 54498 (Clark)	715-229-4703
8	Nohl's Custom Slaughter - W4430 Cty Trunk Jm Route 1, Sheboygan Falls 53085 (Sheboygan)	920-893-0157
9	Marty's Custom Cutting Inc. - Corner Hwy P & N, Rubicon 53078 (Dodge)	262-673-5613
10	Dan's Processing Service - W14656 City Line Dr., Thorp 54771 (Clark)	715-669-5949
11	Ries Farms - N10961 Butternut Rd., Lomira 53048 (Dodge)	920-269-7239
12	Risler's Processing - N46375 Cty Rd V, Eleva 54738 (Trempealeau)	715-287-4535
13	Schmidt's Slaughter House - W3174 Swamp Rd., Bonduel 54107 (Shawano)	715-758-2475
14	Syed Family Sheep Farm - 2739 Hwy MN, Stoughton 53589 (Dane)	608-838-9590
15	Welch's Custom Processing - N5509 State Rd., Black Creek 54106 (Outagamie)	920-984-3667
16	Tri-State Farms - 7805 Cheese Factory Rd., Iron River 54847 (Bayfield)	715-372-6114
17	Witt's Locker - N3929 State Hwy 22, Shawano 54166 (Shawano)	715-526-5478
18	Nhiacha and Chao Butchery - 6056 E. Hwy 29, Luxemburg 54217 (Brown)	920-863-8754

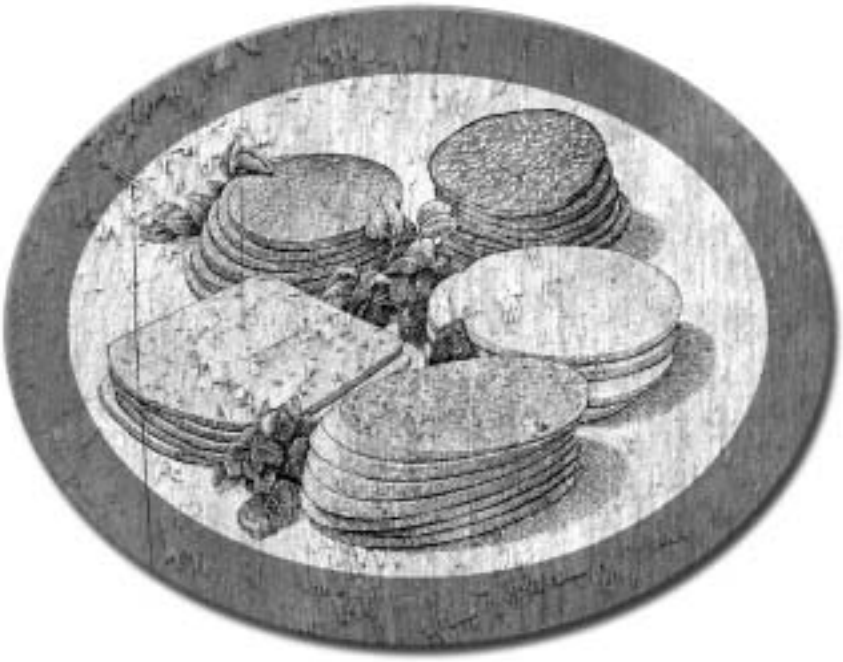
"Plants.CustomExempt", Misc.#10, 1-29-03

Processing Plant Statistics from the Bureau of Meat Safety & Inspection

COMPARISON 2000 – 2001

From The Department of Agriculture, Trade and Consumer Protection

Category	2001	2000	% change
Official Plants	283	281	+0.7%
Exempt Plants	62	62	0%
Total Plants	345	343	+0.6%
Cattle Slaughtered	37,095	37,753	-1.7%
Calves	234	207	+13.0%
Sheep	11,177	10,511	+6.3%
Swine Slaughtered	63,585	67,375	-5.6%
Poultry Slaughtered (Chickens & Turkeys)	170,139	127,092	+33.8%
Pheasants Slaughtered	160,253	128,065	+20.0%
Buffalo Slaughtered	520	387	+34.4%
Other: Deer, Elk	383	304	+25.9%
Ratites	210	466	-54.9%
Ducks, Geese, Wild Geese, Squab	1480	3330	-55.5%
Slaughtered & Processed Wts. (Red Meat)	124,773,772#	97,172,474#	+28.47%
Slaughtered & Processed Wts. (Poultry)	38,232,077#	35,981,125#	+6.3%



Working with Your Meat Processor

By Paul Dietmann, Sauk County Extension Agricultural Agent

The meat processor plays a crucial role in your meat marketing enterprise. It is illegal in the state of Wisconsin to sell beef, pork, or lamb that has not been slaughtered and processed in a state-inspected processing plant. Beyond the fact that it is a legal requirement to utilize the services of an inspected meat processing plant in order to sell most species of meat, your processor is also a part of your marketing team. Your processor will have a big impact on your customers, whether it is through the quality of the meat packaging and labeling or by the manner in which your customers are treated when they pick up their meat order at the processing plant. Selecting the right meat processor, one who understands your marketing goals and is committed to helping you succeed, is one of the most important decisions you will make in your meat marketing business.

Selecting Your Processor

Wisconsin is fortunate to have more than 100 state-inspected meat processing plants located within its borders. Most of these plants are small, family-owned and operated, community-oriented businesses. Our state also has one of the best meat inspection programs in the country. A producer/marketer of meat in Wisconsin can be confident that their products will be handled with great care and attention to food safety in any processing plant in the state.

However, meat processors in Wisconsin tend to fall into two groups when it comes to dealing with producers who are marketing their meat directly to consumers. The majority of processors view producer/marketers as an asset to their business. Every producer/marketer is, in essence, another salesperson for the plant, generating revenue and bringing new customers through the door. These processors appreciate the efforts of producers and will work hard to enhance the value of their producers' meat products so they can grow their businesses as well.

A small number of Wisconsin meat processors are not enthused about the increasing number of producer/marketers in the state. They see these producers as competitors who are taking profitable business away from their meat counters. They don't want to deal with the extra hassle of labeling cuts for producers. They don't want to be bothered with phone calls or pick-ups from the producer's customers and may treat the customers with disrespect. Producers often find that it is hard to schedule processing space in these plants, which will have an adverse impact on the amount of meat they can sell.

Obviously, you want to work with a processor who appreciates your business. There are several ways to find a good processor. First, talk to other direct marketers in your area. Ask them which processors they would or would not recommend and why. Second, make appointments with as many processors you can find within an easy driving distance of your farm. Spend some time visiting with each one and ask some of these questions:

- How many producer/marketers does the plant serve?
- How many weeks in advance will slaughter space need to be reserved? Does that lead-time vary according to the time of year?
- Does the plant have the ability to label the producer's product in accordance with state guidelines?
- Will the processor accommodate any special cutting or packaging requests from customers?
- Does the plant have the ability to dispose of all hides and offal?
- Is locker space available or will all meat have to be picked up as soon as it is wrapped?
- Does the plant have enough cooler space to age carcasses according to the producer's specifications?
- Can the plant cryovac (clear wrap) cuts of meat or do they only use freezer paper?

During your visit to the plant try to look at the facility through your customers' eyes. Will the plant appear clean, well-lit, and inviting to your customers? Is the plant easy to find? Is the entrance (and meat pick-up door, if it's in a different location than the plant entrance)

well-marked? Are the hours of operation convenient for picking up meat? Are plant employees courteous and friendly? Are other complementary products available for sale to your customers?

The process of buying your product should be a pleasant, enjoyable experience for your customers. The processor you choose can truly make or break your business.

Building a Good Relationship with Your Processor

Now that you have found the best processor for your products it is time to solidify that working relationship. The first thing to consider is that the best processing plants in Wisconsin tend to be extremely busy and often short-staffed. Anything you can do to help maintain the plant's efficiency will be greatly appreciated. Try to set up a regular slaughter schedule and give the plant as much lead-time as possible. Keep your animals well-bedded so they will be relatively clean when they get to the processor. Pick up meat promptly and try to avoid tying up the plant's freezer space. Encourage your customer to communicate their special orders to you rather than the plant so that the processor only has to be in contact with you. Ask if the processor will allow you to come into the plant to help label and sort your meat.

Another way to build a positive relationship with your processor is to include the plant in your advertising. A big part of the reason your customers are buying from you is because they value you as a safe, trustworthy, local source of meat; somebody who takes pride in producing a top-quality product. Identifying your processing plant in your advertising as a small, locally owned, quality-enhancing business can boost your image as well as your processor's. Make a point of including a flattering description of your processor in all of your brochures and other promotional materials. Be sure to mention your plant if you have an opportunity to participate in any media interviews about your business.

Encourage your customers to patronize your processor's store and meat counter to buy items they can't get from you. It is likely that your processor is procuring animals from other local producers to fill the meat counter so you will be indirectly helping your neighbors as well as your processor.

Conclusion

We have many excellent meat processing plants in Wisconsin. Spend some time looking for the processor who is most likely to support your business goals and who appreciates the value you bring to his or her business. Remember that your success depends on the strength of the working relationship you build with your meat processor.

The following information was excerpted from an article by Dennis Buege, titled "Direct Meat Marketing by Livestock Producers" (1995)

Producers should consider the following issues when selecting a meat processor:

- Distance from farm and customers
- General appearance/sanitation of plant
- Attitudes and friendliness of manager/employees
- Quality of processing operations:
    - cutting and wrapping
    - cured and smoked meat products
    - willingness to adapt to your customers' needs

The meat plant is an extremely important part of your operation. The two of you are really in this together. Its appearance and sanitation, the quality of work performed, and the manager/employees' attitude and treatment of customers will have a large effect on their satisfaction, and success of your enterprise. It may be worth your while to travel a little further to get the right plant.

How Much Meat Will You Take Home?

(From a Carcass, Side or Quarter)

By Dennis Buege and Ron Russell - Meat Science Laboratory, Animal Sciences Department - UW Madison

When animals are processed and the meat is bought by the carcass, side or quarter, how much trimmed, packaged meat should be available to take home to the freezer? The purpose of this fact sheet is to provide information on meat yields from beef, pork and lamb.

Losses From Slaughter and Meat Cutting

There is a large reduction in weight in going from a live animal to packaged cuts of meat.

Slaughter Losses - The slaughter process involves removal of the animal's blood, hide and internal organs. **Dressing percent** refers to the percentage of the live weight found in the carcass (carcass weight ÷ live weight X 100). Dressing percent varies with the type of animal, its thickness or muscling, its fatness, the method of dressing (skinned vs. dehaired pigs) and how much feed was present in its digestive tract.

	Beef	Pork	Lamb
Dressing Percent	56-65%	65-75%	45-55%
Live weight (lbs.)	1,200	250	120
Carcass weight (lbs.)	650-800	160-190	60-65

Processing or Cutting Losses

Conversion of a carcass to packaged cuts involves the trimming of fat and the removal of some or all bone. **Cutting yield** is the percentage of packaged meat obtained from a carcass (meat cut weight ÷ carcass weight X 100). **Cutting loss** is the percentage of fat, bone and other waste lost from a carcass as it is processed into retail cuts (weight of trimmed fat/bone ÷ carcass weight X 100). Cutting yield or loss is affected by the thickness/muscling and fatness of the animal, the closeness of fat trimming, and the extent of bone removal from cuts.

	Beef	Pork	Lamb
Expected Cutting Yield	55-68%	65-75%	45-65%
Carcass weight (lbs.)	725	175	60
Packaged meat weight (lbs.)	400-500	114-132	28-40
	(40% of live weight)	(50% of live weight)	(30% of live weight)

The above figures are good average values. There will be variation in yields from these values, depending on the factors listed above (animal type, degree of muscling, amount of fat deposition, fill in the G.I. Tract, and cutting method - - closeness of fat trimming and amount of bone removed).

Product Yields from Beef

Live Steer 1200 lbs. → Carcass 725 lbs.

	Estimates			Packaged Product-		
	Untrimmed Wt. (lbs.)	**Trimmed Cuts (lbs.)**	**Ground Beef (lbs)**	**Total Useable Product (lbs.)**	**Total Product (% of Carcass)**	**Possible Cuts**
Round (22%)*	160	72	30	102	14	Sirloin Tip Round Steaks Round Roasts Rolled Rump
Loin (16%)	116	43	15	58	8	T-bone Porterhouse Sirloin NY Strip Tenderloin
Rib (9%)	65	40	12	52	7	Rib Steak Rib Roasts Ribeyes Short Ribs
Chuck (27%)	196	80	65	145	20	Chuck and Arm Roasts Chuck Steaks
Flank, Plate, Brisket, Shank (20%)	145	38	56	94	13	Flank Steak Brisket Short Ribs Soup Bones
Miscellaneous (6%)	43		6	6	1	
TOTAL	725	270	184	457	63	

2. Percent of starting carcass weight.

Product Yields from Pork

Live Pig 250 lbs. → Carcass 175 lbs.

	Untrimmed	Trimmed Product		
	Weight (lbs)	**Weight (lbs)**	**% of Carcass**	**Possible Cuts**
Ham (25%)*	44	32	18	Cured or Fresh Ham
Loin (18%)	34	30	17	Rib and Loin Chops Sirloin Roast Country Style Ribs
Blade Shoulder (8%) (Boston Butt)	15	13	7	Blade Steaks and Blade Roasts
Picnic Shoulder (9%)	16	13	7	Arm Roasts Lean Trimmings for Sausage
Side (17%)	30	28	16	Bacon and Spareribs
Miscellaneous (20%)	36	15	8	Neck Bones Sausage Trimmings
Total	175	130	74	

3. Percent of starting carcass weight.

Product Yields from Lamb

Live Lamb 120 lbs. → Carcass 60 lbs.

	Untrimmed Wt (lbs)	**Trimmed Wt (lbs)**	**% of Carcass**	**Possible Cuts**
Leg (28%)*	17	12	20	Leg Roasts Leg Slices
Loin (16%	9	6	10	Loin Chops Loin Roasts
Rib (12%)	7	4	7	Rib Chops Rob Roasts Rack of Lamb
Shoulder (24%)	14	9	16	Shoulder Roasts Arm Chops Blade Chops
Miscellaneous (20%)	12	6	10	Riblets, Stewmeat Ground Lamb Shanks, Flank
Total	60	45	63	

4. Percent of starting carcass weight.

Meat Processing Terminology

Dressing Percent: The carcass weight expressed as a percentage of the live weight. For example, a 120-pound lamb yielding a 60-pound carcass has a dressing percent of 50%. Dressing percent varies with species of animal, live weight, hide cleanliness, fill in the digestive tract, degree of muscle development, fatness, and dressing procedure. Heavier weights, clean hides, minimum fill, heavy muscling and higher fat content increase dressing percentages.

Dressed Weight: The same as carcass or hanging weight. The weight of the carcass after removal of the head, hide (or hair), feet, organs and digestive tract during slaughter. Meat sold in bulk for the home freezer is usually priced on a carcass or hanging weight basis.

Sides and Quarters: A side is half of a carcass. It is a common method by which beef or pork are sold for home freezers. Beef is also sold as quarters or as "split sides". A front quarter is the front half of a carcass side. A hindquarter is the back half of a carcass side. Because the hindquarter contains a larger proportion of higher priced cuts, it always sells for more per pound than the front quarter. A split side is a quarter of a carcass, but includes cuts from both the front and hind quarter (a "half of a half"). Lambs are usually sold by the full carcass.

Processing Cost: The cost of cutting, wrapping and freezing a carcass, side or quarter. The processing cost is usually charged on a per-pound basis for the hanging weight in addition to a slaughter fee. Additional processing charges are assessed for extra services such as curing hams and bacons, making patties or sausages, etc.

Cutting Loss: Also known as processing loss. It is the percent of the carcass weight lost as bone or fat when a carcass is fabricated into packaged cuts. Cutting losses may vary considerably, depending largely on the amount of trimmable fat on the carcass. For example, a very lean beef carcass may have a cutting loss of only 25-30%, while a very fat carcass may have a loss of over 40%. Cutting loss is also affected by cutting method (bone-in vs. boneless cuts), and how closely the fat is trimmed (1/8 inch vs. 3/4 inch trim). Individual meat cuts sold at retail counters are subject to similar cutting losses. Final retail prices reflect these packer-to-retailer cutting losses.

Packaged Weight: Weight of packaged retail cuts that are ready for display in a meat case or storage in a home freezer.

Aging: Holding meat animal carcasses at low temperatures (35-45oF) for 7 to 14 days to allow naturally occurring enzymes in the meat to improve tenderness. Most tenderization occurs during the first 10 days of aging. Subtle flavor changes may also occur due to chemical reactions in the fat. Only beef and lamb carcasses with a uniform, protective fat cover may be aged without incurring excessive surface moisture loss if they are aged for long periods. Aging is very important to enhance beef eating quality. Because lambs are very young, they require a shorter aging period than beef. Pork is not aged.

Marbling: Flecks of fat in the lean. Marbling contributes to the flavor and juiciness of meat. Larger amounts of marbling increase the caloric content of meat.

Beef Grades: A voluntary carcass classification system administered by the USDA. Graded carcasses are assigned a quality grade based on the estimated eating quality, and a yield grade based on the expected yield of retail cuts from the carcass.

Quality grades (Prime, Choice Select) reflect animal age and the amount of marbling in the lean. As the quality grade increases from USDA Select to USDA Prime, the amount of fat (marbling) in the lean increases.

Quality Grade	Marbling in Ribeye
Prime	Abundant
Choice	Modest
Select	Slight
Standard	Traces

Yield grades (1, 2, 3, 4, and 5) estimate the expected cutting yield when carcasses are processed into retail cuts. Yield grade 1 carcasses are exceptionally lean while yield grade 5 carcasses are very fatty. The degree of muscle development in a carcass can also affect the yield grade.

Forms In Which Meat Can Be Sold
(Beef, Pork, Lamb and Veal)

- whole carcass
- half carcass (side)
- front or hind quarter (beef)
- split side (half of a half)
- bundles
- individual retail cuts
- processed meat products

Meat processors report that split sides are very popular. This gives the customer all the cuts from a side of beef (or pork), but in half the quantity (and for half the cost). Although a processor can offer 25 or 50 pound bundles of beef for sale from his plant, the sale of these smaller quantities may be difficult for a producer to coordinate in direct sales, because of the need to move all the cuts in a somewhat uniform manner. However, it can be done.

Cutting Instructions

Some producers collect cutting and processing information from the customer, and pass it along to the processor. In most cases, the customer deals directly with the plant in arranging cutting instructions. This is the way most plants prefer to operate (some insist on it). Plant operators are experts in processing and can more correctly tailor cuts and package weights to customer needs and desires and can also offer alternatives to customers. Also, if there is dissatisfaction with the processing, it will come back to the processor and not the farmer. Colorful 8-1/2 x 11 inch meat charts showing the major cuts from beef, pork, lamb or veal carcasses are available from the National Live Stock and Meat Board at a cost of $14 per 100. Order at 1-800-368-3138. These may be useful in assisting customers in determining how they want their meat cut.

Packaging and Storage Life

Almost always the meat in direct-to-consumer sales is frozen, and will be used by the customer over a period of months. Proper wrapping of meat in high quality freezer paper and rapid (sharp) freezing contribute to longer lasting quality in the product. The goal is to prevent moisture loss from the meat (freezer burn) and keep out air, which contributes to rancidity development (off flavors). Vacuum packaging in a plastic barrier film is an excellent way to achieve this, and also provides good visibility of the product. However, sometimes, handling of the frozen meat in such vacuum packages may lead to “leakers,” packages which lose their vacuum and the advantages that this packaging system provide.

Another key to customer satisfaction is having them use up the frozen product while it is still in good condition. Remind customers to operate their freezers at 0oF, and to use up the frozen product within these time limits for best flavor:

- beef - within 9 months
- pork - within 4 months
- lamb - within 9 months

For greatest customer satisfaction, try to “size” the amount of meat purchased to how fast a family uses it, so that product does not remain excessively long in their freezer, and provide them with undesirable eating experiences.

The Nutrient Composition of Meat Cuts

By Dennis Buege, Extension Meat Specialist and Susan Nitzke, Extension Nutrition Specialist, University of Wisconsin - Madison

Nutrient information for popular fresh meat, poultry and fish products has been developed from USDA handbooks, and is now posted or made available as handouts at retail cases in many grocery stores. The purpose of this fact sheet is to provide that nutrient information for beef, pork, lamb and veal cuts, and to make comparisons to poultry and fish products.

Nutrient values for fresh meat cuts are based upon 3 ounce (85 grams) boneless portions of cooked lean, trimmed of removable fat. Three ounces of cooked meat is represented by a quarter-pound hamburger (4 ounces raw - 3 ounces cooked), or is approximately the size of a standard size deck of playing cards. The USDA recommends that individuals daily consume two to three servings (5 to 7 ounces) from lean meat, poultry, fish or alternates (such as eggs, dried beans, and nuts) group.

Nutrients In Three Ounce Cooked, Trimmed Serving

Beef

Cut	Calories	Calories from Fat	Total fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Protein (g)	Iron (% daily value)
Eye Round Roast	140	40	4	2	60	25	10
Top Round Steak	150	40	4	1	70	27	15
Tip Round Roast	160	50	6	2	70	24	15
Sirloin Steak	170	60	6	2	75	26	15
Chuck Arm Roast	180	60	7	3	85	28	20
Top Loin Steak	180	70	8	3	65	24	10
Tenderloin Steak	180	80	9	3	70	24	15
Rib Steak, Small End	190	90	10	4	70	24	10
Rib Roast, Large End	200	100	11	4	70	23	15
Chuck Blade Roast	210	100	11	4	90	26	15
Ground Beef (10% fat)*	210	100	11	4	85	27	15
Ground Beef (17% fat)*	230	120	13	5	85	24	15
Ground Beef (27% fat)*	250	150	17	6	85	23	15

** Ground beef fat percentage is before cooking; products were broiled to well-done.*

Veal

Cut	Calories	Calories from Fat	Total fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Protein (g)	Iron (% daily value)
Cutlets	130	25	3	1	90	24	4
Loin Chop	150	50	6	2	90	22	4
Rib Roast	150	60	6	2	95	22	4
Shoulder Blade Steak	170	50	6	2	135	28	6
Shoulder Arm Steak	170	40	5	1	130	30	6

Pork

Cut	Calories	Calories from Fat	Total fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Protein (g)	Iron (% daily value)
Tenderloin Roast	140	35	4	1	65	24	6
Top Loin Roast	170	60	6	2	65	26	4
Top Loin Chop	170	60	7	2	70	26	4
Loin Chop	170	60	7	3	70	26	4
Sirloin Roast	180	80	9	3	75	25	6
Rib Chop	190	80	8	3	70	26	4
Shoulder Blade Steaks	190	100	11	4	80	23	8
Country Style Ribs	210	110	13	5	80	23	6
Ground Pork	250	160	18	7	80	22	6
Spareribs	340	230	26	9	105	25	8

Lamb

Cut	Calories	Calories from Fat	Total fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Protein (g)	Iron (% daily value)
Shank	160	45	5	2	90	26	10
Leg, Whole	160	60	7	2	75	24	10
Shoulder Arm Chop	170	70	8	3	80	24	10
Loin Chop	180	80	8	3	80	25	10
Shoulder Blade Chop	180	90	10	3	80	22	8
Rib Roast	200	100	11	4	75	22	8

Comparisons Among Cooked Meat, Poultry and Fish

Beef (composite)*	185	70	8	3	75	25	14
Pork (composite)*	180	70	8	3	75	25	5
Lamb (composite)*	175	70	8	3	80	24	9
Veal (composite)*	165	55	6	2	100	27	6
Chicken Breast**	120	15	1.5	0.5	70	24	4
Chicken Thigh**	150	60	7	2	80	21	6
Turkey Breast**	120	10	1	0	55	26	8
Turkey Thigh**	140	40	5	1.5	65	23	15
Cod**	90	10	1	0	50	19	2
Salmon**	150	65	7	1	50	22	4
Shrimp	110	20	2	0	150	22	5

** Average of major cuts*
*** Skinless*

How Does Meat Fit Into a Healthy Diet?

Meat is a good source of protein, B-vitamins, and minerals such as iron and zinc. But how does it fit into a heart-healthy diet? The table below presents for three levels of calorie intake the upper limits for daily consumption of total fat, saturated fat and cholesterol, as recommended by the American Heart Association. Comparing the values listed above for various products to this table shows how a 3 ounce serving fits into these daily recommendations:

	Total Fat	Saturated Fat	Cholesterol
American Heart Association Daily Recommendations	< 30% of calories	< 10% of calories	< 300 milligrams

Daily Calories				
1,500 calories	Less than	50 grams	15 grams	300 mg
2,000 calories	Less than	65 grams	20 grams	300 mg
2,500 calories	Less than	80 grams	25 grams	300 mg

Sources of Nutrient Information:

- Beef: USDA Handbook 8-13 (1990)
- Fish:USDA Handbook 8-15 (1987)
- Veal: USDA Handbook 8-17 (1989)
- Lamb: USDA Handbook 8-17 (1989)
- Poultry: USDA Handbook 8-5 (1979)
- Pork:USDA Handbook 8-10 (1991)

Nutritive Content of Alternative Red Meat Products

Ostrich – Emu – Venison – Elk – Bison

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Meat and poultry products provide valuable nutrients to the diet, including large amounts of high quality protein, important minerals such as iron and zinc, and significant amounts of five B-vitamins. Beef, pork, lamb, veal, chicken and turkey have traditionally been the primary meats consumed in the U.S. diet. During the 1990's, other sources of "red" meat emerged as alternatives in the meat supply, such as farm-raised bison, elk, deer, emu and ostrich. Because of their red color and the fact that most have not been traditionally consumed in the U.S., these products are sometimes collectively described as "alternative red meats" (ARM).

For some of these species, meat was initially a by-product of their production. Animal parts such as hide (skin), antlers, feathers, and oil were sometimes the most valuable parts of the animals. However, over time, the meat has become a significant part of their value and is offered for sale at some retail stores and restaurants nationwide.

To date, little nutrient information has been available on the products of these species, as they are raised in the U.S. An exception is bison (American buffalo), which is really one of the original meat sources on this continent, and for which some nutrient information exists. In 1998 the United States Department of Agriculture (USDA) funded a research project at the University of Wisconsin entitled "Alternative Red Meat: Marketing and Processing Improvement." This work was administered through the Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP), and carried out by the Meat Science Laboratory (Animal Sciences Department). An important aspect of this project was determination of the nutrient content of ARM meat products. This article summarizes the findings of that nutrient study and compares them to nutrient information on traditional meat sources.

Source of ARM Products Tested

To assure that the nutrient information obtained was representative of products marketed across the U.S., ARM products were selected for analysis to represent different geographic areas of production and processing, methods of feeding/raising the animals, and organizations that are strongly involved in marketing products. In most cases, 6 samples (or products of 6 animals) were included in the analyses. For venison, bison and elk, several cuts and ground product were examined. For ostrich, only ground product was tested, since Texas A & M University had already done nutrient analyses on ostrich products. Likewise, Texas Tech University had earlier analyzed nutrients in some emu cuts, so this study only examined the nutrient content of ground emu and two selected cuts.

ARM Product Preparation and Nutrient Analysis

Meat products were most often received as prepared cuts or patties, ready for cooking. Bison cuts were received as vacuum-packaged primal sections that were cut into steaks while still in the frozen state. When ground product was received in bulk form, four-ounce patties were formed prior to cooking. All ARM cuts

reported here were broiled to a final internal temperature of 160oF, which corresponds to a medium degree of doneness. Ground products were pan-broiled to an internal temperature of 160oF, the minimum temperature recommended for ground meat patties to insure safety from pathogenic bacteria.

The nutrient content of the trimmed, cooked lean was determined by a commercial analytical laboratory. All procedures used in product preparation and nutrient analysis were approved by personnel at the USDA Nutrient Data Laboratory to insure that the results would be acceptable for later inclusion in their Nutrient Database for Standard Reference.

Source of Nutrient Information on Traditional Meats

The most respected source of nutrient information on foods is the USDA Nutrient Data Laboratory's "Nutrient Database for Standard Reference." This is available to everyone via the internet at www.nal.usda.gov/fnic/foodcomp. Comparative nutrient values for beef, pork, lamb, veal, chicken and turkey products provided in this report were obtained from that web-based source.

Nutrient Composition of Cooked Meat Cuts

Table 1 presents key nutrients present in selected ARM cuts and in comparable cuts of traditional meat and poultry. The information is based upon cooked, three-ounce servings, trimmed of external waste fat, or with skin-removed. Three ounces is the standard serving size designated by nutrition authorities for expressing the nutrient content of fresh meat and poultry products. A three-ounce cooked serving is the size of a quarter-pound hamburger (4 oz. Raw = 3 oz. After cooking), or the size of a standard size deck of playing cards. The USDA's Food Guide Pyramid recommends two to three servings of meat, poultry, fish, beans, eggs and/or nuts daily.

While this project analyzed many nutrients in ARM products (including all minerals, vitamins, amino acids and fatty acids), Table 1 reports only key nutrients for which meat provides significant amounts - protein, iron, vitamin B6 and vitamin B12. Total fat, saturated fat (a part of the total fat), cholesterol and calories are also provided because of consumer interest in these components and their association with important dietary recommendations. Daily recommended intakes of nutrients, as provided by government agencies and health organizations, are included for comparison.

All meat and poultry cuts are excellent sources of high-quality protein, with a three-ounce cooked serving providing about one-half of most individuals' daily protein needs. In general, cooked cuts from the ARM species were lower in fat and saturated fat than comparable beef, pork, and lamb cuts, and chicken thigh. However, the meat of all species was fairly similar in cholesterol content. Although cholesterol is a lipid material, it is not the same as fat and does not vary with fat content of the meat. For example, veal products are lower in fat, but relatively higher in cholesterol. Most of the cholesterol found in meat is associated with muscle and fat cell membranes.

ARM products are very good sources of iron, an important element required for red blood cell formation. Since much of the iron in meat is associated with the red meat pigment myoglobin, the strong red color of ARM products predicts higher iron contents.

Three-ounce servings of the ARM cuts provided from 18% to 35% of the daily Vitamin B6 needs. Vitamin B12, required for the synthesis of DNA and for growth and development, is only found in animal products. Meat cuts varied substantially in vitamin B12 content, ranging from 12% of the daily recommended intakes from a single serving of chicken or turkey to 130% of the recommended daily intake from one serving of venison tenderloin.

Nutrient Composition of Cooked Ground Meat

Producers of all ARM species market ground products. The fat content of ground products can vary widely and is determined by the types of raw materials used. For example, raw ground beef can range from 5 to 30% fat. In these analyses, ground ARM products

represented what was commercially available from industry sources. The average fat content of raw products in this study was: ostrich - 8.7%; emu - 4.0%; venison - 7.1%; bison - 16.2%; and elk - 8.8%. The ground beef and ground turkey included in Table 2 for comparison purposes contained 17% fat (similar to ground chuck) and 8% fat, respectively, in the raw state.

Many of the observations noted above for cooked cuts likewise hold for cooked ground products. ARM ground products tended to be lower in fat and saturated fat, higher in iron, and similar in cholesterol content to ground beef or turkey. An exception was ground bison which was very similar to the ground beef. Ground emu and ostrich were substantially higher in vitamin B12.

Summary

This article summarizes determinations of the nutrient content of cooked products from Alternative Red Meat species (ostrich, emu, venison, bison and elk), and compares them to the nutrient content of traditional meat and poultry species. In general, ARM products tend to be lower in fat and saturated fat, higher in iron and similar in protein, vitamin B6 and cholesterol when compared to most traditional meat products. Emu and ostrich were found to have higher levels of vitamin B12.

For a complete copy of the University of Wisconsin report, contact Dennis Buege (608-262-0463). Cost is $5 to cover copying charges.

This fact sheet has been peer-reviewed by Susan Nitzke and Sherry Tanumihardjo, Department of Nutritional Sciences, University of Wisconsin-Madison.

Table 1. Nutrient Content of Alternative Red Meat, and Traditional Meat and Poultry Cuts

Based upon 3 oz. (85 gram) cooked, trimmed/skinless servings -

Product	Calories	Protein (gm)	Total Fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Iron (mg)	Vit B6 (mg)	Vit B12 (mcg)
Daily Dietary Recommendations*	1600-2800	50	<65	<20	<300 18 - F	8 - M	1.7	2.4
Ostrich[1]								
Fan	114	22	2.3	0.7	65	2.4	NA	NA
Top loin	132	24	3.3	1.0	79	2.8	NA	NA
Inside strip	139	25	3.6	1.1	82	4.1	NA	NA
Tenderloin	113	20	3.2	1.0	81	2.4	NA	NA
Emu								
Fan	122	26	2.0	0.5	70	3.9	NA	NA
Loin	123	25	2.7	0.7	75	4.3	NA	NA
Full Rump2	143	29	2.3	0.7	NA	5.9	0.8	1.9
Inside drum2	133	28	1.7	0.6	NA	6.2	0.8	2.0
Venison								
Round	129	27	1.6	0.8	72	3.6	0.6	2.0
Loin	128	26	2.0	1.0	67	3.5	0.6	1.6
Tenderloin	127	25	2.0	1.0	75	3.6	0.5	3.1
Bison								
Round	146	26	3.9	1.7	71	3.0	0.5	1.6
Rib	151	25	4.8	2.1	67	2.5	0.4	1.1
Sirloin	146	24	4.8	2.1	73	3.0	0.5	2.4
Elk								
Round	131	26	2.2	1.1	66	3.5	0.4	1.3
Rib/loin	141	26	3.3	1.6	64	3.4	0.4	0.7
Tenderloin	137	26	2.9	1.4	61	3.5	NA	NA
Beef[3]								
Round	161	27	5.0	1.7	71	2.4	0.5	2.1
Loin	182	29	8.6	3.3	65	2.1	0.4	1.7
Pork[3]								
Leg (fresh)	179	25	8.0	2.8	80	1.0	0.4	0.6
Loin	173	26	6.6	2.3	68	0.7	0.3	0.6
Lamb[3]								
Leg	162	24	6.6	2.4	76	1.8	0.1	2.2
Loin	183	25	8.3	3.0	80	1.7	0.1	1.8
Veal[3]								
Leg	128	24	2.9	1.0	88	0.8	0.3	1.0
Loin	149	26	5.9	2.2	90	0.7	0.3	1.1

Table 1. Continued

Based upon 3 oz. (85 gram) cooked, trimmed/skinless servings -

Product	Calories	Protein (gm)	Total Fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Iron (mg)	Vit B6 (mg)	Vit B12 (mcg)
Daily Dietary Recommendations*	1600-2800	50	<65	<20	<300 18 - F	8 - M	1.7	2.4
Chicken[3]								
Breast	140	26	3.0	0.9	72	0.9	0.5	0.3
Thigh	178	22	9.2	2.6	81	1.1	0.3	0.3
Turkey[3]								
Breast	115	26	0.6	0.2	71	1.3	0.5	0.3
Dark meat	138	25	3.7	1.2	95	2.0	0.3	0.3

gm = grams; mg = milligrams; mcg = micrograms; M = males; F = females

[1] Source: Ostrich Meat Industry Development Final Reports (1993 and 1996), Texas A&M University.

[2] Source: Texas Tech University

[3] Source: USDA Nutrient Database for Standard Reference.

*Based on FDA's Daily Values for a 2000-calorie diet, and the Institute of Medicine's Dietary Reference Intakes for iron, B6 and B12.

Table 2. Nutrient Content of
Cooked Ground Product from Alternative Red Meat, and Traditional Meat and Poultry Species.

Based upon 3 oz. (85 grams) of cooked product -

Product	Calories	Protein (gm)	Total Fat (gm)	Saturated Fat (gm)	Cholesterol (mg)	Iron (mg)	Vit B6 (mg)	Vit B12 (mcg)
Daily Dietary Recommendations*	1600-2800	50	<65	<20	<300 18 - F	8 - M	1.7	2.4
Ground Ostrich	149	22	6.0	1.6	71	2.9	0.4	4.9
Ground Emu	139	24	4.0	1.1	74	4.3	0.7	7.2
Ground Venison	160	23	7.0	3.6	83	2.8	0.4	2.0
Ground Bison	202	20	12.9	5.7	70	2.6	0.3	1.9
Ground Elk	162	23	7.4	3.6	66	2.8	0.4	2.2
Ground Beef**	217	21	13.9	5.5	69	2.0	0.2	1.7
Ground Turkey**	200	23	11.2	2.9	87	1.6	0.3	0.3

Intakes for iron, B6 and B12.

*Source: USDA Nutrient Database for Standard Reference

[9.] ground beef is 17% fat in raw state (similar to ground chuck). Pan-fried.

[10.] ground turkey is 8% fat in raw state. Cooked.

*Based on FDA's Daily Values for a 2000-calorie diet, and the Institute of Medicine's Dietary Reference

Nutritional Influences on Pork Quality

Facts

National Pork Producers Council

QUALITY

American Meat Science Association

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Nutritional influences on pork quality

Abstract

This paper reviews the literature relating to the potential impact of swine nutrition on pork quality attributes. Supra-nutritional levels of vitamin E have been shown to increase muscle vitamin E content and reduce lipid oxidation; however, the impact on muscle color and water holding capacity has been variable. Selenium is also potentially involved in reducing lipid oxidation; there is no evidence, however, that supplying additional selenium above the requirement improves pork quality. Recent research has suggested that the feeding of high levels of vitamin D3 in the final 10 days prior to slaughter improves pork color and reduces drip loss; these results require validation. Feeding ingredients with relatively high levels of unsaturated fatty acids increases the degree of unsaturation of the fat tissue, decrease fat firmness, and can negatively impact fat quality. The potential to produce "healthier" pork by feeding ingredients rich in omega-3 fatty acids and to improve fat firmness by including conjugated linoleic acid in the diet is discussed. There is evidence that restricted feeding of growing-finishing pigs can negatively impact pork tenderness and juiciness. The marbling fat content of pork has been positively associated with eating quality and feeding protein-deficient diets in the final 5 weeks prior to slaughter has been shown to increase marbling. Australian research has suggested that supplementation of diets with magnesium aspartate for 5 days prior to slaughter reduces the incidence of PSE and improves muscle color and water holding capacity. A range of other dietary compounds has been investigated; however, there is limited evidence on which to judge their efficacy for improving pork quality under commercial conditions.

Introduction

Historically, the formulation of diets for growing-finishing pigs has largely been based on meeting the animal's requirements for energy and protein to optimize growth performance and carcass lean content and supplying sufficient minerals and vitamins to prevent deficiency symptoms. Over recent years, however, there has been an increase in interest in improving pork quality and the potential for nutrition to improve attributes such as muscle color, water holding capacity and pork palatability has been more widely researched. The objective of this paper is to provide a broad overview of the current status of knowledge relating to potential links between swine nutrition and pork quality.

1. Vitamin and Minerals

1.1. Vitamin E and Selenium

A major cause of deterioration in the quality of meat during storage is lipid oxidation which can result in a number of undesirable changes and reduce the shelf-life of pork. These changes include the development of oxidative rancidity and the associated increase in unpleasant odors and flavors. In addition, the deterioration of fresh pork color during aerobic storage has been associated with oxidative changes in the chemical form of muscle pigments; myoglobin can be converted into metmyoglobin producing a dull brown muscle color which is less attractive to the consumer. This color change is particularly important for ground products, such as sausage, where a greater surface area is generally available for oxidation to take place. It has also been proposed that oxidation of the phospholipids in the cell membranes, which are rich in polyunsaturated fatty acids, disrupts cell wall integrity and can reduce water holding capacity.

Polyunsaturated fatty acids are essential components of cell and intracellular membranes but are susceptible to oxidation. The unsaturated fatty acid content of fat depots is very closely related to the composition of the dietary fat ingested by the pig and can therefore be readily manipulated by altering the fat source fed (see section 2). One approach to reducing the impact of oxidation on product appearance is vacuum packaging, where air is removed from the package, or modified atmosphere packaging and storage, which uses gases such as carbon dioxide in packages to displace oxygen and limit oxidation.

Another widely investigated approach to reducing oxidation in pork and improving shelf-life and quality is to use antioxidants such as vitamin E. In growing-finishing pigs, the NRC (1998) recommended that the dietary requirements for vitamin E to prevent deficiency symptoms is 11 mg/kg of feed of DL-α-tocopherol; however, increased levels of 30 mg/kg or higher are recommended in situations where rela-

tively high levels of unsaturated fatty acids are fed (Ullrey, 1981). The feeding of high levels of vitamin E to pigs to improve pork quality has recently been reviewed by a number of authors (Buckley *et al.*, 1995; Cannon, 1995; Jensen *et al.*,1998). Jensen *et al.* (1998) summarized the results of 14 studies that investigated the impact of feeding high levels of vitamin E (within the range of 100 to 800 mg/kg of feed of DL-α-tocopherol) to growing-finishing pigs. These studies used chops, steaks and/or ground pork products and employed a range of storage times and conditions post mortem. All of the studies that measured muscle vitamin E levels showed a dose dependent increase and a significant reduction in lipid oxidation from feeding high vitamin E levels. The effects of vitamin E feeding on pork color and water holding capacity were, however, more variable. For example, Jensen *et al.* (1997) found no effect of feeding vitamin E at levels up to 700 mg/kg on muscle color and drip loss despite the fact that muscle vitamin E levels were increased and lipid oxidation was decreased by the elevated dietary vitamin E treatments. Asghar *et al.* (1991) found that the surface redness of the muscle (measured by Hunter a^* values) was increased and the drip loss from frozen pork chops upon thawing was decreased by feeding 200 mg of α-tocopherol acetate per kg of feed compared to the controls that were fed diets containing 10 mg/kg of α-tocopherol acetate; the color and drip loss of muscle from pigs fed 100 mg/kg feed was intermediate between the other two treatments. These are similar to the results of Monahan et al. (1992). In addition, Monahan et al. (1994) also observed a reduction in lipid oxidation and drip loss from pork chops over an 8-day storage period for pigs fed 200 mg/kg α-tocopherol compared to controls.

Two recent studies that have investigated the effect of vitamin E on water holding capacity are summarized in Table 1. The study of Cheah *et al.* (1995) showed a significant reduction in drip loss from feeding 500 mg/kg of supplementary vitamin E for 46 days prior to slaughter for both Halothane negative and carrier animals. In contrast, Cannon et al. (1996) fed 100 mg/kg of feed of supplementary vitamin E for an 84 day period prior to slaughter and showed no effect on muscle color or drip loss for storage periods of up to 56 days post mortem. The obvious explanation for the difference in response observed in these two studies is the lower level of vitamin E used by Cannon *et al.* (1996) and these authors suggested that the lack of response may have resulted from the low α-tocopherol concentrations found in the muscle of treated pigs. Obviously, the response to dietary vitamin E supplementation will depend on the level fed and the time of feeding and may actually vary depending on the response criterion used.

Another nutrient that is involved in reducing lipid oxidation in the cell membrane is selenium, which is a component of the enzyme glutathione peroxidase. This enzyme can remove peroxides from cell membranes and has, therefore, a shared role with vitamin E in reducing cell membrane oxidation. However, there is little experimental evidence to suggest that providing pigs with additional selenium above that required to prevent deficiency symptoms (i.e. 0.15 to 0.30 ppm) shows any benefit in terms of meat quality. In addition, dietary inclusion levels above 5 ppm are generally considered toxic to pigs (NRC, 1998).

1.2. Vitamin D_3

Recently, there has been considerable interest in feeding high levels of vitamin D_3 to cattle to improve tenderness (Swanek *et al.*, 1997). It has been suggested that such an approach results in an increase in muscle calcium levels which stimulate proteolytic enzyme activity post mortem and improve meat tenderness. A preliminary study conducted at the University of Illinois, which evaluated the impact of feeding high levels of vitamin D_3 (331 vs 55,000 vs 175,000 IU/kg) to finishing pigs during the final 10 days prior to slaughter (Enright *et al.*, 1998), failed to show any beneficial effects on palatability traits (Enright *et al.*, 1998). However, drip loss was reduced and muscle color was improved for treated animals relative to controls. Research at Iowa State University has shown an increase in plasma calcium levels from feeding elevated vitamin D_3 levels (up to 500,000 IU per day) prior to slaughter but no effect on pork quality has been reported (Beitz *et al.*, 1998). Further research is required to validate the impact of feeding high levels of vitamin D_3 on pork quality and animal performance.

2. Fat Nutrition and Fat Quality

Fat quality is largely defined in terms of physical and nutritive characteristics, aspects which are both closely related to the fatty acid composition of the fat depots. In the pig, many of the fatty acids in the diet are absorbed across the gut intact and are deposited directly into the fat. Thus, the composi-

Table 1. Impact of dietary Vitamin E supplementation on drip loss from longissimus chops

Study	Supplementary Vitamin E level (mg/kg)	Other Treatment	Drip Loss (%) Control	Drip Loss (%) Supplemented
Cheah et al., 1995	500	Halothane genotype:		
		Negative	6.9	3.2
		Carrier	9.1	5.0
Cannon et al., 1996	100	Days of storage:		
		0	5.01	4.76
		14	3.81	3.30
		28	2.96	2.68
		56	2.35	2.40

Table 2. Influence of backfat thickness on composition of backfat (%)

Components	Average P2 fat thickness (mm) 8	12	16	SE of difference	Significance
Water	22.36	17.08	14.06	0.560	***
Lipid	69.25	77.00	81.59	0.726	***
Collagen	4.49	2.98	2.04	0.140	***
Fatty acid:					
Myristic (C14:0)	1.49	1.51	1.49	0.021	ns
Palmitic (16:0)	24.55	25.41	25.87	0.181	***
Palmitoleic (C16:1)	2.78	2.66	2.69	0.065	NS
Stearic (C18:0)	13.15	13.83	13.91	0.215	***
Oleic (C18:1)	40.34	42.83	43.11	0.307	***
Linoleic (C18:2)	14.94	12.38	10.65	0.368	***
Linolenic (C18:3)	1.11	0.89	0.84	0.043	***

Wood et al., 1989
NS, *** = not statistically significant, P<0.001, respectively.

tion of the fat depots, in terms of fatty acid profile, is closely related to the fatty acid composition of the dietary fat. If pigs are fed a diet with no added fats or oils they synthesize and deposit saturated fatty acids (principally palmitic and stearic) and mono-unsaturated oleic acid (Metz and Dekker, 1981). Deposition of polyunsaturated fatty acids (principally C18:2 and C18:3) occurs only if they are included in the diet.

The major issues relating to fat quality are soft fat, oxidative rancidity, and the impact of the composition of pork fat on human health. These issues are receiving increasing attention in the US pork industry because of the significant changes in production practices and consumer requirements that have occurred over recent years.

Soft fat is of major concern to the meat processor because it can cause significant problems during cutting, grinding and slicing operations and can result in lower processing yields and reduced value. For example, Shackleford *et al.* (1990) fed corn-soy diets with 0 (control) or 10% of either beef tallow, safflower oil, sunflower oil, or canola oil and showed a significant reduction in fat firmness for pigs fed the oil containing diets relative to controls. In addition, belly slicing yields and flavor and overall palatability ratings for bacon were lower for pigs fed canola oil. The softness of fat is directly proportional to the amount of unsaturated fatty acids in the fat depot. This area is receiving increasing attention because of changes in the genetics of pigs and in feed ingredients used to formulate swine rations. Soft fat problems are relatively greater in leaner pigs which have a greater proportion of the fatty acids in the carcass fat derived from the diet and a smaller proportion from *de novo* synthesis of fatty acids by the animal. This is illustrated by the results of a study by Wood *et al.*, 1989 (Table 2) that compared the composition of the backfat in pigs with different backfat depths and showed that leaner pigs had a higher proportion of polyunsaturated fatty acids (C18:2 and C18:3).

The inclusion of fat supplements in corn-soy diets is increasing due to the economic competitiveness of certain fats relative to corn on a cost per unit of energy basis and also to suppress dust levels within swine buildings. The use of high-oil corn in swine rations is also increasing and there is concern over the potential impact of this change on fat quality. All of these developments will result in an increase in the proportion of unsaturated fatty acids in the fat depots of the pig and increase the likelihood of soft fat problems.

The unsaturated fatty acid that is of major concern is linoleic acid (C18:2), because it is at a relatively high concentration in conventional feedstuffs and fat sources used in pig diets. Linoleic acid is not synthesized by the pig or significantly modified before being deposited in the fat depot. This means that all of the C18:2 in pig fat is derived directly from the diet. Vegetable oils are generally higher in unsaturated fats than animals fats, particularly C18:2, and the inclusion of these in rations will obviously increase the degree of unsaturation in the fat depots and increase the likelihood of fat quality problems.

A measure of the degree of unsaturation of fats, both dietary and within the body, is the Iodine Value (IV), with higher values indicating a greater proportion of unsaturated fats. Boyd *et al.* (1997) investigated the relationships between dietary fatty acid profile and the fatty acid profile and IV of backfat. The relationship between dietary linoleic (C18:2) content and the IV of the backfat was linear, with IV's increasing from approximately 65 to 76 for diets containing 1.3 and 3.5% of C18:2, respectively.

Threshold levels for body fat composition for soft fat problems have not been clearly established for US pigs. The Danish Meat Research Institute has set a fairly rigid standard of a maximum body fat IV of 70 (Barton-Gade, 1987). Boyd *et al.* (1997) suggested that some pigs fed a corn-soy diet with no added fat would exceed this threshold. To prevent problems occurring, dietary specifications in Europe generally include a maximum inclusion level for C18:2 which is commonly set at around 1.6% of the diet for finisher rations. Boyd (1997) has suggested a less stringent IV threshold of 74 for US conditions and dietary linoleic maximum of 2.1% to be under this threshold.

An area that has received relatively little attention is the relationship between the composition of pig fat and the eating

quality of pork, particularly in terms of odor and flavor. Historically, major problems in this respect were experienced with feeding fish oils or fish meals with a relatively high oil content and the associated development of fishy taints in the meat. Fish oils are high in polyunsaturated fatty acids such as C20:5 and C22:6 (Irie and Sakimoto, 1992) that are very susceptible to oxidative rancidity and the development of off-flavors.

The relationship between fatty acid composition of intramuscular fat and the palatability of pork was investigated in a European study by Cameron and Enser (1991) who showed that the correlations between the concentration of specific fatty acids and eating quality traits were generally weak. However, correlations involving polyunsaturated fatty acids and palatability scores were generally negative and those for the saturated fatty acids were generally positive suggesting that the higher the degree of unsaturation in the IMF, the greater the incidence of abnormal flavors. A possible explanation for this is the increased level of oxidation and development of rancidity for fat that is high in unsaturated fatty acid.

One of the consequences of the close relationship between the composition of dietary and body fat is that it is relatively easy to manipulate fat composition by changing the fat source fed to the pig. In the human, the consumption of high levels of saturated fat has been associated with an increasing incidence of coronary heart disease and a number of studies have investigated the potential for increasing the concentrations of "healthier" fatty acids in pig fat by including them in the diet.

Of particular interest have been the so-called omega-3 fatty acids that have been associated with a beneficial effect on cardiovascular diseases. Feed sources that are rich in omega-3 fatty acids include fish oils and certain vegetable oils such as flaxseed and linseed. Including these feedstuffs in diets for pigs has led to an increase in omega-3 fatty acid concentrations in the fat depots of the animal but has also been associated with an adverse effect on flavor in some studies probably as a result of lipid oxidation (Romans *et al.*, 1995a, 1995b).

Another issue receiving increasing attention is that of the effects of dietary conjugated linoleic acid (CLA) on growth, carcass and meat quality characteristics. This fatty acid is found at a relatively high level in dairy products and has been shown to increase feed conversion efficiency and decrease carcass fat content in laboratory animals (Chin *et al.* 1994). There has been little published on the effects of CLA on growth and meat quality in pigs. Duggan *et al.* (1997) fed diets containing either 2% CLA or 2% sunflower oil from 61.5 to 106 kg liveweight and found a reduction in feed intake (-5.2%), improved feed efficiency (5.9%), reduced subcutaneous fat levels (-6.8%) and similar growth rates for pigs fed CLA compared to those fed sunflower oil. Thiel *et al.* (1998) showed improvements in daily gain, feed efficiency and carcass fat levels from feeding between 0.12 and 1.0% CLA to pigs between 26.3 and 116 kg liveweight. In addition, belly hardness increased linearly as the concentration of CLA in the diet increased, suggesting an improvement in fat quality due to CLA inclusion. Further research is required to validate the effect of CLA on fat quality, including evaluation of palatability traits.

3. Feeding Level and Dietary Protein:Energy Ratio Effects

A number of studies carried out in the United Kingdom have shown an eating quality advantage for pigs reared under *ad libitum* compared to restricted feeding. The results from two of these studies are presented in Table 3. The feeding regimes were imposed between approximately 30 kg liveweight and 80 to 85 kg in the case of the Warkup *et al.* (1990) and from 30 kg to between 80 and 120 kg in the study of Ellis *et al.* (1996). The degree of feed restriction imposed was similar in both trials at approximately 82% of *ad libitum* intake. The results of these studies (Table 3) suggest a small but significant improvement in tenderness and juiciness from *ad libitum* feeding. The mechanism for any improvement in palatability observed with from *ad libitum* feeding has not been established but could result from the improved growth rate and/or increased intramuscular fat levels in *ad libitum* compared to restrict fed animals. Warkup and Kempster (1991) proposed a theoretical model in which increases in intramuscular fat levels and/or lean growth rates are associated with improvements in tenderness and juiciness. This model has not been validated but raises an issue over the extent to which eating quality can be improved by manipulating the growth curve of the animal.

In contrast to these positive associations between growth performance and palatability, other research has shown little effect of either feeding level or growth rate on eating quality. In a recent study, Wood *et al.* (1995) found no effect of *ad libitum* compared to restricted feeding (80% of *ad libitum* intake between 25 and 95 kg liveweight) on eating quality characteristics. In addition, a recent collaborative study carried out by Purdue University and the University of Illinois found little difference in tenderness and juiciness between pigs of the same genotype that were grown at widely different rates (A. Schinckel, personal communication) . This calls into ques-

Table 3. Effect of ad libitum and restricted feeding regimens on eating quality

	Advantage of ad libitum over restricted feeding[1]	
Trait	**Trial A[a]**	**Trial B[b]**
Tenderness	0.30***	0.47*
Juiciness	0.26***	0.19*
Flavor	.00	-0.05
Odor	0.12	0.02
Overall acceptability	0.19***	

1 8 point scale; lower values = poorer quality
*, *** = P<.05, P<.001, respectively
a Source: Ellis et al., 1996
b Source: Warkup et al., 1990

Table 4. Influence of feeding protein deficient diets on intramuscular fat content of the longissimus

Dietary protein/lysine level (%)		Intramuscular fat (%)		Weight range	Source
Adequate	Deficient	Adequate	Deficient	(kg)	
18.5/0.96	13.1/0.64	1.5	2.5	to 103	Essen-Gustavsson et al, 1994
17.6/0.81	11.9/0.48	1.4	3.5	25 - 98	Castell et al, 1994
25.0	10.0	3.4	9.4	30 - 90	Goerl et al, 1995
16.0/0.82	12.0/0.55	5.5	11.2	10 - 100	Kerr et al, 1995
20.5/1.05	16.6/0.70	1.2	2.4	39 - 90	Blanchard et al, 1998
14.0/0.56	10.0/0.40	3.8	5.7	80 - 110	Cisneros et al, 1996

tion the influence of feeding regime and growth rate on eating quality.

There is concern that the low levels of IMF in some of the genetically lean lines of pigs result in reduced palatability of pork. In the short term, the easiest method to increase IMF levels is via nutrition and a number of studies have shown substantial increases in intramuscular fat from feeding protein-deficient diets to pigs (Table 4). However, most of these trials were carried out during both the growing and finishing phases of production. The protein-deficient diets also produced substantial increase in carcass fat levels and reductions in feed efficiencies and would be uneconomic in most situations. The impact of short-term feeding of protein-deficient diets on IMF levels is less well established. Cisneros *et al.* (1996) produced a 2 percentage units increase in IMF from feeding a protein-deficient diet for approximately 5 weeks prior to slaughter (Table 4). In a follow up study, Cisneros *et al.* (1998) investigated the interaction between the level of protein deficiency and time of feeding of protein deficient diets on longissimus IMF. The results of this study suggested that a minimum feeding period of 5 weeks was required to elicit a consistent response in IMF and that there was an optimum level of protein deficiency to produce the maximum response. Feeding protein levels above or below this optimum resulted in a reduction in the level of IMF within the muscle. In the study of Cisneros *et al.* (1998), pigs on the lowest level of protein (0.4%) had reduced growth rates relative to the other treatments and this is the probable explanation for the relatively modest response in IMF for this treatment.

Data from the quality lean growth modeling project carried out by the National Pork Producers Council has also shown a positive effect of feeding amino acid deficient diets on intramuscular fat but also the low-protein diets produced a deleterious impact on drip loss and tenderness.

4. Feed Withdrawal Prior to Slaughter

Denying pigs access to feed for a period of time prior to slaughter has a number of potential advantages. The stomach is relatively empty at slaughter and consequently the incidence of stomach punctures during the evisceration process and, therefore, the potential for carcass contamination by gut contents should be reduced. In addition, it may be possible to lower the glycogen content of muscles at slaughter and increase ultimate pH (Warriss and Brown, 1983), which may improve pork quality attributes.

The impact of feed withdrawal prior to slaughter has been investigated in a series of studies carried out at the University of Illinois which have used pigs with high and low glycolytic potential resulting from the presence of the Rendement Napole gene (LeRoy *et al.*, 1990; Lundstrom *et al.*, 1996). Pigs that carry the dominant allele of this gene (RN-RN- or RN-rn+) have elevated muscle glycogen levels and might be expected to respond differently to feed withdrawal compared to animals that are homozygous recessive at this locus (rn+rn+) and have normal, lower muscle glycogen levels. In the first of these studies (Bidner, 1998; unpublished data), pigs with high (RN-rn+) and low (rn+rn+) glycolytic potential were held off feed for 12, 36 and 60 hours before slaughter. The results from this study are presented in Table 5. Withdrawing feed for 36 or 60 hours resulted in an increase in muscle ultimate pH and improvements in muscle color for animals with low (rn+rn+) but not with high (RN-rn+) glycolytic potential. There was a numerical improvement in purge and drip loss for pigs with low glycolytic potential on the 36 and 60 hour treatments but this was not statistically significant (Table 5). Apparently, feed deprivation in animals with high glycolytic potential did not reduce muscle glycogen to a level low enough to impact muscle ultimate pH.

In a further study (Bidner, 1998; unpublished data), pigs with high and low glycolytic potential were held off-feed for period of 12 or 36 hours prior to slaughter. The longer period of feed withdrawal produced no change in muscle pH or any of the quality attributes for pigs with low or high glycolytic potential which is in contrast to the results of the previous study (Table 5). In the first study, pigs were mixed with other animals at the start of the feed withdrawal period, whereas they were not mixed with other pigs in the second study. This suggests that some form of additional stressor(s) is required to reduce muscle glycogen levels and improve meat quality. These two studies suggest that genotype and animal handling factors interact to determine the response in pork quality to feed withdrawal.

In addition, prolonged periods of feed withdrawal may be associated with loss of carcass weight and a reduced return for animals that are paid for on a carcass weight basis. British research has shown that carcass weights start to decline after about 9 to 18 hours of feed withdrawal and Warriss and Brown

Table 5. Influence of pre-slaughter feed withdrawal on longissimus muscle quality in pigs with low (rn+rn+) and high (RN-rn+) glycolytic potential - Study I.

Glycolytic potential	Low			High				
Time off-feed (hours)	12	36	60	12	36	60	SE	SIG
Ultimate pH	5.45[a]	5.59[b]	5.65[b]	5.36[a]	5.34[a]	5.36[a]	.02	*
Purge Loss, %	4.10	2.46	2.37	4.48	4.66	4.05	.33	NS
Drip Loss, %	4.17	3.11	3.50	5.49	6.22	5.25	.30	NS
Hunter L*	55.54[a]	53.08[b]	51.76[b]	55.33[a]	55.55[a]	55.48[a]	.45	*

(Bidner, 1998; unpublished data)
NS, * = not statistically significant, P<.05
a, b means within rows with different superscripts differ (P<.05)

(1983) predicted that between 18 and 48 hours of feed withdrawal the rate of loss was to equivalent to 0.11 % of carcass weight per hour. However, studies at the University of Illinois have suggested little impact of feed withdrawal times of up to 60 hours on carcass weight. The British research was based on entire males rather than castrates and used much lighter slaughter weights than in the Illinois studies, two factors that may explain the differences in response in carcass weight observed. Dressing percentage (i.e. carcass weight expressed as a percentage of slaughter live weight) is actually increased by feed withdrawal prior to slaughter as a result of losses of gut fill and offal weight, particularly a reduction in liver weight. This is illustrated by the results from the first study from the University of Illinois described above where dressing percentage was increased from 68.9 to 74.2 % for pigs held off feed for 12 and 60 hours, respectively.

An interesting finding with implications for feed withdrawal prior to slaughter has emerged from recent research carried out at the University of Illinois that investigated eating behavior in growing-finishing pigs (Hyun *et al.*, 1997). This study showed that in uncrowded situations, pigs consumed relatively little feed during the night time between 6.00 pm and 6.00 am. This suggests that if pigs are dispatched for slaughter early in the morning then the majority will not have fed for approximately 12 hours. If, however, pigs are crowded or the environmental temperature is high then feeding is likely to continue during the night time for most animals.

Another important factor that should be taken into account when considering feed withdrawal times is the impact on the shedding of bacteria by the animal. For example, there is evidence of an increase in the shedding of salmonella with increasing time of feed withdrawal prior to slaughter (R. E. Isaacson, 1999, personal communication), which obviously could have a negative impact on food safety. Further research is required in this area.

5. Other Compounds

A number of other dietary components have been reported to improve meat quality. Two recent studies have highlighted the potential to improve meat quality through inclusion of specific compounds in the diet immediately prior to slaughter that modify post-mortem glycolysis. A study carried out in Australia has shown a large effect on pork quality of dietary magnesium supplementation for 5 days prior to slaughter (D'Souza *et al.*, 1998) in terms of reduced drip loss, improved color and a lower incidence of the PSE condition for treated animals compared to controls (Table 6). Magnesium reduces plasma cortisol and catecholamine concentrations and may act to reduce the animal's glycolytic response to pre-slaughter stress. In a follow-up study, these researchers showed that cheaper magnesium sources (magnesium chloride and sulphate) were as effective in reducing drip loss and magnesium aspartate (D'Souza *et al.*, 1999).

Kremer *et al.* (1998) showed that

Table 6. The effect of feeding magnesium aspartate and pre-slaughter handling (minimum or negative) on meat quality

Diet (D)	Control		Magnesium Aspartate					
Handling (H)	Minimum	Negative	Minimum	Negative	SE of Diff	D	H	D*H
pH (40min)	6.60	6.59	6.79	6.69	.074	**	NS	NS
pH (24 hrs)	5.48	5.51	5.61	5.57	0.45	**	NS	NS
Drip loss, %	4.0	6.4	3.5	3.5	.82	**	*	*
Lightness-L*	48.7	49.1	45.2	47.4	1.11	**	NS	NS
% PSE carcasses	8	33	0	0	-	*	NS	NS

D'Souza et al., 1997
NS, *, ** = not statistically significant, P<.05, P<.01, respectively.

feeding sodium oxalate to pigs for 4 hours immediately pre-slaughter slowed the post-mortem decline in pH and decreased water loss from the muscle during a 12-day storage period. Sodium oxalate inhibits the action of the enzyme pyruvate kinase and, consequently, reduces the rate of post-mortem glycolysis.

There has also been interest in the administration of oral electrolytes in the last few days prior to slaughter to alter the acid-base balance of the animal. In particular, the use of oral sodium bicarbonate, an alkaline salt, has been evaluated as a technique to reduce the incidence of PSE. One study (Ahn *et al.*, 1992) has shown a delayed post-mortem pH decline in pigs given sodium bicarbonate orally immediately prior to slaughter. However, this study and that of Boles *et al.* (1994) failed to show any positive benefit of sodium bicarbonate treatment on pork color or drip loss.

Other reports have suggested that feeding high levels of L-carnitine (up to 300 mg/kg) and niacin (150 mg/kg) may positively impact meat quality (cited by Mordenti and Marchetti, 1996), although further research is required to confirm these findings. Also, recent data support the use of creatine monohydrate to enhance growth rate and to reduce drip loss as well as to improve juiciness and tenderness of the final product (E. P. Berg, 1998, personal communication). This work also needs further confirmation.

Conclusions

Research relating to potential links between nutrient supply and pig meat quality have been reviewed and a number of opportunities for nutrition to impact pork quality, both positively and negatively, have been identified. Generally speaking, most of the approaches to improving quality will increase production costs and ways of capturing any added value for the producer are needed before widespread adoption of these techniques by the industry.

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Chuck 7-Bone Pot Roast
Chuck Short Ribs
RIB 2
Rib Roast
Small End, Premium
Rib Steak
Small End
Ribeye Roast
Premium
Ribeye Steak
Back Ribs
SHORT LOIN 3
Top Loin (Strip) Steak
Boneless
T-Bone Steak
Porterhouse Steak
Tenderloin Roast
Premium
Tenderloin Steaks
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GRILL/BROIL
MARINATE & GRILL/MARINATE & BROIL
STIR-FRY
ROAST
STEWING
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POT ROAST
SHANK 6 & BRISKET 7
Shank Cross Cut
Brisket, Whole
Brisket, Flat Cut
Boneless
PLATE 8 & FLANK 9
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Upper row (l-r): center rib roast (Rack of Pork), bone-in sirloin roast. Middle: boneless center loin roast. Lower row (l-r): boneless rib end roast (Chef's Prime™), boneless sirloin roast.

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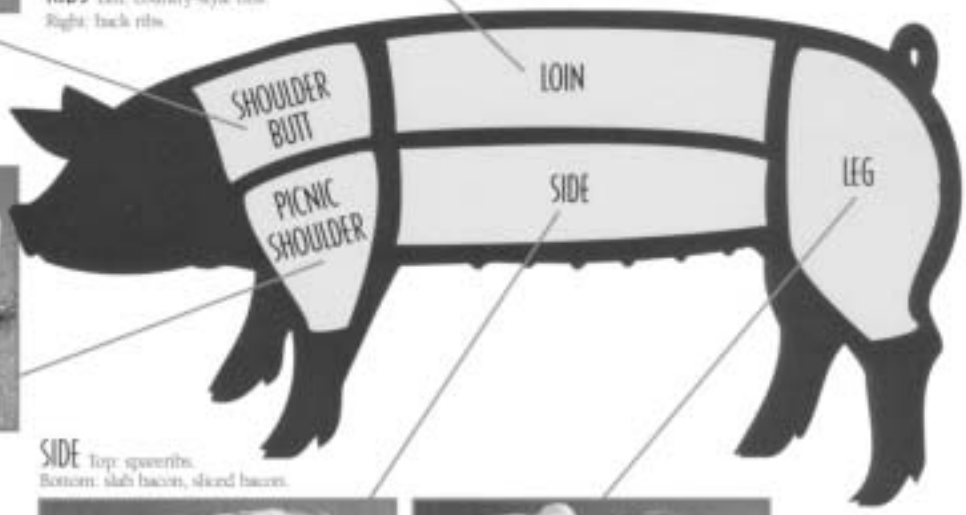
Left: country-style ribs.
Right: back ribs.



PICNIC SHOULDER

Upper row (l-r): smoked picnic, arm picnic roast.
Lower row: smoked hocks.

SIDE

Top: spareribs.
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BEEF FACTS: Meat Science

Aging of Beef

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Introduction

Postmortem aging, sometimes called *"conditioning"* or *"ripening,"* is a natural process which improves the palatability attributes of meat, especially cuts from the rib and loin. Commercially, postmortem aging is accomplished by subjecting carcasses, primal or subprimal cuts to controlled, refrigerated (above freezing) storage conditions. Of the palatability attributes of beef steaks, tenderness is the attribute most demanded by consumers, and the improvement in tenderness is the primary reason for postmortem aging. Postmortem aging, however, also improves the palatability attribute of flavor.

Primal or subprimal beef cuts from the loin and rib (middle meats) are specifically aged postmortem, since these serve as the source of the most desirable steaks (rib, T-bone, Porterhouse, top loin, sirloin and filet mignon steaks).

(While carcasses or cuts from any species could be aged, postmortem aging is generally limited to beef, due to the relative youth of pork, lamb and veal. Consequently, this discussion concentrates on the postmortem aging of beef.)

What is Postmortem Aging?

Postmortem aging is a process that occurs naturally in all muscle tissues, whether vacuum packaged or in the form of carcasses or wholesale cuts. In the conversion of muscle to meat, natural enzymes (*proteases*) found in muscles, break down specific proteins in muscle fibers (a process called *proteolysis*). This breaking (or *fragmentation*) of these protein strands, called *myofibrils*, by natural enzymes results in improved tenderness of the rib and loin muscles during postmortem aging.

Tenderization occurs at a relatively rapid rate until 3 to 7 days postmortem, and then the rate of increased tenderness diminishes with time. Practically speaking, the increase in tenderness of rib and loin cuts after 7 to 10 days is relatively small, compared with the increase during the first 7 to 10 days postmortem.

Types of Aging

Two types of postmortem aging processes are practiced commercially: *"dry"* and *"wet"* aging.*

Dry aging (Figure 1) is the traditional process of placing an entire carcass or wholesale cut (without covering or packaging) in a refrigerated room for 21 to 28 days at 32-34° F and 80-85% relative humidity, with an air velocity of 0.5 to 2.5 m/sec. All three conditions, although varying widely in commercial practice, are extremely important in the proper postmortem aging of carcasses, as well as beef ribs and loins.

Figure 1: Dry aging of a beef carcass.

* A third method, *accelerated aging*, uses a higher holding temperature, with ultraviolet light used to retard microbial growth which would normally occur at higher temperatures. This method, however, has not been used commercially to a significant degree in recent years, due to the extent that vacuum packaged products are subjected to wet aging.

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Too much humidity will allow excessive microbial growth, whereas too little will cause excessive shrinkage. Eighty-five percent relative humidity is a happy medium in slowing microbial growth and moisture loss.

Tenderness development can be accelerated by aging at a higher temperature; however, increased microbial growth becomes a serious problem at higher temperatures.

Air velocity is essential because it acts as a medium for moisture removal from the refrigerated area. Insufficient air velocity will allow excessive moisture to condense on the product, and as a result, off-flavors and aromas, as well as spoilage, will occur. Too high an air velocity, on the other hand, will result in excessive surface drying, with resulting weight and trim losses. The main disadvantage of dry aging is the cost associated with these weight and trim losses.

Wet aging (Figure 2) is the aging of meat in vacuum bags (usually the middle meats) under refrigerated conditions of 32-34° F. Obviously, humidity and air velocity are not necessary requirements for proper wet aging. Because most beef is vacuum packaged at the site of carcass *fabrication* (cutting), wet aging is the predominant method of postmortem aging today.

The aging process continues when a primal or subprimal cut has been placed in a vacuum package. By the time the cut reaches the retail store, at least 7-10 days have normally elapsed following slaughter, due to holding at the packing plant for carcass chilling and fabrication, inventory storage, shipping to the retail warehouse, and subsequent shipping to the retail store level. Therefore, the time associated with the rapid tenderization (7-10 days) and that associated with product movement to the retail store are similar. However, additional aging time is generally beneficial.

Figure 2: Wet aging of vacuum-packaged beef.

Dry and wet aging both result in a similar degree of palatability of rib and loin steaks; however, there can be distinct flavor differences. Meat from vacuum-aged cuts has a more bloody/serumy and metallic flavor, whereas, meat from dry-aging has a more brown-roasted beefy flavor.

What Factors Affect Aging?

Aging rate and time are postmortem variables affecting tenderness. Different rates of aging means some carcasses and/or cuts tenderize very early, while others tenderize gradually. In fact, some beef does not tenderize appreciably, regardless of the aging time. Muscles that are moderately high to high in connective tissue (e.g., muscles located in the round) generally are not very tender after adequate aging because the connective tissue is not fragmented sufficiently during aging.

Widely differing amounts of time for postmortem aging occur in commercial practice, due primarily to the time that vacuum packaged cuts are held in inventory prior to being processed into retail cuts for sale. The *National Beef Tenderness Survey*, conducted in 1991, indicated that beef was held (and, in effect, aged) from 3 to 90 days (with an average of 17 days) before retail sale. Aging beyond 28 days results in little benefit to enhanced palatability, and may even be detrimental in terms of increased and unwanted microbial growth and flavor changes.

Fortunately, most beef reaches some level of acceptable tenderness during postmortem aging; even so, the *National Beef Tenderness Survey* indicated that 15-20% of beef was undesirable in tenderness. Postmortem aging optimizes tenderness, but does not insure totally and uniformly tender beef steaks.

Specific muscles and quality grades are also considered important variables in postmortem aging. The tenderloin is the most tender muscle in the beef carcass, and interestingly requires little postmortem aging. The loin muscle, a relatively tender muscle, because of high fragmentation and small quantities of connective tissue (collagen), has a similar pattern of postmortem aging as the eye of the round, a less tender muscle of low fragmentation and more quantities of connective tissue (collagen). Steaks from different USDA quality grades, although differing in tenderness within and between grades, have a similar pattern of aging. That is, beef cuts from USDA Choice will age very similarly to beef cuts from USDA Select.

While postmortem aging can have a profound effect on improving palatability (especially tenderness), breeding, feeding, processing and preparation all play an important role in final consumer satisfaction. Indeed, cooking (preparation) often can be the most profound factor in determining beef steak tenderness. For example, beef loin steaks

broiled to a rare degree of doneness will be more tender than steaks cooked medium or well done.

Summary

Postmortem aging of beef carcasses and cuts is a natural process that usually improves tenderness under refrigerated conditions. Natural enzymes act to break specific muscle protein strands into smaller pieces to result in improved beef steak tenderness of rib and loin cuts. Most tenderization occurs early in the postmortem aging process, and by 10 days postmortem, most tenderization has occurred in rib and loin cuts.

Although postmortem aging has a profound optimizing effect on tenderness, it does not insure total and uniformly tender beef steaks because several other ante- and postmortem factors impact tenderness.

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Meat Science and Meat Sense

Information on Sausages and Sausage Manufacture

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Sausage Types

A simple definition of sausage is ground or chopped meat combined with salt, spices and other ingredients and shaped in some manner, usually by means of size casings. The origin of sausage-type products precedes recorded history. Over the centuries, sausage making has been refined and developed into an art strongly tied to ethnic groups. Today scientific principles are being employed to improve production procedures and product quality. By altering the process and meat and spice ingredients, a wide variety of sausages can be produced. Classifying all sausages into specific categories is very difficult, since any given sausage may be produced in a number of different ways. Below is a very simple and broad classification of the various sausage types based upon processing procedures and product characteristics:

Fresh sausages: Raw sausages (cooked by consumer), and do not contain the "curing" ingredient nitrite. Examples include fresh pork sausage, fresh Italian sausage, and fresh bratwurst.

Cooked sausages: Ready-to-eat sausages which are fully cooked during manufacture. Many are also smoked. These products may be eaten without heating, but often are reheated before serving. Examples include wieners, bologna, cotto salami, smoked sausage, cooked bratwurst and liver sausage.

Fermented sausages: Have a characteristic "tangy" flavor due to the accumulation of lactic acid produced from a microbial fermentation of added sugars (or in some cases by direct addition of encapsulated acids). These sausages are dried to varying extents during processing. Semi-dry fermented sausages (slight drying) include summer sausage and snack sticks. Dry fermented sausage (extended drying) include pepperoni, hard salami, and Genoa salami. With the proper amount of acidification and drying, these sausages can be shelf stable (no refrigeration needed).

Meat loaves and jellied products: Mixtures of chopped meat usually processed in pans or metal molds. Jellied products consist of cooked meat chunks suspended in gelatin. Examples include pickle and pimento loaf, honey loaf, jellied roast beef loaf and head cheese.

Sausage Types

Meat: Beef, veal, pork, lamb, mutton and poultry are all suitable for use in sausage. If you slaughter your own animals, meat off of the head, trimmings off of the skeleton and less popular cuts can be saved for sausage. If you purchase meat ingredients for making sausages, inexpensive cuts such as beef short ribs, chuck cuts, round cuts, and pork shoulder cuts can be used. Tenderness won't be a problem since we're producing a ground product. Whatever the source, use only raw meat ingredients that are fresh and wholesome. High quality sausages can be made only if the starting raw materials are of high quality.

Venison and other game meat may be substituted for all or part of the lean meats in sausage recipes. Because game is often slaughtered in the field under less sanitary conditions, it is especially important to be aware of the wholesomeness and condition of this type of meat. Generously trim away evidence of spoilage (discoloration, off-odors, stickiness, slime, etc.). Some people remove all of the trimmable fat from venison, as this fat can contribute to the development of rancid off-flavors.

Salt: Salt is the most important non-meat ingredient in sausages. Salt enhances the flavor of the sausages, and aids in preserving them against microbial spoilage (although the low, present day salt levels exert less of a preservative effect that the higher levels of the past). Salt also "solubilizes" and extracts the muscle protein on the surface of meat particles. This semi-fluid protein film coagulates during heating, binding the meat particles together and producing a firm sausage texture. Most sausage formulations contain 1 to 3% salt. Salt levels can be adjusted to suit your tastes. "Lite" salt, a blend of sodium chloride and potassium chloride, can be used to reduce the amount of

sodium in the product (be aware that excessively high levels of potassium chloride can import a bitter flavor to the product).

Nitrites and Nitrates: The purpose of these "curing" ingredients is to inhibit the growth of certain microorganisms (including the one that causes botulism); to develop the typical pink color of cured meats; and to enhance the flavor of the product. Nitrite is the specific active ingredient that carries out the functions listed above. When nitrate is used, it must be first converted to nitrite by microorganisms present in the meat. Potassium nitrate (saltpeter) was the salt historically used for curing. However, sodium nitrite has largely replaced the use of nitrate today.

Caution must be used in adding nitrite to the sausage batter since overdoses of this ingredient can be toxic to humans. Because of the safety concern in using nitrite, it is not readily available in pure form. In addition, since nitrite is added at a very low level (1/4 ounce per 100 pounds of meat) it would be difficult to accurately weigh out the desired amount on commonly available scales. Therefore, for safety and accuracy salt blends already containing nitrite at the proper level are best used by home sausage makers when the recipe calls for nitrite or nitrate addition. Mortons "Tender Quick Salt" is an example of such a blend, containing a very small amount of nitrite and nitrate. It is available in many grocery stores. When this blend is used as the salt source for products that call for nitrite or nitrate, these curing ingredients will automatically be added to the batter at a safe and proper level.

Most commercial meat processors obtain their nitrite in the form of a "curing salt." This is usually a blend of 6% sodium nitrite and 94% salt (colored pink by some manufactures to clearly distinguish it from salt or sugar). At this dilution rate processors add 4 ounces of the curing salt to 100 pounds of meat (0.4 ounces or 11 grams per 10 lbs. Of meat) to achieve the proper level of nitrite addition (156 parts per million).

Cooked sausages can be made without adding nitrite if desired. Such sausages will be brown in color (rather than pink), and more susceptible to flavor changes and microbial spoilage. It is best to store them in the freezer.

Spices: Much of the distinguishing flavors of different varieties of sausage is due to the type and quantity of spices in the recipe. Home sausage makers will usually use ground or whole natural spices in their products. The commercial meat processing industry today also uses spice extracts (extracts from natural spices which contain the characteristic flavors) in place of some natural spices. When these extracts are used, they are listed as "flavorings" on the product label.

Spices can be a significant source of bacterial contamination to sausages. Processors, if desired, can buy spices which have been sterilized by exposure to ethylene oxide gas or irradiation. Buy the best spice you can, for maximum flavor and greatest purity. Spices can loose volatile flavor components during storage. Store in covered containers and avoid long periods at high temperatures (i.e. above 80oF). Spices which are over one year old may have lost some of their flavor, particularly if they were not stored well.

Sugars: A variety of sugar sources can be used to impart sweetness and flavor to sausages. These include sucrose (table sugar), brown sugar, dextrose, and corn syrup. Sugars also react with proteins during heating to produce browning which enhances flavor and appearance.

Ascorbic Acid: Ascorbic acid (vitamin C) or sodium ascorbate speed the development of the pink cured color in sausages containing nitrite. Sodium erythorbate is chemically similar to ascorbate and is also used for this purpose. These "cure accelerators" are an optional ingredient for home sausage makers. When used, sausages can be heated and smoked immediately after stuffing. If ascorbate or erthythorbate are not used, the batter or stuffed sausages should be held overnight (refrigerated) before smoking and heating, to allow time for good cured color development. These ingredients are used at the rate of 7/8 oz. Per 100 pounds of meat.

Binders and Extenders: These are miscellaneous ingredients that may improve

flavor, help the sausages better retain fat and moisture (binders), or lower the cost of the sausage recipe (extenders). The best known of these ingredients include non-fat dried milk, cereal flours, and soy protein products. These products can be incorporated to suit your taste. In most commercial products they are restricted to less than 3.5% of the product weight.

Water: Government regulations permit various levels of water to be retained in many finished sausage products. This varies from 3% in fresh sausages to as much as 25% in low-fat cooked sausages. From a practical standpoint, 3% water could be added to fresh sausages if desired, and 10 to 15% to cooked sausages (remember some of that water will be lost from the product during cooking). Water aids the salt in "solubilizing" meat proteins (by forming a brine), helps the mixing of the batter and contributes to the juiciness of the final product.

Starter Culture: This is an inoculum of lactic acid bacteria that converts added sugar to lactic acid, producing the tangy flavor in fermented sausages. Many sausage processors mix a starter culture into the batter of summer sausage, snack sticks, etc. prior to the stuffing step, to insure later production of lactic acid in the sausage. Historically, processors relied upon chance inoculation by bacteria present in meat. However, if insufficient numbers of naturally-occurring lactic acid bacteria are present, little tang may develop. Starter cultures come in frozen or freeze-dried forms, and are available from suppliers who serve the meat industry. Although most starter cultures will ferment common table sugar (sucrose), the simple sugar dextrose is the choice of most sausage makers to include in their fermented sausage recipe.

In order to get a successful fermentation and acid production, the stuffed sausages must be held at temperatures favorable for bacteria growth (80-100oF) for 10 to 15 hours to allow the starter culture bacteria to grow and ferment the sugar to lactic acid. Without an effective starter culture in the batter to rapidly produce acid, these abusive fermentation temperatures can pose a microbiological safety risk

Encapsulated acids: In recent years some processors have acidified their sausage by adding encapsulated citric or encapsulated lactic acid to the batter, rather than using a starter culture. Encapsulated acids are small beads of acid surrounded by a lipid coat. These acids are gently blended into the batter near the end of final mixing (do not grind after mixing – don't want to disrupt the lipid coat). The sausage can then immediately be cooked, and when the batter temperature reaches 137oF, the lipid coat melts releasing the acid. Direct addition of acid must be done in this encapsulated form because direct addition of non-protected acid to the batter during mixing would cause the meat proteins to coagulate while still in the mixer, ruining product texture.

Encapsulated acids would be the easiest way for home meat processors to get a tangy flavor into their summer sausage, if they desired it. Consult local processors to see if they use this product, or can offer a source of these acids. Usual addition level of encapsulated acid is 6 to 10 ounces per 100 pounds of meat (depending on level of acid tang desired).
Note: While most summer sausages today are fermented or acidified, it is not a requirement for these products. Some summer sausages are made just as cooked sausages with summer sausage seasoning. Such sausages will not have an acid tang, but that is desired by some consumers.

Temperatures

It is extremely important to maintain proper refrigeration (40oF or lower) on your raw materials and product throughout processing, and on the finished product. Prolonged temperature abuse during manufacture can permit growth of undesirable microorganisms, leading to product spoilage or food-bourne illness.

During heating of cooked sausages, temperature of the product should pass rapidly through the temperature zone of 60-130oF which favors rapid bacteria growth. Most cooked sausages are heated to a final internal temperature of around 160oF. There are some alternative holding time and internal product temperature combinations which will also insure an adequate kill of disease-causing (pathogenic) bacteria.

These include:

Product internal temperature	Minimum holding time at internal temperature
145o F	10 minutes
150o F	3 minutes
155o F	1 minute

If product is being cooked in water, the water temperature should be in the range of 160-180oF. If being heated in a smokehouse or grill, an air temperature of 160 to 200oF is desirable. When cooked by dry heat, pans of water can be placed near the product to provide some humidity to reduce drying of the sausage.

Products should be adequately cooled after cooking. While adequate cooking will destroy all vegetative cells of disease-causing bacteria, several pathogens can form spores which will survive normal cooking procedures. If sausages are cooled too slowly, the spores may revert to the vegetative form and begin to grow. Commercial processors meet the following internal temperature cooling guidelines:

Uncured products (no nitrite):
- from 130oF to 80oF in less than 1.5 hours
- from 80oF to 40oF in less than 5 hours

Cured products (nitrite present):
- from 130oF to 80oF in less than 5 hours
- from 80oF to 45oF in less than 10 hours

Casings

Home sausage makers often inquire about where they can buy sausage casings. Usually a small supply of natural and synthetic casings can be purchased from local meat processors, who use these casings in the manufacture of their own line of sausages. If local processors do not have extra casings to sell, they could direct you to their casing suppliers. Most casings used in sausage making are either natural, collagen or synthetic. Natural casings are from the G.I. tract of animals. Most fresh bratwurst are in pork casings. Natural casing wieners and some breakfast sausages are in lamb casings. Ring bolognas are typically in beef casings. Natural casings always have a natural “curve” to them.

Collagen is an animal protein, often extracted from beef hides, and manufactured into an edible casing (collagen is also the main protein present in natural casings). Collagen casings are used on some breakfast links, bratwurst (especially pre-cooked bratwurst and other types of linked sausages. Collagen casings provide straight sausage links (no curve).

Synthetic casings come in a variety of forms. “Skinless” hot dogs are manufactured in cellulose casings (made from cotton linters), which allow smoke to penetrate and moisture to escape during cooking. After skinless franks are cooked and cooled, the cellulose casings are peeled off and discarded, producing “skinless” products. Larger size cellulose casings have paper fibers added for strength, and are termed “fibrous” casings. They are used for summer sausage and larger diameter slicing products.

Equipment

All equipment should be clean and in good working order. Minimum equipment needed for manufacturing most sausages includes accurate scales, a grinder and a stuffer. A silent cutter, consisting of high-speed rotating knives within a revolving metal bowl, is used for production of fine textured sausages. Sausage texture (coarse vs fine) can also be affected by the size of the holes in the grinder plate, and the number of passes of the meat through he grinder. The cooking of sausages may be accomplished in smokehouses, covered grills or water baths.

Trichinosis

This illness is often contracted by ingesting raw meat products containing pork infected with the parasite Trichinella spiralis. Although very few pigs today carry this parasite in their muscle, government regulations specify all pork containing products that might be eaten without further cooking must be heated to an internal temperature of at least 145oF as a precautionary measure. Alternatively, if pork is frozen at 0oF or lower for 20 days or more, it can be safely used in products that are not heated above 140oF. This frozen product is called “certified pork.”

Sausage Recipes and Procedures

The following pages list recipes and procedures for the sausages listed below. Each recipe is based upon a batch size of 10 pounds of meat. These are recipes used at the Meat Science Lab, collected from a number of sources. Meat types are suggested for each sausage. However, substitutions of other meats of similar fat content can be made with only minor flavor effects on the product. For example, lean venison could be substituted for the lean meats in any of the recipes. Often pork or beef containing some fat are included with venison to enhance eating quality. The composition of the sausages is really up to the producers' preferences.

Fresh Pork Sausage

Fresh pork sausage is a mixture of pork meats, salt and spices that has been ground or chopped with no added water or extenders. Fat content ranges from 35 to 50% depending upon individual preference. (Formulas - for 10# of pork trimmings)

Spicy or hot
(red pepper may vary depending on taste)
3.2 oz. Salt
0.6 oz. Sugar
0.6 oz. White pepper
0.15 oz. Rubbed sage
0.15 oz. Ginger
0.4 oz. Mace
0.4 oz. Thyme
0.4 oz. Red pepper
0.8 oz. Monosodium glutamate

Mix spices with trimmings; grind once through 3/8" plate and then through 3/16" plate. Use in bulk form, stuff in natural casings (pork rounds) or collagen casings.

Italian Style Pork Sausage

10.0 lbs. Lean pork trimmings (65% lean)
2.4 oz. Salt
0.4 oz. Fennel seed
0.4 oz. Crushed red pepper
0.2 oz. Ground black pepper
0.2 oz. White pepper
0.2 oz. Paprika
0.2 oz. Coriander (optional)
0.4 chopped fresh parsley (optional)
2 garlic cloves, minced (optional)

Grind the pork trimmings through a 1/4 inch or 3/8 inch plate. Mix seasoning with the trimmings thoroughly and stuff in natural casings or size 30 to 36 collagen casings. Hang overnight in 38oF refrigeration for spices to marinate.

SOURCE: A. E. Reynolds, Extension Meat Specialist, Michigan State University

Bratwurst

7.5 lbs. Pork trim
2.5 lbs. Beef trim or
10.0 lbs. Pork trim (80% lean)
3.2 oz. Salt
0.8 oz. Sugar
8.0 oz. Crushed ice
3.2 oz. Non-fat dry milk
2.0 oz. Fresh chopped onion
0.5 oz. Ground white pepper
0.15 oz. Lemon juice
0.013 oz. Ground allspice (.04 gm)
0.1 oz. Ground celery seed

Grind beef and pork separately through 3/8 inch plate. Regrind beef with onions and half the ice through 1/8 inch plate. Mix all remaining ingredients and remaining ice with ground beef and onion. Add pork and mix thoroughly. Regrind through 3/16 inch plate. Stuff into 32-35 mm hog casings and link. Cook in 170oF water for 10 minutes. Cool in 40oF cooler.

Polish Sausage

9.0 lbs. Boneless pork shoulders (80% lean)
1.0 lb. Beef trimmings
4.8 oz. Shaved ice
1.6 oz. Dextrose
0.5 oz. White pepper
0.3 oz. Mustard seed
0.2 oz. Marjoram (leaf)
0.1 oz. Granulated garlic
0.2 oz. Monosodium glutamate
0.2 oz. Nutmeg
3.6 oz. Salt

Grind through 1/8 inch or 3/16 inch plate and stuff into small diameter collagen casings or natural pork rounds. This sausage may then be smoked if desired. Further cooking is required. Sodium nitrite (see instructions) may be added to the fresh Kielbasa if a pink color is desired.

Holiday or Smoked Kielbasa

4.0 lbs. Lean pork trimmings (85% lean)
3.0 lbs. Lean beef trimmings (90% lean)
3.0 lbs. Regular pork trimmings (50% lean)
1.0 lb. Shaved ice
Sodium nitrite (see instructions)

Use the same spices as for Fresh Kielbasa. Grind lean beef through 1/8 inch plate and pork trimmings through 3/16 inch plate. Add cure, seasonings and ice and mix thoroughly. Stuff in natural hog casings and smoke at 90-100oF for 12 hours. Raise temperature gradually to 165-170oF and cook until internal temperature reaches 150oF.

SOURCE: A. E. Reynolds, Extension Meat Specialist, Michigan State University

Wieners

6.0 lbs. Beef
4.0 lbs. Pork
2.5 lbs. Ice
3.2 oz. Salt
0.7 oz. Sugar
0.5 oz. Ground white pepper
0.3 oz. Ground coriander
0.2 oz. Ground nutmeg
0.1 oz. Ground mustard
Sodium nitrite (see instructions)

Grind beef and pork through a 1/4 inch plate. If a silent cutter is available, chop the beef with the salt, nitrite, and half the ice to a temperature of 45oF. Add the pork, spices and remaining ice, and chop until proper texture is achieved, but not beyond a temperature of 58oF in the meat mixture. If a silent cutter is not available, a coarser textured product can be made by grinding the beef through a 1/8 inch plate and mixing thoroughly with the ice, cure, salt and spices. Grind the pork through a 1/8 inch plate and add to mixture. Blend until a uniform consistency is achieved. Stuff into natural or cellulose casings and hold over night at 40oF. Wieners are cooked in the smokehouse by slowly increasing the temperature from 130-170oF. Smoke may be applied during all or part of the cooking period.

Summer Sausage

Formula No. 11:
6.0 lbs. Lean pork trimmings
4.0 lbs. Beef trimmings (sinews removed)
4.8 oz. Salt
0.8 oz. Sugar
0.4 oz. Ground black pepper
0.5 oz. Vinegar
0.2 oz. Coriander
0.05 oz. Garlic powder (optional)
Sodium nitrite (see instructions)

Grind trimmings through 3/16” or 1/4” plate. Mix the ground materials with the seasonings and nitrite. Pack sausage in 6” deep pans and cure at 40-45oF for 2-3 days. Regrind through 1/8” plate and stuff in No. 4 fibrous casing or 2 1/2” casings. Place in the smokehouse at 90-110oF and give a heavy smoke for 6-8 hours. Raise the temperature gradually to 165-170oF and cook until the internal temperature reaches 140-150oF. Remove, shower with cold water, allow to dry and place the sausage in refrigeration.

SOURCE: A.E. Reynolds, Extension Meat Specialist, Michigan State University

SOURCE: Robert Rust, Extension Meat Specialist, Iowa State University

Dry Beef Salami

9.0 lbs. Beef trimmings (lean, 85%)
1.0 lb. Pork fat or beef kidney fat
5.0 oz. (10 Tbsp) salt
1.2 oz. (8 1/4 tsp) sugar
1.0 oz. (2 Tbsp) white pepper or black pepper
0.1 oz. (5/8 tsp) mace
0.1 oz. (5/8 tsp) ginger
Sodium nitrite (see instructions)

Grind beef through an 1/8 inch plate and fat through 1/4 inch plate. Mix all the ingredients for 5 minutes or until a good distribution of the fat and lean is apparent. Store the mix in trays 8 to 10 inches deep for 2 to 4 days at 40-45oF. Stuff into 5 inch fibrous casings, sewed bungs or suitable sized collagen casings. Hold stuffed product for 9 to 11 days at 40oF and 60% relative humidity.

SOURCE: A. E. Reynolds, Extension Meat Specialist, Michigan State University

Spiced Luncheon Loaf

10.0 lbs. Extra lean pork trimmings (85% lean)
1.2 oz. Clear corn syrup
4.4 oz. Salt
0.6 oz. White pepper
0.2 oz. Mace
0.1 oz. Nutmeg
Sodium nitrite (see instructions)

Grind pork trimmings through ¼” plate. Place in mixer, add ingredients and mix thoroughly. Fill in molds or stuff in No. 6 fibrous casings and hold overnight in 38oF cooler to cure. Water cook at 160-165oF until the internal temperature rises to 150oF. Molds may be oven-cooked at 250-275oF until temperature rises to 150oF. Allow to cool at room temperature, remove from molds and place in refrigeration for storage.

SOURCE: Service Manual of Union Carbide Corporation

Family Loaf

8.0 lbs. Pork trim (80% lean)
2.0 lbs. Lean beef trim (90% lean)
2.0 lbs. Water or ice
1.0 lb. Corn syrup
8.0 oz. Dried skim milk
0.8 oz. Dried onion
4.0 oz. Salt
8.0 oz. Tomato juice
0.5 oz. White pepper
Sodium nitrite (see instructions)

Grind pork through 3/16” plate. Chop beef and other ingredients for 2 minutes. Add the dried milk and chop for 3 more minutes. (Alternatively, grind beef through 5/8” plate - mix with remaining ingredients and grind through 1/8” plate.) Add ground pork and mix for 4 minutes. Cure for 24 hours at 40oF. Remix and pack in loaf pans. Leave at room temperature until internal temperature reaches 55oF. Bake at 250oF to an internal temperature of 150oF. Cool to 100oF and remove from pans. Refrigerate.

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Marketing

This chapter begins with an excerpt from an article by Dr. Dennis Buege that appropriately focuses on customers. To be successful at direct marketing, producers often need to develop a whole new set of skills that are necessary to attract and keep customers. One set of skills involves doing your own market research, as Dr. Rami Reddy explains in the next article. Finding customers who want and value what you can offer, and learning how to modify what you offer to better fit your customers' needs, are the goals of market research.

Once you know who your potential customers are, you need to convince them that you have what they're looking for. Self-promotion is not a natural thing for a lot of livestock producers, but direct marketing requires one to promote not only your products, but yourself and your farm. Dr. Reddy discusses this in the third article of this chapter on marketing. Next, Dr. Reddy and Paul Dietmann tackle the issue of pricing meat products. Then Greg Lawless raises the question of whether direct marketers could improve some of their individual marketing efforts by cooperating more with their fellow producers.

One of the market niches that some producers have tried to fill is consumer demand for "organic" meat products. A short piece provided by consultant Laurie Greenberg explains some of the differences between "natural" and organic labels. For the latest federal ruling on organic meats, a USDA contact is also provided. Next a National Pork Board article about organic pork standards is included because it's details about production practices probably carries over to other animal species. Again, the USDA should be consulted for the latest rulings.

Another NPB article introduces another market niche for livestock producers: ethnic markets. As Wisconsin and the rest of the Midwest becomes more ethnically diverse, that opens up market opportunities for producers who can produce products that appeal to different communities.

Fortunately, Wisconsin has a grant program to support producers who are making investments and taking risks to develop new products and markets. The Agriculture Development and Diversification (ADD) program of the state department of agriculture has helped support many meat-related new ventures over the past dozen years. All of these funded projects are listed the conclusion of this chapter.

Direct Meat Marketing by Livestock Producers

By Dr. Dennis Buege,
Extension Meat Specialist, UW Madison

The direct sale of meat products to consumers represents a possible means for livestock producers to increase returns for their animals. By assuming some of the marketing roles involved in transforming the live animal on the farm to retail products ready for consumers' freezers, extra income can be generated for the farmer, and cost savings possible for consumers. In addition, there are also other advantages for consumers which may be as important as reduced cost. These may include:

- Exceptional eating quality
- Freshness of product
- Reduced fat ("select" grade beef, lean hogs and lambs, very close fat trim on cuts, lean ground beef)
- Convenience of an in-home meat supply
- Favorable production practices
- Knowledge of source of product
- Animals raised without growth promoters or antibiotics[1]

Direct marketing requires extra work and responsibilities of the producer. Major considerations include:

- Producing high quality livestock which satisfy customers desires
- Having a good working relationship with a local meat processor
- Having an adequate base of potential customers - finding customers
- Evaluating competition in area for these types of meat sales
- Coordinating transactions from farm to freezer
- Determining a price for the sale
- Collecting the money
- Making good on meat which is unacceptable to customers

Satisfying Customers

Customers are the heart of your direct marketing enterprise. You are no longer shielded from them by the packer and retailer. You must do everything within reason to satisfy them and encourage future sales. Your goal should be to provide them with a very pleasurable experience when they purchase the products and every time they consume them. This includes not only the quality of the meat and the processing job, but also the ease of the transaction and the friendliness and courtesy with which it was carried out. Remember, the "customer is always right."

Within the flexibility of the plant operation, give them as many options as possible on how they can have their meat processed. Try to tailor the product to their wants and lifestyle. For example, if a family does not enjoy chuck steaks or roasts, show them how they can divert it to ground beef, cubed steaks or summer sausage. Consider providing some new and easy recipes to increase their enjoyment and use of the product. These can be obtained from state livestock councils.

Some marketers like to give their customers a little "bonus gift" with each order. This might be a stick of summer sausage, a jar of maple syrup or a bottle of barbecue sauce. Customers remember these little things, and look forward to what the next gift might be.

[1] The USDA has regulations on how meat from animals raised without antibiotics and growth promotants can be labeled. They allow the use of specific statements about production as: "Animals raised without the use of growth promoting hormones" or "Beef raised without the use of antibiotics for 100 days prior to slaughter". Producers making such claims must be able to substantiate their production methods. If no length of time is defined in the statement, it is assumed that the practice existed for the entire life of the animal. "Natural" is not an appropriate term to describe such meat. The USDA defines natural as "minimally processed and with no added ingredients," and all fresh meat products would therefore qualify.

Repeat Sales

If you and your cooperating processor are providing high quality products and services to your customers and satisfying their needs, they will probably want to continue to buy from you.

However, some may be so busy that they fail to contact you as their meat supply dwindles or runs out. Therefore, after an appropriate time interval, give them a call or send them a note to remind them about your product. This is also a good opportunity to obtain some feedback on how satisfied they were with your product, and invite suggestions for future improvements. Consider sending a newsletter which reminds them about ordering more meat, and also provides one new recipe, and perhaps some interesting fact or quiz question about the industry (such as, which country has the most pigs? - answer = China). Use your imagination to stimulate a repeat sale, and provide them with an interesting and fun experience.

Keys to Customer Satisfaction (Repeat and New Sales)

1) Consistently provide high-quality product. Do not compromise this principle. Do not use direct marketing as an outlet for inferior animals. Determine what your customers want, and strive to provide it as best you can. Remember, positive word-of-mouth advertising is the best and least expensive kind.

2) Insure that beef is aged a minimum of 10 days. Because pigs and sheep are younger (more tender) at the time of slaughter, aging is not necessary. For optimum freshness, pigs should be cut and processed 1 or 2 days after slaughter.

3) Promote good communication between the plant and customers on cutting instructions. Be sure the plant cuts the meat according to the customers' needs and desires, and not according to how the plant likes to cut it. However, customers must be realistic in their demands. An innovative plant can offer new and alternative cuts which can increase customer satisfaction.

4) Encourage excellence by the plant in cutting, trimming, wrapping and freezing the meat. A very close fat trim on cuts is desired by most customers. Likewise, make sure the fat content of the ground beef meets the expectations of the customer.

5) Conduct open and honest communication with customers throughout the process. Take time to answer their questions and make sure they understand yields and costs up-front. Follow-up after they have had the meat for awhile, to see if there are any problems. Customers frequently are reluctant to complain about problem product, especially if they personally know the seller. Such "stored-up dissatisfaction" can kill futures sales. On the average each dissatisfied customer tells 66 other people about their unhappiness with the product.

6) Stand behind the product. Even when producing high quality animals, there will likely be a time when a customer is dissatisfied with the product. It is better to replace the meat or give the money back than to argue about it. Correcting a product problem in a constructive, positive manner can actually promote repeat and new sales, because customers develop confidence and trust in you, and share this with their friends and acquaintances.

Do you know that satisfied customers will leave the business for no reason and it costs seven times more to acquire a new customer than to retain the existing one? Hence there is a great need to keep each and every customer. As a direct marketer of meat you need to cultivate these human relationships.

Dr. Avuthu Rami Reddy, UW-Platteville

Doing Your Own Market Research

By Dr. Rami Reddy,
Livestock Marketing Specialist, UW-Platteville

Introduction

Have you done any market research lately? You will probably respond by saying no. But if I ask you "Have you read the recent article on alternative meat marketing?" or "Are you following the prices of livestock and meat products?" the answer is probably yes. When people hear the word research they often imagine the time-consuming, expensive and specialized nature of marketing science. Market research can be as simple as following daily prices, observing the markets, or reading a report. The general economic conditions that we observe and the forecasts we receive involve an abundance of market research activity. We get information through several sources such as friends, print media, radio, TV, newsletters etc., When we follow the prices of the cattle, pork or any other livestock, we are following the trends and observing the market direction. We read articles in the trade magazines or journals, where most of the findings are based on research. We are involved in the process of market research through these secondary sources of information on a daily basis.

In our busy world it is becoming harder for a small businessperson to keep up with the market developments, let alone conduct market research. But conducting market research is often simple and only requires a disciplined approach.

Market research seeks to answer a few common questions that come naturally to meat marketers such as "What does the customer want?" "Where can I sell my meat and meat products?" "Does my new enterprise have any potential?" "What alternative markets are there to explore?" "What are the legal and regulatory constraints?" "How should I price my meat and meat products?" "How do consumer trends affect the livestock business and meat marketing?" "Where can I sell organic and natural products?" "How can I reach these markets?" "What about ethnic markets?" "What are the consumer perceptions and attitudes towards our products?" "What discounts and commissions should be given to agents and brokers?"

In order to answer these questions, conducting market research is inevitable. Most market research studies are aimed at finding and understanding the customer. Other research has focused on promotions, and product and sales research. In this document we will explore the dynamic process of market research and learn some simple and timesaving market research methods.

Why Do Market Research?

Market Research helps you:

- Define the market such as market potential, trends, customer and competitive analysis, new products, etc.
- Evaluate your market share by area, by product line, and by customer category.
- Determine how your business and products are perceived in various markets.
- Identify the causes of your marketing problems.
- Improve your marketing mix elements, such as product, price, place and promotions.

Market research plays three roles. It is descriptive in the sense that it helps us understand sales trends and consumer attitudes. It helps us in problem solving by identifying problems and finding solutions. It is predictive in the sense that it addresses "what if" questions. For example, with market research we can determine the results at various promotional expenditures.

Significance of market research:

Here are a few points to take note of regarding the importance of market research:

- Market research lowers your costs of doing business by increasing the quantity and quality of information available for making business decisions, and thus reducing the mistakes you make.
- Trying to sell the wrong product to the wrong target market at the wrong price is often a result of inadequate market research, and is detrimental to the business's success.
- Market research and competitive intelligence are absolutely essential for the

businesses in order to stay competitive and remain profitable.

- Market research precedes, proceeds and supersedes all other marketing functions.

Market research could be as simple as talking to existing customers or suppliers or as complex as conducting an elaborate test marketing of the product. A few time and cost saving market research techniques are as follows:

1) Ask your friends and relatives if they are interested in the product you are offering.
2) Check for referrals and call them up.
3) Use the telephone as your medium and the telephone book as a resource.
4) Conduct simple surveys or personal interviews.
5) Listen to the current customers.
6) Place simple classified advertisements in the media (print) that cover your target market, and then observe the response.
7) Clip articles of interest and keep them in a file.
8) Attend industry-sponsored conferences and workshops.
9) Sponsor community programs or participate in community events.
10) Hang flyers in places that are visited by your target audience.
11) Identify potential business advisors that can provide you with expert advice and answers to your business problems.
12) Talk with your employees.
13) Talk to the store manager. Look at the local retail outlets and their meat product offerings. If your product is unique (eg: buffalo, rabbit, pastured poultry, quail etc.) and not carried by the store, talk to the purchasing manager about placing your product on the shelf, and then monitor the movement of the product.
14) Audit local food stores for new products and current product disappearance.
15) Conduct simple experiments. For example, measure the promotional effectiveness by looking at the sales before and after promotions such as price rebates.
16) Conduct surveys or interviews in order to gather primary data to seek solutions for the specific problems of your business.
17) Observing customers is the best method. Though it involves time, it may yield valuable information regarding the buyer, purchasing habits, market conditions etc.

Marketing Research (MR) Process

Marketing research involves planning, collecting and analyzing data relevant to marketing decision-making. MR helps small business owners to develop the marketing mix by providing insights into lifestyles, preferences and purchasing habits of target consumers.

Knowing the process of research will enable you to save considerable amounts of time, gives you pride in doing your own research, and confidence in the results.

A small business owner can minimize the costs of MR by using secondary sources of information, using simple methods of gathering primary information, and creating a good customer contact management system.

Designing and conducting an MR project:

The MR process is a scientific approach to decision-making that maximizes the researcher's chance for securing accurate and meaningful results. The following represent the steps in market research process:

1) Define the marketing problem
2) Design your research plan
3) Collect and analyze the data
4) Prepare and present the report
5) Follow up: make appropriate changes in your business

1. Define the marketing problem

Develop a problem statement or research objectives. For example, "How can I reach new markets?" "How can I sell the least preferred cuts?" Stating the purpose of the research will improve the clarity. When dealing with a particular problem for the first time, conduct a situation analysis. If you understand the problem and define the problem correctly, you already have half the solution in your hands.

2. Design your research plan

Research design specifies the research questions to be asked and answered, how and when the data be gathered, and how data will be analyzed. Budget is finalized after the design. In order to obtain facts, opinions and attitudes survey methods are widely used. The most common survey types are: In-home, In-store, telephone interviews, focus groups and mail surveys.

3. Collect and analyze the data

Decide the type of data required for decision-making. There are two sources, primary data and secondary data. Secondary data consists of information that already exists. This is data previously collected for any purpose other than the one at hand.

Sources of secondary data include trade associations data, consumer expenditure survey, Bureau of Labor Statistics, U.S. Census, newspapers, radio, TV, phone books, library resources, CD-ROMs, on-line databases (NTIS, ABI/INFORM), small business development centers, better business bureaus, memberships of local organizations, university systems, extension offices, governmental agencies (USDA, DATCP), internet, trade magazines, conferences and professional meetings, professional associations etc.

One advantage of secondary information is that it is inexpensive and easy to obtain. It saves a lot of time and money. One disadvantages of secondary information is potential mismatches between the current problem and the data gathered. The quality of secondary data may also be a problem. Make sure to find out who gathered the data, why the data were obtained, what methodology was used, and when it was gathered. Some secondary sources are free and others are costly. Choose the ones that fit your budget and need.

Primary data is information collected for the first time. It is used to solve a particular problem under investigation. Primary data is gathered when information is not available from existing sources. It can be obtained by simple means, such as recording your own observations, doing simple surveys or interviews and focus groups.

Advantages of primary data are that it will answer specific research questions. The data are current and you know the source. Sometimes no other secondary information is available and primary data collection is only the way to solve a problem. Some disadvantages of primary data are that it is expensive and time consuming.

Next, interpret and draw conclusions from the data collected. For example, determine what percentage of people liked your product. What percent of sales went up due to promotions? This is the phase where relevant information is generated from the raw data collected. Three types of analysis that are commonly used are one-way frequency counts, cross tabulations and simple statistical analysis such as correlations and regressions.

4. Prepare and present the report

Always prepare a written report. It should begin with a clear, concise statement of the research objectives, followed by a brief explanation of the research design or methodology employed. A summary of major findings should come next. The conclusion of the report should also cite recommendations. Even though it is not required to prepare a formal written report for yourself it is highly recommend that you prepare a report. If you document your observations others can easily follow by reading the report, and additionally you can use it for later reference. These reports can also serve you in order to secure financing from the bankers.

5. Follow up

Make appropriate changes in your business based on the findings. Unless you take action to implement what you found, market research will be a futile exercise.

When decision-making information already exists and when the costs of conducting research exceed the benefits then you should resist conducting research. Field service firms or individual contractors can complete the research when you are pressed for time.

Research Process at Work: An Example

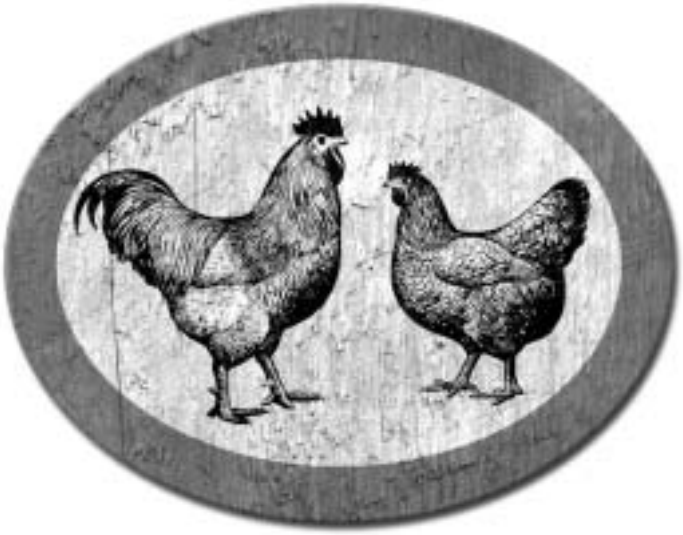
Let us take a research question. Who are my customers? In order to answer this question you should be able to describe and define your customer base. First, identify your customer base and get the customer profile for your products or business. The next step of research is designing the research plan. Here you will define what kinds of data you need to gather and you will determine what amounts of time and money are needed to conduct the research. Thirdly, you will collect the data from primary and secondary sources. The data can be collected based on geographic and demographic characteristics of the target market. A geographic description establishes where the customers are present physically. You will collect data on the distance your customers must travel to reach to your business, customer place of residence, the topography of the region, presence of competitors etc. You will define the trade area based on customer zip codes or drive time. If your business is located on the highway, data form the department of transportation (WISDOT) may be helpful in finding out the traffic rate each hour of the day in a week, as well as monthly statistics.

Demographics refer to the characteristics of the population. You should collect data on age, income, gender, occupation, education and type of residence of your target market. Other variables include lifestyle, personality, and degree of product loyalty by the target market.

Once you have all the data, analyze it by simple frequency or count methods. Then prepare a report highlighting the characteristics of your target market, giving the customer profile based on several variables such as geographic and demographic characteristics.

Conclusion

The importance of market research lies in its ability to improve the quality of decisions, to help trace problems, to better understand the market place and market trends. Systematic, regular collection of information will aid in good decision-making. Market research is a very useful exercise and a good habit to repeat. Try to make market research an every day habit. Be organized in how you collect, record, and store new information. Make careful changes in your business in response to what you learn.



Promote Yourself!

By Dr. Avuthu Rami Reddy,
Livestock Marketing Specialist, UW-Platteville

Introduction

Developing a good product that is both available and attractively priced is important, but communicating directly with your target market is the key to successful direct marketing. A target market is a set of customers or buyers sharing common needs or characteristics that the business serves. As a meat direct marketer, your target market may be your neighbors, church congregation, wealthy suburbanites, upscale restaurant chefs, grocery managers or internet shoppers. You should decide how much to spend on what methods to best communicate with your target market.

There are different methods to communicate directly with your target market. These methods can be categorized into four areas: advertising, personal selling, sales promotions, and public relations. Advertising is any paid form of non-personal presentation and promotion of ideas, goods and services sponsored by the business. Personal selling may be a personal presentation (such as face to face contact) made by the sales force in order to make a sale and build customer relationships. Sales promotions involve short-term incentives such as coupons, free samples, and limited-time discounts to encourage the purchase of a product or service. Finally, public relations involve building good relations by obtaining favorable publicity, building good image, and handling unfavorable rumors, stories and events. Usually, public relations are free publicity.

Promotional mix and benefits

The above marketing communication methods constitute the promotional mix. A skillful marketer will understand how to use the proper mix of the promotional methods while developing a "plan" to reach their target market in a cost-effective way. The goal of promotions is to increase sales, build favorable product image, increase market share, and keep present customers while attracting the new ones.

To be successful, each promotion should first increase product attention, raise the target market interest level in the product, increase the target market desire for the product, and encourage the target market to take action.

These goals are expressed in the acronym AIDA (Attention, Interest, Desire, and Action).

Direct target market product promotions will be beneficial when:

1) Products are clearly differentiated (unique, high quality and freshness).
2) Products are highly seasonal and high in demand.
3) Most effective with products that are uniform in quality, size and appearance.
4) Products that are competitively priced.

The promotional plan involves the proper mix of budget and time, along with the desired results stated in the form of goals. A plan should:

1) Be prepared with six to twelve months lead time.
2) Put the plan in writing.
3) Have specific goals.

The promotional plan should also contain information regarding the consumer, competition, market trends, target market, alternatives, and evaluation procedures.

In order to come up with a promotional budget you can follow three approaches:

11) Percentage of sales or profits: Allocate a certain percentage of your sales or profits towards the promotion. (e.g., spend 8-10% of gross sales or 5% of the profits).

12) Units of sale: Allocate a certain amount toward the promotion or each item (e.g., promotional budget = number of items sold times promotional spending for each item).

13) Objective and task: Depending on your goals, the promotional budget will vary (e.g., in order to gain more market share use promotional pricing or use a loss-leader item to make more sales and revenue on other items).

Following is a list of media outlets or methods to consider using in your promotions:

- Word of mouth
- Direct mailing
- Newspapers
- Yellow pages
- Radio and television
- Point-of-purchase materials
- Consumer guides
- Labels
- Brochure
- Newsletters
- Window displays
- Bulletin boards
- Fairs
- Exhibits
- Internet tools

Sales promotions

There are several kinds of sales promotions, each aimed to capture the mind and heart of the customers. To be successful, your sales promotions should follow a few guidelines. Having a clear sales objective and setting up a good promotional program can achieve the desired results.

Sales promotions consist of short-term incentives to encourage the purchase of a product or service. Unlike advertising, sales promotions offer reasons to buy now rather than just offering reasons to buy. There are several different kinds of sales promotions that are targeted at consumers, businesses, and sales force. Particularly, in consumer markets there is a rapid growth in sales promotion activities. For consumer packaged goods companies, sales promotions accounts for 75 percent or more of all marketing expenditures.

Some of the objectives of consumer promotions are:

- increase short-term sales
- capture most of the market share
- introduce a new product
- increase the longevity of existing products
- lure consumers away from competitor's products
- retain and reward loyal consumers or
- increase sales and revenue

Many tools can be used to accomplish these objectives. The main promotion tools include:

- samples
- coupons
- cash refunds
- premiums
- advertising specials
- patronage rewards
- point-of-purchase displays
- demonstrations
- contests
- sweepstakes and games

The three basic elements of any sales promotion program are the offer, media for communicating the offer to the target audience, and the message or theme that moves the audience towards the desired response. In order to develop a sales promotion program there are several steps, with each step involving several decisions that need to be made. First, decide upon the size of the incentive or offer. Second, decide upon the conditions for participation (i.e., who can participate and time the offer will be valid). Third, choose the length of promotion (time period to run). Fourth, promote and distribute the promotional program. Finally, evaluate whether the objectives were achieved or not. One evaluation method is to compare the pre- and post-promotional periods sales, revenue, or market share results.

Promotional Materials:
Brochures, Logos, Signs, and Business Cards

Brochures

For a small business owner or direct marketer running a roadside or on-farm stand, effective promotional materials can improve the business. Brochures are crucial pieces of literature in the marketing communications. They are the centerpiece of your business marketing materials. Creating an effective brochure or flier will cost time and money, but a good brochure will generate improved sales that justify the effort.

Why have a Brochure?

A well-designed brochure will direct the target market toward a specific action, motivate them to buy, and create a strong visual image for the business. Well-created brochures are a valuable information and promotional tool when used properly. Here are few tips to follow.

Brochure design points:

By producing your own brochure, you may reduce the cost of production. You can also hire a design firm or ad agency to create a brochure for your business. Either way, here are few points to keep in mind before designing your brochure.

- A brochure should focus on the benefits to the customer. Look from the standpoint of the prospective customer. Ask the question 'What's in it for me?' For example, emphasizing the health benefits of the fresh, natural, organic products that you sell should be included. Your brochure should speak to the prospective 'what he will get' rather than narrating 'what you have'.
- Your logo, the font, the colors and layout, and even the kind of paper you use to print the brochure convey an image about your business.
- If you are designing your own brochure, you may wish to ask others for advice on a good software program that can assist you.
- Avoid the temptation to use too many fonts or colors in your text. Keep it simple. Use one font typeface for headlines and other for the text. Use boldface for text emphasis rather than underlining.
- The brochure design should be clean, readable and simple.
- Spend time to develop a great headline to motivate your target market to open the brochure and read on. Make sure your headings and subheadings capture the attention of the reader by conveying the benefits of your offerings.
- At the end of the brochure don't forget to include a strong 'call to action' that encourages your target market customers to respond quickly. This may be a coupon, telephone number, or a postage paid return post card.

The brochure cover or front page should contain a photograph or picture with a caption that creates product excitement or product interest by asking questions. Regarding the copy of the brochure, less is usually better. The shorter the paragraph, the more likely it will be read. Limited bullets, good use of color and lots of white space – all these elements will enhance your message by making the copy easy to read. A few strong, brief points are far more effective than dozens of weak ones.

Following is a template showing the front and back pages of a typical brochure with three folds. Collect the best brochures from other businesses and copy the best features into your brochure in order to product the best product.

Example: Three fold brochure (front page):

Mailing Address	Map to Your Farm Your Contact Information Another Photo	**Farm Name** Company Logo Farm Family Photo *"Slogan"*

Example: Three fold brochure (back page):

Headline Short paragraphs Who you are? What are your values? **Side Bar:** Special Information Maybe farm history Or quotes from satisfied customers.	Product Photo What is great about your product? How will the customer benefit from buying it?	**Order Form & Product List** • product a _____ • product b _____ • product b _____ Ask them something Special Offer or Coupon

How to distribute brochures effectively?

The unsolicited marketing brochure is rarely read. Plan to have your brochures available at places and times where your target market customers are near. Mass mailings are a waste of time and effort and usually do not reach your direct target.

How to know if your brochure is effective?

What did you hope your brochure would accomplish? To measure the effect of the brochure on the target audience, it is usually best to directly ask the customer what they thought about your brochure. Questions like:

- How did the customer become aware of the products and message?
- Can the customer recall the product benefits and message offered?
- How or where did the customer get the brochures?
- How many customers bought your product due to the brochure or talked to others about it?
- How many coupons that were distributed with the brochures were redeemed?
- How many toll free calls were received?
- How many people/customers visited your web site?

Basically, ask the customer how he/she found out about you. Remember, once you have used a brochure for couple of years or as the nature of your business changes, the brochure becomes outdated and needs to be replaced.

Business Logo

An effective business logo is an important design element, since it will appear on all of your communication media such as signs, business cards, stationary, packaging, and promotional materials. Plan the color and graphics of your logo so they are consistent with your products. It may be worthwhile to seek a professional designer's help while designing your logo. Professional designers know whether the chosen logo design will transfer properly into print, signage, or other forms of media. Your logo is the foundation for all of your promotional materials and is probably going to remain with you for a long time. Therefore, spending a little money now for the proper logo will pay for itself later. When developing your logo:

- Select colors and graphics that convey the feelings you want your customers to have toward your products.
- It is better to use an icon rather than a picture within the logo.
- Don't be afraid to brainstorm with your friends and customers to develop 10 or 15 different initial logo ideas. Then choose 2 or 3 and develop one of them into the logo.
- Design a logo that can be resized easily
- Be sure your colors are consistent.
- Develop a black and white logo along with the colored one.
- Be sure your logo does not change often.

Signs

Good signs have the power to draw customers to the business. Signs are an important element of your business identity. Consider products, personnel, and everything physical to be a 'sign'. You may wish to seek professional help when designing proper signage. If you do, you will need to provide them with the proper specifications. Signage also needs to send a welcome message to potential customers. A few items to consider about signs are:

- Should be easy to read from a distance.
- A logo should appear on every sign.
- Place the signs properly.
- Clearly state price on your signs.
- Do not clutter a sign.
- Know your local laws or ordinances before placing a sign by the roadway, on billboards etc.

A good sign will usually consists of: your logo and business name; your location; business hours; products, especially any seasonal products; special promotions; any other attractions. Remember, your parking area, business vehicles, vending area(s), also present a 'sign' or send a messages to your potential customers. Do not ignore these areas and remember that everything contributes to the proper image of your business.

Business cards

A good business card can convey an important message about your business in a limited space. Again don't be hesitant to look at the business cards that you receive and imitate features from cards that you like. A good business card should have the following items:

- Your logo as the largest element on the card.
- Keep the text simple, necessary information only.
- Include your name, title, company name, address, phone, fax and e-mail address.
- Color, wording and texture of the card should convey your business image.
- Do not make your business card in an unusual shape.
- Use colors and a typeface that is easily readable (consider sans-serif typeface fonts).

Conclusions

Many promotional techniques are currently available and new ones are constantly evolving. In selecting a technique, a marketer must consider its suitability and compatibility within their objectives and budget parameters. Clearly, sales promotion plays an important role in the total promotional mix. To use it well, the marketer must define the sales promotion objectives, select the best tools, design the sales promotion program, implement the program and evaluate the results. Brochures, logos, signs and business cards are important promotional items that each business should take the time to properly design.

Pricing Your Meat Products

Dr. Rami Reddy, UW - Platteville and
Paul Dietmann,
Sauk County Extensiuon Ag Agent

Introduction

Pricing issues are frustrating for even the most seasoned meat marketers. Low prices will likely result in fast sales and greater market share, but will also lead to reduced net revenues and profits. On the other hand, prices that are too high will result in poor sales and loss of demand. Correctly priced products will result in greater sales and profits. You should realize that prices determine the revenue side and everything else falls into the expense or cost side of doing the business. Hence care needs to be taken with regard to pricing.

Meat marketers should also know that their premium products deserve a premium price. In order to achieve high price, meat marketers should be willing to price a product depending upon the demands in the marketplace, product characteristics, and changing nature of the competition. As a direct marketer, you are selling a product that is different than anything else on the market.000 whether it is organic, natural, locally raised, derived from a particular breed of animal, etc. The extra price you are able to gain in the marketplace depends on how well you are able communicate the extra value to your potential customers.

Setting a Floor Price: Comparing Direct Marketing to Conventional Markets

The first step in retail pricing is to figure out what the animal would be worth in the conventional market. That option needs to be explored to determine whether direct marketing has the potential to offer enough of a premium to reward the farmer for the extra time, effort and expense involved. Live market prices are reported on a daily or weekly basis through many media outlets and in the "Blue Sheet," compiled by the USDA (http://www.ams.usda.gov/lsg/mncs/LS_MPR.htm). Wholesale prices of carcasses and primal cuts can be obtained from the Yellow Sheet, published by Urner Barry, (http://www.yellowsheet.com/). These reports form the basis of all price quotations used in the livestock and meat industry.

To accurately compare conventional market prices to the prices that could potentially be received by marketing meat directly to consumers, we need to figure out how many pounds of retail cuts each animal is likely to produce or the potential "yield" of each animal. Figure 1 illustrates the relationship between the average live weight of three species of meat animals, average carcass weights, and the total number of pounds of retail cuts that each animal is likely to produce.

Caution: The values in Figure 1 are only examples; the actual carcass and retail yields of a particular animal could be several percentage points different from these examples depending on the breed of the animal, management practices, environmental conditions and other factors. Use these examples as a rough guideline and, if possible, collect actual yield data on your animals from your processor.

Species	Beef	Pork	Lamb
Average Live Weight	1200 lbs	250 lbs.	120 lbs.
Average carcass weight % of live weight	720 lbs. 60%	175 lbs. 70%	60 lbs. 50%
Avg. total pounds of retail cuts % of live weight	480 lbs. 40%	125 lbs. 50%	36 lbs. 30%

Figure 1

(To calculate the number of pounds of each variety of retail cut an animal is likely to yield, please see "How Much Meat Will You Take Home from a Carcass, Side or Quarter?" by UW-Extension Meat Scientist Dr. Dennis Buege in page 53 of this handbook.)

After we have determined how many pounds of meat we will likely have to sell, we need to calculate our wholesale cost of that meat.

Figure 2 shows examples of wholesale values of carcasses and retail cuts for each of the three species shown above. These are wholesale values to the producer prior to processing.

Species	**Beef**	**Pork**	**Lamb**
Example values for live animals	1200 lb @ 0.77 $924	250 lb @ 0.42 $105	120 lb @ 0.75 $90
Carcass value (excluding processing cost)	$ 1.28/lb	$ 0.60/lb	$ 1.50/lb
Value of retail cuts (excluding processing cost)	$ 1.92/lb	$ 0.84/lb	$2.50/lb

Figure 2

Obviously, we need to add the processing cost per pound to get closer to the producer's actual wholesale cost per pound for retail cuts. However, we also need to add to the wholesale value a number of other costs including:

- All extra processing costs including licensing, labeling, locker charges
- The producer's time for hauling livestock to the processor, picking up meat, making phone calls and deliveries, and other marketing activities
- Advertising costs, brochures, farmers' market fees, etc.

All of these costs need to be factored into the ultimate retail price of the meat. In the early stages of developing a direct market for his or her meat a direct marketer may not be able to recoup all of these costs in the retail price but that should be a long-term goal for the enterprise.

How a Grocer Sets Retail Meat Prices

As was mentioned previously, meat that is sold directly from the farm to consumer is unique in the marketplace. The grocery store is not a direct marketer's primary competitor. Yet, it can be helpful to a direct marketer to understand how a grocer determines the retail price for various cuts of meat.

The percentage of retail markup varies for different meat items but markups from 15% to 50% are not unrealistic. There are essentially two ways that a percentage markup can be built into retail meat prices. In the first method, the wholesale price of the cut is divided by the difference between 100% and the percentage markup. For example, if the wholesale price of a given cut of meat is $2.00 per pound and the desired markup is 22%, the retail selling price would be $2.56/lb. The formula is illustrated below:

Retail Selling Price = Wholesale cost of the meat item per pound / 100% - % Markup.

= $2.00 lb./100% - 22%

= $2.00 lb./78%

= $2.00 lb./0.78

= $2.56/lb

The second method used to calculate retail meat prices is to simply multiply the wholesale price of a given cut by 100% plus the percentage markup. Using this method with the example above, the retail price would be $2.44/lb. The calculation is shown below:

Retail Selling Price = Wholesale cost of the meat item per pound * (100% + % Markup).

= $2.00 lb.*(100% + 22%)

= $2.00 lb.*(1.00 + 0.22)

= $2.00 lb. * 1.22

= $2.44/lb

The second method results in a lower retail price, yet it is the method most widely used in the industry.

Finding a Ceiling Price for Meat

Wholesale costs set a floor price for meat; consumer perceptions of the product's value set the ceiling. We will discuss three mutually interdependent methods of finding that ceiling price: Product-based; competition-based; and customer-based pricing. A basic understanding of these methods will aid in correct pricing of meat products. Often a combination of these three methods will yield the best results.

1. Product-based pricing:

Of the three pricing methods, product-based pricing is the method most similar to the way a grocer sets retail meat prices. We have a certain number of pounds of meat, we know our total wholesale cost, we simply add our desired markup and set the retail price accordingly. If we later find that some cuts are not moving from the freezer, we adjust the retail price. Some customer preferences such as the desire to buy from a local source and the demand for a better price for volume purchases are considered when setting the markup. However, the producer's cost of bringing the product to the market is the primary factor in the pricing equation.

2. Competition-based pricing:

While the retail grocer may not be a direct-marketers primary competition, the same cannot be said for other producers who are marketing meat directly to consumers. Competition-based pricing would set the price of meat relatively close to the price being charged by other direct-marketers, regardless of wholesale costs or consumers' perceptions about quality.

Understanding the competition will help in setting a price range. If competitive forces are less severe for the product, the price is set on the higher end of the price range. If the product can be distinguished from that of the competition, and the marketer can create a unique selling proposition based on quality, freshness, locally grown, or organic, the price can be established at the higher range. Fierce competition and a failure to establish the unique characteristics of each marketers' products can send them all off on a race to the bottom if they are following a competition-based pricing strategy.

3. Customer-based pricing:

The first consideration in customer-based pricing is the customers' perceptions of what constitutes "value." More are demanding safe, reliable, nutritious and healthy products. They want to be able to trace back the source of their food and strongly prefer locally grown or organic foods. The price that these consumers are willing to pay for products with the above characteristics is high. If they perceive that those products are in short supply, only seasonally available, or any other factors that create heavy demand they are willing to pay premium prices. In fact, they will expect to pay premium prices as they relate high price with high quality.

Understanding the perceptions of your product by the core consumer group via personal interviews or some other market research methods is vital. (Please refer to the article on marketing research methods elsewhere in this publication.) Customer-based pricing recognizes that it is to the advantage of the marketer to set prices based on the customers' perceived value of the product. This could also be considered value-based pricing: setting price based on the buyer's perception of value rather than on the seller's cost.

Customer-based pricing requires the marketer to carefully monitor changes in customer demand for meat products and to respond appropriately. The marketer can only command premium prices as long as the customers continue to perceive that they are receiving premium products and services.

Presenting Your Meat to Consumers

Farmers who are marketing meat directly to consumers typically offer their product as carcass halves or quarters, as mixed quarters, or as individual cuts. There are advantages and disadvantages with each of these offerings.

Halves or quarters - A producer selling half or quarter carcasses will generally price their meat based on the carcass weight of each animal they have processed. The price will often be a nominal markup from the live-weight value of the animal, with the customer picking up the cost of processing. For example, if a 1,200-pound beef steer sold for $.75 per pound live-

weight, the carcass value of the animal (assuming 60% yield) would be $1.25/pound. A direct-marketer selling halves or quarters might simply set a price of $1.30 per pound of "hanging weight" multiplied by the carcass weight of each animal.

The advantage of selling halves or quarters in this manner is that it is relatively easy for the producer. The price calculation is simple, the customer deals directly with the plant to specify their cutting and wrapping preferences, and to schedule a time to pick-up the meat.

The major disadvantage of this method is that it can be very confusing to the consumer. The consumer may find it hard to understand why they had to pay $1.30 per pound for 360 pounds of carcass but only received 240 pounds of retail cuts. The sheer volume of meat may also be a challenge for the average consumer. He or she may not have enough freezer space or be able to afford a half or quarter-carcass. Finally, the consumer may be disappointed with receiving a relatively large amount of certain meat cuts and small amounts of others, particularly if they purchased a quarter.

Mixed quarters or "freezer bundles" - Some beef producers who are direct marketing have been selling mixed quarters, which essentially gives the consumer half of the retail cuts from a front quarter and half from a rear quarter. A few producers have gone a step farther to offer a "freezer bundle," which is half of a mixed quarter. The price of mixed quarters or bundles is generally either based off of the value of the retail cuts and the total weight in each quarter or bundle, or is simply a flat price per quarter or bundle.

The positive aspects of selling mixed quarters or bundles are that the customer gets a wider variety of cuts and the producer doesn't end up with a large number of front or rear quarters sitting in the freezer. Also, the pricing is simple and straightforward; it is easy for the customer to understand. Finally, two big advantages of freezer bundles are that they are more affordable than a full quarter or half and most consumers can find space for them in their freezers.

A disadvantage of mixed quarters or freezer bundles is that they require more sorting and handling by the producer.

Individual cuts - This is the easiest and most familiar way for consumers to buy meat. It is easy for them to understand the pricing and make comparisons to prices at their local grocery store. Usually those price comparisons will favor the producer. The customer can buy only the cuts they want; they don't have to buy porterhouse steaks and end up with a bunch of chuck roasts too. Consumers can more easily afford several packages of cuts than they can a quarter or half-carcass.

There are some disadvantages to the producer who sells individual cuts. Much more handling is involved than with selling larger packages of meat. The pricing is more complicated as separate prices need to be set for each cut. Finally, the producer may end up getting stuck with a large quantity of less desirable cuts while being sold out of the cuts that are most in demand.

A Few Ideas for More Cost-Effective Sales

Experienced meat marketers will say that word-of-mouth is the best advertising for their business. Paid advertising is limited in its usefulness. There are a number of ways to increase sales or cut marketing expenses without spending a fortune.

One of the best ways to increase sales is by offering an incentive for your current customers to bring new customers to your business. Perhaps your current customers could be given a small gift or a discount on their next order as a token of appreciation for referring people to your business.

Another way of increasing sales is by giving current customers an incentive to buy more meat. Some marketers offer volume discounts to encourage customers to buy quarters or halves rather than individual cuts. Some may want to consider offering a price incentive to buy another species of meat that haven't previously purchased from your farm.

Cooperation between local producers of different meat species is a great way to enhance the sales of each enterprise. A poultry producer

could refer her customers to a neighbor who is marketing beef. A pork producer could send customers to the poultry farm. Each marketer has a customer base that could complement, not compete with, their neighbor's.

Encouraging customers to pick their meat up at the processing plant or the farm is a great way to increase the cost-effectiveness of meat sales. If a producer put a reasonable value on the time he or she spent delivering meat to customers, they might find that it would be much cheaper to give a 10% discount on orders picked up at the farm.

Conclusions

Meat pricing is a dynamic activity. It involves the synthesis of several dimensions of the marketplace to find a price that will both sell the product and lead to greater profits. It is a creative exercise that involves constant research. The direct-marketer must maintain the flexibility to change pricing strategies depending upon changes in product costs, customer demands and competition. Simple pricing methods such as product-based pricing as well as the more sophisticated techniques required for customer-based pricing should be considered. The challenges and potential rewards are greater than they would be in selling through more conventional marketing channels but ultimately, direct marketing is a way for producers to build and control their own marketing channels, and to take control of the pricing of their products.

Cooperative Strategies

By Greg Lawless, Extension Outreach Specialist, UW Center for Cooperatives

Competition is essential in a market economy. It can result in lower prices for consumers and efficient use of resources, as producers, manufacturers, and retailers try to outdo each other to minimize their own costs and beat their competitors on price.

When there isn't enough of competition, someone usually suffers. In the livestock industry, for instance, most producers have seen their pay prices and their share of the consumer dollar stagnate or decline for decades. Many of them blame that on the high concentration within the meatpacking sector. Stuck in a market situation of too many sellers and too few buyers, producers are, as they often complain, "price takers, not price makers." Meatpackers, on the other hand, can argue that they themselves are under intense pressure themselves, with large retailers like Wal-Mart enjoying substantial market power to force meat prices downward.

The move by many livestock producers into direct marketing is in large part an attempt to escape these market conditions. The tremendous growth in direct meat marketing has been documented in Iowa and Minnesota, and a similar study has been proposed for Wisconsin.1 Clearly there is a growing demand among consumers for direct-marketed meat products, and we can expect that more and more producers will attempt to meet that demand.

However, there are some significant obstacles to making direct meat marketing a significant alternative for both producers and consumers. These include:

A shortage in many areas of adequate meat processing capacity.

A significant educational cost to informing consumers of alternative sources for meat products.

Inefficiencies at the production, processing and retailing levels compared to the predominant system, which result in higher prices for consumers, which in turn limits sales.

Certainly many producers have overcome all three of these obstacles. Some have established good working relationships with their local processors, and found interested consumers who are willing to pay higher prices. But what would it take for Wisconsin to see a ten-fold increase in direct meat marketing sales over the next ten years?

It is here where we can see that cooperation can be as critical as competition in achieving market goals.

In the processing arena, new investment in small and moderate-sized plants is needed. Many existing plant owners are either satisfied with their current volume of sales, or they are facing retirement, or they are struggling with major labor issues. Very few plants in Wisconsin are USDA-inspected, which limits out-of-state sales to places like Chicago and the Twin Cities. Furthermore, there is only one slaughter plant for poultry left in the entire state.

If direct meat marketers want greater access to better processing facilities, they may need to make some investment in that industry, or at least make significant long-term commitments of product. Producers can aggregate their resources and spread out their risk by making these investments and commitments as a group.

Consumer education is a cost that could be shared by many producers pooling their resources. Modest financial contributions from many farms could finance a marketing campaign that would reach a broad swath of consumers.

Inefficiencies throughout direct meat marketing channels could be reduced in many ways through cooperative strategies. Theoretically, the costs of inputs, transportation, processing, packaging, and retailing could all be reduced through "gains from coordination" that cooperation often entails. It's certainly worth exploring.

Until now Wisconsin's direct meat marketers have largely operated independently of one another. A competitive spirit between neighboring farms and producers of different species is to some extent healthy and to be expected. But perhaps the time has arrived for our state's direct meat marketers to come together and explore cooperative strategies to build their individual businesses.

[1] Cooperative Development Services of Madison, Wisconsin has produced these studies.

Natural Meat

By Laurie Greenberg, Private Consultant formerly with Cooperative Development Services of Madison

What are the USDA regulations on natural meat?

According to USDA (Policy Memo 055):

"The term "natural" may be applied only to products that contain no artificial ingredients, coloring ingredients, or chemical preservatives; and the product and its ingredients are not more than minimally processed." http://www.fsis.usda.gov:80/OPPDE/larc/Organic_Claims.htm

Minimal processing refers to processes which "do not fundamentally alter the raw product". For meat, this means you may smoke, roast, freeze, dry or grind it.

During label approval by USDA, all claims are checked to be sure that they are accurate and not misleading. Affidavits and testimonials must be provided by producers to federal officials at the time of slaughter to verify claims about animal production practices.

What claims can be made on labels?

The only allowable claims are those which state that certain practices or substances are NOT used. For example, you can say, "no antibiotics or growth hormones are administered". These are called "negative label claims" and are independent of USDA policy for use of the term "natural" on product labels.

NOTE: In the case of poultry and swine, growth-promoting hormones are not permitted during production. Therefore a claim that they were not administered is not allowed except to say something like: "Federal regulations prohibit the use of hormones in poultry.

What does this mean for producers?

This means that there are no specific production standards—either requirements or restrictions—for use of a "natural" meat label. Rather, a natural meat label refers only to the processing stage. So, for example, use of antibiotics or hormones during production is allowable with a natural label unless the label makes a negative claim otherwise.

Organic Meats

What are the USDA regulations on organic meat?

"Animals for slaughter must be raised under organic management from the last third of gestation, or no later than the second day of life for poultry. Producers are required to feed livestock agricultural feed products that are 100 percent organic, but may also provide allowed vitamin and mineral supplements. Producers may convert an entire, distinct dairy herd to organic production by providing 80 percent organically produced feed for 9 months, followed by 3 months of 100 percent organically produced feed."

"Organically raised animals may not be given hormones to promote growth, or antibiotics for any reason. Preventive management practices, including the use of vaccines, will be used to keep animals healthy. Producers are prohibited from withholding treatment from a sick or injured animal; however, animals treated with a prohibited medication may not be sold as organic."

"All organically raised animals must have access to the outdoors, including access to pasture for ruminants. They may be temporarily confined only for reasons of health, safety, the animal's stage of production, or to protect soil or water quality."

What claims can be made on labels?

Meat from livestock raised under these regulations can be labeled as "certified organic". Production must be certified by an accredited certifying agent.

What does this mean for producers?

The standards for livestock apply to animals used for meat, milk, eggs, and other animal products which are sold or labeled as organic. Producers must comply with all regulations outlined in the final organic rule, including: no genetically-modified organisms in feed, no feeding of animal by-products, no irradiation, no paraciticides in slaughter stock. An organic certifying agent can assist producers in meeting these standards and outlining others.

NOTE: The above summary from USDA is not complete as production standards. To obtain a complete copy of the National Organic Program's final rule of regulations for organic production of livestock:
http://www.ams.usda.gov/nop/
or contact:
Keith Jones; USDA-AMS-TM-NOP;
Room 2945-South Building,
PO Box 96456;
Washington, DC 20090-6456;
Telephone: (202) 720-3252,
Fax: (202) 690-3924.

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PORK QUALITY

American Meat Science Association

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Organic Pork Standards

Introduction

The demand by consumers for organic foods has grown tremendously since the coining of the term by J.I. Rodale, a Pennsylvania farmer, in 1942. Numerous food manufacturers have developed and are marketing organic processed products and several retail markets specialize in the sale of "organic" products to today's consumers. According to the Organic Trade Association, the availability of organic products has grown 20 percent each year since 1990 with the number of organic farms reaching over 12,000 today, most of them small-scale producers. The United States Department of Agriculture (USDA) estimates that the value of retail sales of organic foods in 1999 was approximately $6 billion. Organic cash retail sales are predicted to reach $8 billion by the year 2010 with products ranging from food to clothing to pet food items. According to a recent USDA study, certified organic cropland more than doubled from 1992 to 1997. Two organic livestock sectors, eggs and dairy, grew even faster. The growth of organic food production and the ensuing trade has brought about the need for verification that products are truly organic as determined by set standards. Less than 7,000 of the farms claiming to be organic are actually now approved by some certifying agency.

Organic Foods Protection Act

In the late 1980's, after an unsuccessful attempt to develop a consensus of production and certification standards, the organic industry petitioned Congress to draft the Organic Foods Production Act (OFPA) defining "organic". The growth and ultimate survival of the industry depended on the need for a credible certification process to enhance consumer trust. Therefore, in 1990, Congress passed the Act to: (1) establish national standards governing the marketing of certain agricultural products as organically produced products; (2) assure consumers that organically produced products meet a consistent standard; and (3) facilitate commerce in fresh and processed food that is organically produced.

The Act of 1990 gave the USDA authority to write a regulation that explains the law to producers, handlers and certifiers who are regulated. The OFPA also provided that an advisory board, the National Organic Standards Board (NOSB), be assembled to help USDA write the regulation. The result of the OFPA was the USDA adopting, in some form, the NOSB recommendations, listening to public input, consulting with states and certifying agents, and considering other federal regulations, to develop the National Organic Program (NOP) Proposed Rule of 2000. This proposed rule, after public comment, was finalized on December 20, 2000 thereby providing structure for all organic products in the United States, including pork. According to USDA, all agricultural products labeled organic must originate from farms or handling operations certified by a state or private agency accredited by the Department of Agriculture. Farms and handling operations that sell less

than $5,000 worth of organic agricultural products per year are exempt from certification. All farmers and handlers have 18 months to comply with the national standards. Therefore, consumers should begin to see some products on the shelf with new organic labels by mid-year 2001. According to the U.S. Secretary of Agriculture, these standards ensure consumers that they can be confident in knowing what they are buying. For farmers, these standards create clear guidelines on how to take advantage of the exploding demand for organic products. And for the organic industry, these standards provide an important marketing tool to help boost exports since trading partners will now deal with only one national standard rather than multiple state and private standards.

So, why not Organic Pork?

Is there a niche for such a product? Does such a product truly exist? Is "organic" pork different from "traditional" pork? These are the questions individual producers must ask themselves as they explore other avenues of value-added marketing. Those interested in pursuing such a market will find the ensuing information helpful, if not challenging when realized in the production scheme.

USDA National Organic Program (NOP)

The new regulation and rules promulgated by USDA to govern the production and marketing of organic products are numerous and stringent. The national organic standards address the methods, practices, and substances used in producing and handling crops, livestock, and processed agricultural prod-

ucts. The requirements, which may be found on the internet at "www.ams.usda.gov/nop/" apply to the way the product is created, not to measurable properties of the product itself. Although specific practices and materials used by organic operations may vary, the standards require every aspect of organic production and handling to comply with the provisions of the Organic Foods Production Act (OFPA). Organically produced food cannot be produced using excluded methods, sewage sludge, or ionizing radiation. The information below is a layman's summary, gleaned from USDA and other sources, of the new regulations which will help those interested, in determining whether this is a market they should attempt to pursue. Basically, the new organic standards offer a national definition for the term "organic."

Certification

Producers with operations or portions of operations that produce or handle agricultural products that are intended to be sold, labeled, or represented as "100 percent organic," "organic," or "made with organic ingredients or food group(s)" must be certified. Farms and handling operations that sell less than $5,000 a year in organic agricultural products are exempt from certification. However, these producers and handlers must abide by the national standards for organic products to be able to label their products as organic. Handlers, including final retailers, that do not process or repackage products and those that only handle products with less than 70 percent organic ingredients are exempt . A handling operation that is a retail food establishment that processes or prepares, on the premises of the establishment, raw and ready-to-eat food labeled organic or that uses the word organic only on the information panel is also exempt.

Farmers and handlers who wish to become certified must submit specific information to an accredited certifying agent. The information will include: type of operation, history of substances applied to land for the previous 3 years, and organic products being raised or processed. Also, an organic plan, which includes practices and substances used in production must be submitted. The organic plan also must describe the monitoring practices to be performed to verify that the plan is effectively implemented, the record-keeping system, and the practices to prevent commingling of organic and non-organic products and to prevent contact of products with prohibited substances.

Applicants for certification will have to keep accurate post-certification records for 5 years concerning the production, harvesting, and handling of agricultural products that are to be sold as organic. These records should document that the operation is in compliance with the regulations and verify the information provided to the certifying agent. Access to these records must be provided to authorized representatives of USDA, including the certifying agent.

Certifying agents will review applications for certification eligibility. A qualified inspector will conduct an on-site inspection of the applicant's operation. Inspections will be scheduled when the inspector can observe the practices used to produce or handle organic products and talk to someone knowledgeable about the operation. The certifying agent will review the information submitted by the applicant and the inspector's report. If this information shows that the applicant is complying with the relevant standards and requirements, the certifying agent will grant certification and issue a certificate. Certification will remain in effect until terminated, either voluntarily or through the enforcement

process.

Annual inspections will be conducted of each certified operation, and updates of information will be provided annually to the certifying agent in advance of conducting these inspections. Certifying agents must be notified by a producer immediately of any changes affecting an operation's compliance with the regulations, such as application of a prohibited pesticide to a field. Unannounced inspections at any time to adequately enforce the regulations and residue tests will be performed to help in enforcement of the regulations. Certifying agents and USDA will conduct residue tests of organically produced products when there is reason to believe that they have been contaminated with prohibited substances. If any detectable residues are present, an investigation will be conducted to determine their source.

Organic System Plan

An organic system plan must meet the requirements set forth below for organic production or handling. An organic production or handling system plan must include: (1) A description of practices and procedures to be performed and maintained, including the frequency with which they will be performed; (2) A list of each substance to be used as a production or handling input, indicating its composition, source, location(s) where it will be used, and documentation of commercial availability, as applicable; (3) A description of the monitoring practices and procedures to be performed and maintained, including the frequency with which they will be performed, to verify that the plan is effectively implemented; (4) A description of the record keeping system implemented to comply with the requirements; (5) A description of the management practices and physical barriers established to prevent commingling of organic and non-organic products on a split operation and to prevent contact of organic production and handling operations and products with prohibited substances; and (6) Additional information deemed necessary by the certifying agent to evaluate compliance with the regulations.

Production Standards

Any farm, wild crop harvesting, or handling operation that wants to sell an agricultural product as organically produced must adhere to the national organic standards. Handling operations include processors, manufacturers, and repackers of organic products. These requirements include operating under an organic system plan approved by an accredited certifying agent and using materials in accordance with the National

List of Allowed Synthetic and Prohibited Non-Synthetic Substances available from USDA. Retail food establishments that sell organically produced agricultural products but do not process them are exempt from certification.

Livestock standards apply to animals used for meat, milk, eggs, and other animal products represented as organically produced. The livestock standards state: Animals for slaughter must be raised under organic management from the last third of gestation. Producers are required to feed livestock agricultural feed products that are 100 percent organic, but may also provide allowed vitamin and mineral supplements. Organically raised animals may not be given hormones or antibiotics to promote growth. Preventive management practices, including the use of vaccines, will be used to keep animals healthy. Producers are prohibited from withholding

treatment from a sick or injured animal; however, animals treated with a prohibited medication may not be sold as organic. All organically raised animals must have access to the outdoors. They may be temporarily confined only for reasons of health, safety, the animal's stage of production, or to protect soil or water quality. Handling standards say that all non-agricultural ingredients, whether synthetic or non-synthetic, must be included on the National List of Allowed Synthetic and Prohibited Non-Synthetic Substances. Handlers must prevent the commingling of organic with non-organic products and protect organic products from contact with prohibited substances. In a processed product labeled as "organic," all agricultural ingredients must be organically produced, unless the ingredient(s) is not commercially available in organic form.

Origin of livestock

Livestock products that are to be sold, labeled, or represented as organic must be from livestock under continuous organic management from the last third of gestation. Livestock or edible livestock products that are removed from an organic operation and subsequently managed on a non-organic operation may be not sold, labeled, or represented as organically produced. Breeder stock that have not been under continuous organic management since the last third of gestation may not be sold, labeled, or represented as organic slaughter stock. Producers must maintain records sufficient to preserve the identity of all organically managed animals and edible and non-edible animal products produced on the operation.

Livestock feed

Producers must provide livestock with a total feed ration composed of agricultural products, including pasture and forage, that are organically produced and, if applicable, organically handled: Except that, non-synthetic substances and synthetic substances allowed may be used as feed additives and supplements. Producers must not: use animal drugs, including hormones, to promote growth; provide feed supplements or additives in amounts above those needed for adequate nutrition and health maintenance for the species at its specific stage of life; feed plastic pellets for roughage; feed formulas containing urea or manure; feed mammalian or poultry slaughter by-products to mammals or poultry; or use feed, feed additives, and feed supplements in violation of the Federal Food, Drug, and Cosmetic Act.

Livestock health care practice standard

The producer must establish and maintain preventive livestock health care practices, including selection of species and types of livestock with regard to suitability for site-specific conditions and resistance to prevalent diseases and parasites; provide a feed ration sufficient to meet nutritional requirements, including vitamins, minerals, protein and/or amino acids, fatty acids, energy sources, and fiber (ruminants); establish appropriate housing, pasture conditions, and sanitation practices to minimize the occurrence and spread of diseases and parasites; provide conditions which allow for exercise, freedom of movement, and reduction of stress appropriate to the species; perform physical alterations as needed to promote the animal's welfare and in a manner that minimizes pain and stress; and administer vaccines and other veterinary biologics. When preventive practices and veterinary biologics are inadequate to prevent sickness, a producer may administer synthetic medications, provided, such medications are allowed. Parasiticides allowed may be used on breeder stock, when used prior to the last third of gestation but not during lacta-

tion for progeny that are to be sold, labeled, or represented as organically produced. The producer of an organic livestock operation must not: sell, label, or represent as organic any animal or edible product derived from any animal treated with antibiotics, any substance that contains a synthetic substance not allowed or any substance that contains a nonsynthetic substance prohibited; administer any animal drug, other than vaccinations, in the absence of illness; administer hormones for growth promotion; administer synthetic parasiticides on a routine basis; administer synthetic parasiticides to slaughter stock; administer animal drugs in violation of the Federal Food, Drug, and Cosmetic Act; or withhold medical treatment from a sick animal in an effort to preserve its organic status. All appropriate medications must be used to restore an animal to health when methods acceptable to organic production fail. Livestock treated with a prohibited substance must be clearly identified and shall not be sold, labeled, or represented as organically produced.

Livestock living conditions

The producer of an organic livestock operation must establish and maintain livestock living conditions that accommodate the health and natural behavior of animals. Animals must have access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of production, the climate, and the environment. Also, appropriate clean, dry bedding is necessary. If the bedding is typically consumed by the animal species, it must comply with feed requirements. Shelter must be provided which is designed to allow for natural maintenance, comfortable behavior, and with an opportunity to exercise. Also, appropriate temperature level, ventilation, and air circulation suitable to the species is required. The producer of an organic livestock operation may provide temporary confinement for an animal because of inclement weather, the animal's stage of production, conditions under which the health, safety, or well being of the animal could be jeopardized, or risk to soil or water quality. Producers must manage manure in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, heavy metals, or pathogenic organisms and optimizes recycling of nutrients.

Organic handling requirements

Mechanical or biological methods, including but not limited to cooking, baking, curing, heating, drying, mixing, grinding, churning, separating, distilling, extracting, slaughtering, cutting, fermenting, eviscerating, preserving, dehydrating, freezing, chilling, or otherwise manufacturing, and the packaging, canning, jarring, or otherwise enclosing food in a container may be used to process an organically produced agricultural product for the purpose of retarding spoilage or otherwise preparing the agricultural product for market. Nonagricultural substances allowed and non-organically produced agricultural products allowed may be used: (1) In or on a processed agricultural product intended to be sold, labeled, or represented as "organic,", if not commercially available in organic form; (2) In or on a processed agricultural product intended to be sold, labeled, or represented as "made with organic (specified ingredients or food groups)". The handler of an organic handling operation must not use in or on agricultural products intended to be sold, labeled, or represented as "100 percent organic," "organic," or "made with organic (specified ingredients or food groups)," or in or on any ingredients labeled as organic: (1) Practices prohibited; or (2) A volatile synthetic solvent or other synthetic processing aid not allowed, except,

that, non-organic ingredients in products labeled "made with organic (specified ingredients or food group(s)" are not subject to this requirement.

Facility pest management practice standard

The producer or handler of an organic facility must use management practices to prevent pests, including but not limited to: (1) Removal of pest habitat, food sources, and breeding areas; (2) Prevention of access to handling facilities; and (3) Management of environmental factors, such as temperature, light, humidity, atmosphere, and air circulation, to prevent pest reproduction. Pests may be controlled through: (1) Mechanical or physical controls including but not limited to traps, light, or sound; or (2) Lures and repellents using non-synthetic or synthetic substances consistent with the National List. If these practices are not effective to prevent or control pests, a non-synthetic or synthetic substance consistent with the National List may be applied. If the infestation continues a synthetic substance not on the National List may be applied, provided that the handler and certifying agent agree on the substance, method of application, and measures to be taken to prevent contact of the organically produced products or ingredients with the substance used.

Commingling and contact with prohibited substance prevention practice standard

The handler of an organic handling operation must implement measures necessary to prevent the commingling of organic and non-organic products and protect organic products from contact with prohibited substances. The following are prohibited for use in the handling of any organically produced agricultural product or ingredient labeled: (1) Packaging materials, and storage containers, or bins that contain a synthetic fungicide, preservative, or fumigant; and (2) The use or reuse of any bag or container that has been in contact with any substance in such a manner as to compromise the organic integrity of any organically produced product or ingredient placed in those containers, unless such reusable bag or container has been thoroughly cleaned and poses no risk of contact of the organically produced product or ingredient with the substance.

Certifying Agents

The OFPA directs the USDA to accredit certifying agents so they can certify that producers and handlers representing their products as organic have complied with USDA regulations. USDA's accreditation program establishes requirements an applicant must meet in order to become an accredited organic certifying agent, and procedures and requirements to maintain accreditation. The program is designed to ensure that all organic certifying agents act consistently and impartially. There are nearly 50 private and State organic certification programs in the United States, some of which have existed for 20 years or more. Certifying agents will apply for accreditation to the Administrator of the Agricultural Marketing Service. USDA will evaluate the application to ensure that the certifying agent can comply with the NOP requirements, including a site evaluation at the applicant's place of business. Accreditation will be for 5 years. The OFPA requires USDA to review the certification programs under which imported organic products are produced to ensure that they meet the requirements of the NOP. Certifying agents operating in foreign countries may apply for USDA accreditation and will be evaluated based on the same criteria as domestic certifying agents.

State Organic Program

The U.S. Secretary of Agriculture will approve State

Facts

organic programs that are consistent with the national organic standards and regulations established under the OFPA. Under USDA's NOP, a State government may request the U.S. Secretary of Agriculture to approve its State organic program. Once a State's requested organic requirements are approved, those requirements become the NOP requirements for organic producers, handlers, and certifying agents operating in the State. Under the NOP final rule, a State's organic requirements cannot be less restrictive than NOP requirements. State organic programs can have more restrictive requirements than the NOP, however, these more restrictive requirements will be approved only if those requirements are found to be necessary in light of a particular environmental condition or unique production or handling practice in the State or a particular area of the State. For instance, a State may request approval of additional restrictions to protect a sensitive watershed. A State's more restrictive standards cannot be applied to production and handling activities outside its jurisdiction. Finally, a State's more restrictive requirements cannot be used to discriminate against organic products produced in other States.

The State's organic program will oversee certified organic producers and handlers in the State to assure that they are operating in compliance with the NOP. Working with certifying agents, the State organic program will administer enforcement and appeal procedures to make sure all certified organic operations are in compliance with NOP and State requirements. However, only the NOP will exercise compliance authority over accredited certifying agents operating in the State. In States with no approved State organic program, USDA will administer and enforce the requirements of the NOP. USDA will monitor any State, private, and foreign certifying agents operating within the State to assure compliance with the national program.

Temporary variances

A temporary variance from the requirements may be established by the Administrator due to: (1) Natural disasters declared by the U.S. Secretary of Agriculture; (2) Damage caused by drought, wind, flood, excessive moisture, hail, tornado, earthquake, fire, or other business interruption; and (3) Practices used for the purpose of conducting research or trials of techniques, varieties, or ingredients used in organic production or handling.

Labeling

The OFPA and the NOP are intended to assure consumers that the organic foods they purchase are produced, processed, and certified to consistent national organic standards. The labeling requirements of the new program apply to raw, fresh products and processed foods that contain organic ingredients. Foods that are sold, labeled, or represented as organic will have to be produced and processed in accordance with the NOP standards. A certified operation may label its products or ingredients as organic and may use the "USDA Organic" seal.

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PORK QUALITY

American Meat Science Association

Author: *Dr. Benjy Mikel, University of Kentucky*
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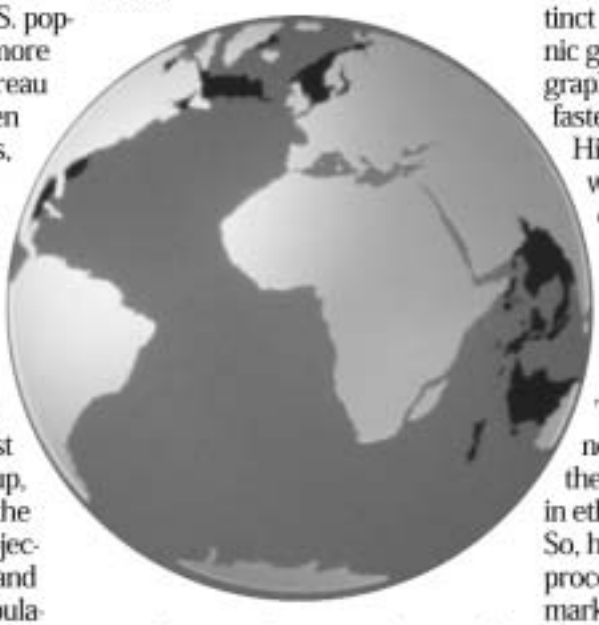
Ethnic Marketing of Pork

Introduction

The United States population has always been diverse and ever-changing with immigrants from every corner of the world. However, today more than ever, the ethnic make-up of the U.S. population is rapidly becoming more diverse. In 1994 the U.S. Bureau of Census estimated that, then current minorities, Hispanics, African Americans, Asians, and Native Americans composed approximately 28 percent of the population with a purchasing power of almost $750 billion. This same group is projected to reach majority status (about 50%) by the middle of the 21st century. Of this diverse group, by far the fastest growing is the Hispanic population with projections to exceed 14% by 2010 and approach 25% of the total population by the year 2050. While the current make-up of the U.S. population remains approximately 75% non-Hispanic white and 12% African American, the growth of Hispanic and Asian populations in the next half century will be tremendous. Also, the largest growing household segments in the U.S. with children will be Hispanic and Asian. Therefore, demand for more flavorful and unique foods will continue to increase with authentic cuisines and ingredients of various countries becoming more prominent. The fusion of these flavors will likely evolve into new products and tastes.



In addition to future implications for the food industry, today divergent ethnic groups have already played a major role in the development of numerous "Ethnic" products. Numerous further processing companies have jumped on the bandwagon early on and taken advantage of this diversity for further product line growth. New products, such as spicy marinated pork tenderloins, or re-invented traditional products, like spicy low-fat smoked sausages, exemplify how ethnic diversity has spiced up our lifestyle and eating habits.

However, not all ethnic groups are created equal or homogeneous. In fact, in many cases there are distinct differences within certain ethnic groups depending on their geographic or cultural origin. The fastest growing ethnic group, Hispanics, for instance differs widely in the types of products demanded due to their own diversity depending on the region from which they immigrated. The same is true, though to a lesser extent, of Asian ethnic groups.

Therefore, no one product or no one marketing effort will fit the needs of all groups, even within ethnicity.

So, how do pork producers and processors take advantage of these marketing opportunities? The answer lies in knowing what your market demands. Market research is not something that most small producers and processor have paid much attention to in the past. The traditional markets, buying stations or stockyards for producers and local groceries and perhaps "mom and pop" food service outlets for small processors have been the norm. To capture the opportunities made available by ethnic diversity,

pork Facts

both small producers and processors must be willing to work together to maximize the various market advantages.
As mentioned above, each ethnic market is different. Just as there are numerous niche markets in the traditional American market, so are there niches for the various ethnic markets. Producers and processors should aggressively investigate their market parameters. The following issues should be considered prior to development of products for an ethnic market.

Market Research

Know your clientele! You can not market until you know to whom you will be marketing.
Oftentimes this is as easy as following local news stories on cultural diversification. In addition, local census data is also useful to determine if the ethnic population of your market area is changing. In small communities, just watching who walks up and down Main Street or shops at the local discount store may be a good indicator to let you know who to gear your market toward.
Once you have an idea about to whom you wish to direct your product toward, explore their cultural background. This could be accomplished through the local library or internet by searching for food preferences for Hispanics from various regions of the Americas. Another way is to approach selected individuals in the community and survey their interest in the types of food products you are interested in offering.
However you decide to proceed with your market research, make certain that you are comfortable that you have solid information before acting. This is the point in the process where it is most economical to change directions. The further down the chain of product development and rollout, especially with added value specialized products like these, the more expensive changes can be to the process.

When assessing ethnic demographics, as with traditional consumers, you must consider the following key issues:

■ Level of education- Normally higher education levels reflect more health conscious purchasing decisions.

■ Level of income- Higher incomes, whether single or dual income, tend to lead to purchase of convenience type items. A premium is paid for time-saving meals.

■ Level of affluence- Although normally a factor related to income and education, affluent consumers tend to purchase higher priced items regardless of whether they are added-value products or just products which normally demand a higher price. In essence, the value to cost ratio of products is normally deemed less important to affluent consumers compared to others who might purchase larger portion sizes to decrease the cost per serving although total purchase price may be higher at the check-out counter.

■ Family Size- Number of adults and children in the family plays a major role in the purchases of products regardless of ethnic group. However, Hispanic and Asian groups both tend to have larger families with a greater number of children. In addition, these ethnic groups tend to have larger "extended" families with larger numbers of relatives nearby or in one household.

■ Age- Consumer age, specifically as it relates to recent immigrants, finds that particularly older consumers tend to continue their traditional cultural food choices. Younger ethnic consumers, especially those born in the U.S., tend to adopt commonly accepted local trends and product profiles.

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What About Your Current Market and Products

Don't think that just because you are looking at new markets, your old market and products don't fit into the mix any more. Consider where your current product line may meet the demand of the new market. In some cases there may be considerable overlap of existing products or minor adjustments needed to satisfy a number of markets. Pork tenderloin is pork tenderloin, no matter who the customer! However, to build market demand, various flavor profiles created by a mixture of seasonings and spices may be necessary.

Also, development of new markets may require variations in cutting and processing techniques. Just because you have always done it this way does not mean there is not another way. Many of the cuts demanded by ethnic groups are basically the same wholesale cuts of today's meat industry with only minor variations in cutting specifications.

While a vast portion of the industry has now converted to almost completely boneless retail cuts, many ethnic groups tend to prefer those cuts that still have the bones intact. Whether this be a factor of lower prices or enhanced flavor due to their methods of cookery or a combination of both, is not entirely clear. However, the processor who has the ability to modify his traditional fabrication methods can produce a more acceptable product for many ethnic groups. Often, just leaving longer tails on the pork chops can enhance their value to ethnic consumers while at the same time increasing weight on a more valuable cut of the carcass. Another added benefit to exploring ethnic markets is the increased demand and therefore increased value of lesser valued cuts and variety meats. Both Hispanic and Asian culture groups tend to use cookery methods that improve the palatability of lower quality meat products. Another aspect common among most ethnic groups is their desire for fresh meat. Their definition of fresh in many cases is while the carcass is still warm or shortly thereafter. Therefore, most attempts at marketing frozen products have had little success. In addition, it is often feasible to market whole carcasses, but only if producers are willing to feed to lower weights. It is not uncommon for finished weights to be less than 200 pounds and "roaster pigs" (often weighing from 75 to as little as 40 pounds live weight) to be in high demand. Furthermore, further processed products, especially those other than sausage products, have little demand by most ethnic populations. They tend to buy the raw materials themselves, regardless of the product, and produce the final product at home.

Test Market New Products

One major difference between Hispanic and non-Hispanic white consumers is how the product will be used. Most Hispanic consumers cook with the mindset that pork is an integral ingredient in the dish or meal being prepared while most white consumers view pork as a stand-alone entree, the main course with all other aspects of the meal as side dishes. Therefore, it is essential that a processor test market their product to a focus group of the ethnic population being targeted prior to full-scale product launch. A favorable market test ensures a greater success rate and therefore a more favorable return on investment by limiting unnecessary product development as well as market roll out cost and investments.

Promotion of Products

Though often overlooked, product promotion is very important. Many good products have died a painful death on the shelf due to

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inadequate or inappropriate promotion. Although all products require adequate length of time and intensity of being promoted, various ethnic cultures dictate that promotion techniques vary. Consider the following guidelines when promoting products to Hispanic and Asian cultures in the United States.

■ Establish brand loyalty- Both Hispanics and Asians tend to show a greater affinity for product loyalty than the average white U.S. consumer. Once a product is identified to meet their needs they seldom shop around for better prices. The same can be said for their loyalty to specific retail outlets.

■ Use creative communication- Being creative, while direct, is essential to reaching the consumer, regardless of culture. In today's glitzy world, with numerous product pitches for over 30,000 food products, consumers look for information that directly describes the product while at the same time is catchy and upbeat.

■ Use the native language- While often difficult and sometimes expensive to do, use of the target consumer's native language appeals in most cases. This is most easily accomplished in larger markets with printed Point of Purchase (POP) materials rather than large print or voice advertising promotionals. However, care must be taken to avoid any embarrassing misinterpretations.

■ Use appealing display- In addition to POP information, the display itself should be colorful, vibrant, and appealing to the consumer. Bright colors normally are well accepted by all ethnic populations, but some colors are more typical than others for certain ethnic groups.

■ Consider seasonal demand- As with white American consumers, ethnic populations also have seasonal desires and preferences which play heavily into food purchases. Attention to these variations will help increase product acceptance and inventory turnover. An awareness of religious or other special holiday celebrations may be helpful.

Conclusions

Marketing pork products directly to the ever growing ethnic markets is an opportunity for small producers and processor to capture an additional portion of value in order to remain competitive. The rewards may be great, but the input required to develop such a market is no small issue. Financial as well as time commitments, should be weighed carefully prior to entering any new venture. Prepare ahead! Evaluate the risk versus benefits of such a venture and decide if it fits into your overall business plan. Ethnic marketing is not for everyone, but those who address it in a careful and appropriate manner will find the potential benefits rewarding.

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Agricultural Development and Diversification (ADD)

Grant Program

The Agricultural Development and Diversification Grant Program invites proposals for projects that are likely to stimulate Wisconsin's farm economy. ADD grants are awarded competitively to projects that may create new opportunities within Wisconsin agriculture through new value-added products, new market research, new production or marketing techniques, or alternative crops or enterprises.

Individuals, associations, agribusinesses and industry groups can submit proposals for an ADD grant using the Request for Proposal (RFP). Currently, the program has $380,000 to award to projects with a maximum grant amount of $50,000. The RFP (application guide) is available from the ADD program office or on the DATCP website. Proposals for grant funding consideration must be submitted between January 15 and March 15.

For questions about the ADD program, the ADD Grant RFP or about grant proposals, please email Mike Bandli or call at 608-224-5136.

Summary of Meat & Meat Animal-Related ADD Grant Projects

2002

17090

Grant

Bringing Wisconsin Raised Pork to the Marketplace

WI Pork Producers Association
Amount Awarded: $35,000.00
Keri Retallick 608-723-7551
Box 327, 9185 Old Potosi Road
Lancaster, WI 53813

An opportunity for Wisconsin pork producers to bring Wisconsin Raised Pork to the marketplace by developing and implementing both business and marketing plans, ultimately benefits both the producer and the consumer. This project investigates marketing channels, slaughter capacity, and processing capacity in order to create business models and technologies that can be used by the state's pork producers.

2001

16016

Grant

Development of Wisconsin Livestock Premise and Individual Animal Identification and Information Retention System

The Livestock Identification Consortium
Amount Awarded: $37,380.00
Thomas Lyon 715-526-2141
100 MBC Drive
Shawano, WI 54166

This project's mission is to develop a comprehensive livestock identification program for Wisconsin producers. The system will help track animal identification to enhance the quality and safety of the food supply and add value to the marketing of milk, meat and other livestock-based products.

2000

15059

Grant

Real Time, On-Line Auction Sales for Wisconsin Agriculture

Equity Cooperative
Amount Awarded: $32,815.00
Tod Fleming 608-356-8311
E10890 Penny Lane
Baraboo, WI 53913

The goal of this pilot project would be to enhance the marketing process for farmers through the use of real-time, on-line agricultural auctions. It is anticipated that marketing in this manner will increase the efficiency of the auction, increase the number of buyers, enhance price discovery, and open more market opportunities. If proven successful, this project could be transferred to all facets of agriculture.

1999

14046

Grant

Wisconsin Lamb Roll - Second Generation

Amount Awarded: $24,475.00
Sandra Russell 608-647-7351
18256 County NN
Cazenovia, WI 53924-9551

This project further identifies the market potential for the Wisconsin Lamb Roll as a reduced-labor, standardized, processed meat product. This project developed the production protocol necessary to produce lamb rolls, which in turn may increase profit opportunities and returns for lamb producers and meat processors through product market development.

14057

Grant

International and National Marketing of Wisconsin's Beef Genetics

Wisconsin Cattlemen's Association
Amount Awarded: $18,500.00
John Freitag 608-527-5747
New Glarus, WI 53574

This project helps develop the market for Wisconsin's beef genetics. By providing exposure of Wisconsin's beef cattle to a larger audience, this project may increase the opportunities available to Wisconsin's beef industry.

14077

Grant

A Model to Add Value to Wisconsin Raised Pork

WI Pork Producers Association
Amount Awarded: $29,050.00
Keri Retallick 608-723-7551
PO Box 327
Lancaster, WI 53813

The object of this project is to study the opportunities available to Wisconsin pork producers in the creation of value-added pork products. Through the creation of new value-added pork products, this project seeks to increase the profitability to producers.

1998

13038

Grant

Wisconsin Lamb Roll

Amount Awarded: $25,500.00
Patrick and Sandra Russell 608-647-7351
18256 County NN
Cazenovia, WI 53924-9551

The objective of this project is to identify the market potential for the Wisconsin Lamb Roll as a reduced-labor,

- standardized, processed meat product. This project will generate increased profit opportunities and returns for
- both lamb producers and meat processors through product market development.

13076

Grant

The Wisconsin Organic Meat Initiative (Phase 2)

Coulee Region Organic Produce Pool (CROPP)
Amount Awarded:$18,800.00
George Siemon 608-625-2602
507 W Main Street, PO Box 159
La Farge, WI 54639

The purpose of this project is to develop markets for organic poultry and pork products. It continues the efforts to establish a national distribution network for organic meat products and increase income to farmers.

13087

Grant

Trailblazing into the next 150 Years with a 1999 Premier Bison Show and Sale

Wisconsin Bison Producers
Amount Awarded: $20,900.00
Mary Jenkins 920-648-5433
38413 Delafield Road
Oconomowoc, WI 53066

A Wisconsin Show and Sale of Bison helps expand the bison industry and bring national attention to the quality bison herds in the Eastern United States. This show gives bison producers an outlet for their production and helps educate the public about the value of bison products.

13106

Grant

Agriculture and Land-Use: Preventing Conflicts Over the Expansion of Wisconsin's Livestock Industry

Wisconsin Environmental Initiative
Amount Awarded: $25,313.00
Karl Bryan 608-280-0360
16 North Carroll Street, Suite 840
Madison, WI 53703

Under the leadership of the Wisconsin Environmental Initiative, this project examined issues regarding livestock expansion. Specific issues to be studied are public concerns with livestock expansion; standards livestock expansions must meet to be acceptable to the public and recommendations on regulator's role in livestock expansions. By finding workable solutions to these problems, this project may protect the environment and protect the jobs and incomes of citizens who depend on the livestock industry.

1997

12042

Grant

Value-Added Lamb

Bayfield Lamb Cooperative
Amount Awarded: $27,000.00
Dale Baggerly 715-373-5122
Route 3, Box 3575
Washburn, WI 54891

This project increased the price lamb producers received and helped form the Bayfield Lamb Cooperative. In order to achieve this goal, lamb producers from Bayfield County conducted a feasibility and product development study to identify possible value-added lamb meat products. After identifying several possible products, the group created a business plan for the producer-based association.

12057

Grant

Improving the Competitive Position of Wisconsin's Animal Agriculture (Phase 2)

Wisconsin Agribusiness Council
Amount Awarded: $28,650.00
Frank Friar 608-224-1450
Madison, WI 53718-6797

Under the leadership of the Wisconsin Agribusiness Council, Wisconsin Cattlemen's Association, Wisconsin Pork Producers Association, Consortium of Animal Agriculture Resource Development, UW-Madison College of Agricultural and Life Sciences, and UW-Extension Cooperative Extension Division, this project's mission is to revitalize Wisconsin's animal agriculture industry. The second year of this project focused on issues challenging Wisconsin's animal industry and solutions proposed at the invitational leadership conference in the project's first year.

12089

Grant

Poultry Processing and Marketing Project

Wisconsin Farmland Conservancy
Amount Awarded: $12,615.00
Tom Quinn 715-235-8850
500 East Main Street, Suite 307
Menomonie, WI 54751

This project studied the feasibility of constructing a USDA certified poultry processing facility in Northwestern Wisconsin and will develop a model for establishing a producer cooperative that could finance, build and operate the plant.

12091

Grant

The Wisconsin Organic Meat Initiative (Phase 1)

Coulee region Organic Produce Pool (CROPP)
Amount Awarded: $15,900.00
George Siemon 608-625-2602
P.O. Box 159, Main St.
LaFarge, WI 54639

The purpose of this project was to develop organic meat products and establish a national distribution network. The establishment of these new products may open overseas markets, show evidence of the added value for organic meat products, and increase income to farmers.

1996

11025

Grant

Improving the Competitive Position of Wisconsin's Animal Industry - New Dimensions and Directions

Wisconsin Agribusiness Council
Amount Awarded: $19,850.00
William Geary 608-224-1450
2820 Walton Commons W, # 132
Madison, WI 53704-3129

Developed under the Consortium for Animal Agriculture Resource Development (CAARD), the project was led by the Wisconsin Agribusiness Council, Wisconsin Cattlemen's Association, and the Wisconsin Pork Producers Association. As part of this project, CAARD held a national invitational leadership conference to focus attention on issues challenging Wisconsin's animal industry.

11059

Grant

Organic Meat Marketing Cooperative

Wisconsin Farmland Conservancy
Amount Awarded: $16,000.00
Tom Quinn 715-235-8850
500 East Main St Suite 307
Menomonie, WI 54751

This project was a continuation of a 1995 ADD-funded project. The goal was to complete a formal business plan to establish a new, independent, farmer-owned fresh organic beef and pork marketing cooperative in Wisconsin. In the first year, the project completed substantial market research, formed a base of farmer producers, developed quality standards, surveyed potential processing options, and established a network of cooperation with university, meat industry and cooperative resource persons.

1995

10010

Grant

Utilization of Northern Wisconsin Pasture Forages

UW-Extension
Amount Awarded: $14,200.00
Russell Kiecker 715-635-3506
W6646 Hwy 70
Spooner, WI 54801

Farmers and county extension agents in six Northwestern counties (Ashland, Bayfield, Douglas, Price, Rusk and Washburn) worked together in a demonstration project to show how seasonal grazing of beef cattle can increase the productivity of under-utilized land. Increasing income from available land can add significantly to rural economies.

10083

Grant

Emu Product Market Development

Octagon Farms, Inc.
Amount Awarded: $29,820.00
Jayne Wick 414-377-8420
364 Lake Shore Road
Grafton, WI 53024-8420

The primary goal of this study was to develop and provide information necessary for capital-intensive investment in grow-out and slaughter facilities in Wisconsin, as well as to support the marketing of Wisconsin-raised emu. The objectives of this study are in support of developing a commercial emu industry in Wisconsin. As a result of this project, an emu/ostrich processing facility was established in Elroy, Wisconsin.

1995 – continued

10085

Grant

Family Farm Marketing Network for Fresh Meat

Wisconsin Farmland Conservancy
Amount Awarded: $16,000.00
Tom Quinn 715-235-8850
500 E Main St, Suite 307
Menomonie, WI 54751-2509

A direct marketing strategy project, in Western Wisconsin, was designed to provide farmers with a model for premium direct markets for beef and pork. The project linked farmers and local processors in a cooperative effort to market fresh meat to supportive supermarket outlets.

1994

09059

Grant

Strengthening the Pork Industry of Wisconsin through Multiple-Site Applications, Structural Changes and Environmentally Sound Practices

WI Pork Producers Assoc.
Amount Awarded: $25,000.00
Keri Retallick 608-723-7551
PO Box 327
Lancaster, WI 53813

The Wisconsin Pork Producers Association conducted a feasibility study analyzing Multiple-site Production Systems. Through the study, the association sought to identify and analyze the environmental, economic and social aspects of multiple-site pork production systems in Wisconsin. Information gleaned from the study will be used to assist the Wisconsin pork industry in meeting present and future competitive challenges.

09083

Grant

Formation of the Wisconsin Animal Agriculture Coalition

Wisconsin Agribusiness Council
Amount Awarded: $25,000.00
William Geary 608-224-1450
2820 Walton Commons W, #132
Madison, WI 53704

This project organized the Consortium for Animal Agricultural Research Development (CAARD), with mission of sustaining and developing animal agriculture in the state. Creating a public environment which encourages investment and growth in animal agriculture is a major goal of CAARD. A combined effort will be put forth by industry, agriculture organizations, government agencies and educational institutions to meet the competitive challenges facing Wisconsin's animal agriculture industry.

1993

08020

Grant

Marketing Bison to an International Conference

Wisconsin Bison Producers
Amount Awarded: $8,345.00
Mary Jenkins 414-648-5433
PO Box 423
Cambridge, WI 53523

Using the International Bison Conference as a focused marketing event, the Wisconsin Bison Producers successfully carried out the objectives of improving public awareness and understanding of the low cost production, environmentally friendly, and the highly nutritional advantages of raising bison. A Wisconsin Bison Producers Association directory, listing ninety Wisconsin producers, was also developed through the project.

08045

Grant

World Beef Expo (Year 2)

World Beef Expo
Amount Awarded: $25,000.00
Tom McKittrick 608-224-6455
2820 Walton Commons West, 101
Madison, WI 53704

The second year of support for the World Beef Expo helped to establish the sustainability of this event which serves as a showcase for Wisconsin's beef industry. This event has helped to strengthen Wisconsin's position in the world marketplace.

1992

07003

Grant

Sweet Water From Ethanol Production for Cattle Feeding

Eureka Company
Amount Awarded: $32,000.00
William Bartlett 920-685-2881
% DATCP
Berlin, WI 54923

Sweet water is a by-product of ethanol production that can be used in livestock feed. The ethanol fermentation process produces a wet mash product equal in nutritional content to soybean oil meal. Cattle fed the wet mash continued to gain weight as consumption of dry grain decreased.

07028

Grant

World Beef Expo (Year 1)

Wisconsin Cattlemen's Association
Amount Awarded: $25,000.00
Dick Hauser 608-833-0320
632 Grand Canyon Dr.
Madison, WI 53719

This project helped establish a new marketing medium for the Wisconsin Beef Industry. The first year of an annual event, the World Beef Expo, established a forum for the worldwide agricultural community to participate in beef shows, sales, educational programs, trade shows, beef processors competition, meat products shows, 4-H, FFA and college judging contests. The World Beef Expo Board was also developed to provide the infrastructure necessary for sustaining this annual event.

1991

06077

Grant

Feasibility Study & Creation of WILAMBCO A Lamb Marketing Cooperative

WILAMBCO
Amount Awarded: $17,000.00
Robert Black 414-623-3536
7868 Hwy 73
Columbus, WI 53925

This feasibility study concluded that value-added lamb products become more expensive due to the added labor of boning and trimming. In addition, the lambs, purchased under a floor price situation in a lamb cooperative marketing venture, were at a significant price disadvantage. It was suggested that a lamb marketing cooperative would not be an economically viable venture in the present marketplace.

1990

05069

Grant

Fully Cooked, Ready To Eat, Bone-In Pork Loins & Related Products

New World Foods, Inc.
Amount Awarded: $11,650.00
Curtis Hornbeck and Stephen Scott
% DATCP
Belleville, WI

Producing and packaging a line of fully cooked convenience pork products proved to be feasible, but the economics of the process remains questionable. The owners sold this company and the new products became part of the new company.

Contacts/Resources

Direct Marketing

North American Farmers'
Direct Marketing Association
62 White Load Road
Southampton, MA 01073
(888) 884-9270
http://www.nafdma.com

Meat Processors

Wisconsin Assn of Meat Processors
150 S. Main
Lodi, WI 53555
Ken Bisarek, Executive Sec.
608-994-3173

National Trade Associations

National Cattlemen's Beef Assn
9110 E. Nichols Ave. #300
Centennial, CO 80112
(303) 694-0305
or
1301 Pennsylvania Ave. NW,
Suite 300
Washington, D.C. 20004
(202) 347-0228

National Pork Producers Council
7733 Douglas Avenue
Urbandale, IA 50322
p: 515.278.8012
515-223-2600
www.nppc.org

National Pork Board
P.O. Box 9114
Des Moines, IA 50306
515-223-2600
www.porkboard.org

State Trade Associations

Wisconsin Beef Council
680 Grandy Canyon Dr.
Madison, WI 53719-1044
(608) 833-7177
FAX: 608-833-4725

Wisconsin Livestock and Meat Council
Neil Jones, President
c/o DATCP Mktg Division
PO BOX 8911
Madison, WI 53718
Phone: 608-224-5113

Wisconsin Pork Producers Assn
Keri Retalick, Exec. Director
9185 Old Potosi Road
P.O. Box 327
Lancaster, WI 53813
(608) 723-7551

Wisc. Sheep Breeders Co-op
Gary Vlondrachek, President
7811 Consolidated School Road
Edgerton, WI 53534
920-894-3945
Garyv@TCEI.com

Wisconsin Bison Producers Assn
Georgia Derrick, President W5707 Cty. Rd. D
Montello, WI 53949 bufflogal@yahoo.com
www.wibison.com

Wisconsin Commercial Deer
& Elk Farmer's Association
3591 High Point Rd.
Spring Green, WI 53588
(888) 233-1667
www.wcdefa.org

Food Safety And Regulations

Wisconsin Dept of Agriculture, Trade and Consumer Protection (DATCP)
Food Safety Division
Central Administrative Office
(and the Southern Regional Office)
2811 Agriculture Dr, 1st Floor
P.O. Box 8911
Madison, WI 53708
(608) 224-4700
http://datcp.state.wi.us

In Milwaukee area call:
(414) 777-0529

Northeast Regional Office
200 N. Jefferson, Suite 146A
Green Bay, WI 54301
(920) 448-5120

Northwest Regional Office
3610 Oakwood Hill Pkwy
Eau Claire, WI 54701-7754
(715) 839-3844

USDA's Meat and Poultry Hotline:
800-535-4555

Other Wisc Dept Of Ag Resources

Agricultural Development and Diversification (ADD) Grant Program
Mike Bandli: (608) 224-5126

Something Special from Wisconsin
Lisa Stout: (608) 224-5126

Organic Agriculture
Perry Brown: (608) 224-5114

Animal Health Division
(608) 224-4872

UW-Extension

Emergin Ag Markets (EAM) Team
www.uwex.edu/ces/agmarkets

Dr. Dennis Buege
Extension Meat Specialist
Meat Science Laboratory
1805 Linden Drive
Madison, WI 53706
(608) 262-0555
drbuege@facstaff.wisc.edu

Dr. David Thomas
Extension Sheep Specialist
438 Animal Sciences Blgd
1675 Observatory Dr.
Madison, WI 53706
(608) 263-4306
dlthomas@facstaff.wisc.edu

Ron Kean
Extension Poultry Specialist
Department of Animal Sciences
1675 Oservatory Drive
Madison WI, 53706-1284
rpkean@facstaff.wisc.edu
(608) 262-8807

Greg Lawless
Co-op Development Specialist
UW Center for Cooperatives
224 Taylor Hall, 427 Lorch St.
Madison, WI 53706
(608) 265-2903
lawless@aae.wisc.edu

To find your county extension office:
http://www1.uwex.edu/ces/cty/

Resources for Meat Judging

Provided by Dennis Buege, Extension Meat Specialist, UW-Madison

1. American Meat Science Association (AMSA),

1111 North Dunlap Avenue, Savoy, IL 61874; 217-356-3182 (phone), 217-398-4119 (fax); www.meatscience.org (can order online)

- "Guide to Identifying Meat Cuts" ($3.00 - shipping included) This pocket-sized guide is a handy reference for consumers, students and meat science professionals. It includes photos, descriptions, and cooking guidelines for over 200 cuts of beef, pork, lamb and veal.
- "Meat Evaluation Handbook" ($55.00 - shipping included) Revised in 2000. For years this handbook has served as the primary text for training meat science professionals in the area of fresh meat evaluation. Now in a revised and expanded edition, the handbook is the industry standard guide for fresh meat grading and selection.

2. National Cattlemen's Beef Association (NCBA),

P.O. Box 670, Bloomington, IL 60108
1-800-368-3138 (phone), 1-800-368-3136 (fax)

- Marbling Photos (#06-901) - $19.50
- Beef Retail Cut Chart, wall size (#10-501) - $2.50
- ("Beef Made Easy") Notebook (#10-502) - $6.50/100
- "Guide to Identifying Meat Cuts" (#06-202) - $2.60 53 pages. Includes information on retail cut identification (color photos of cuts), meat labeling, meat safety, and meat cookery. Also available from AMSA (above) and National Pork Board (#04362 - $2.00 each).

3. National Pork Board,

P.O. Box 9113, Des Moines, IA 50306; 515-223-2621 (Attn: Nancy Newman), 515-223-2646 (fax)

- Pork Retail Cut Chart: Wall Size (NPPC-03341) - $.60 each
  - Notebook (NPPC-03342) - $.10 each
- NPPC Pork Quality Standards
  - (texture, color, marbling - new version available in 1999)
  - 8 1/2 X 11" Notebook Size - $1.00 each
  - 25 X 35" Wall Poster - $10.00 each
  - Laminated cards (each standard) in a vinyl pouch - $32.50

4. University of Illinois - Information Technology and Communication Services,

1917 S. Wright Street, Champaign, IL 61820; 800-345-6087

- Meat Judging and Grading Booklet (40 pages #J180F) - $3.85
- Retail Meat Identification Flash Card Set (126 color photos #X180B) - $75.00
- Retail Beef Cut Identification (67 photos • #PCD109) - $45.00
- Beef CD with wholesale and retail names on each photo #PCDlllL - $45.00
- Retail Pork and Lamb Cut Identification (75 photos #PCD110) - $45.00
- Pork/lamb CD with wholesale and retail names on photos #PCD1126 - $45.00

5. University of Nebraska Animal Science Website: animalscience.unl.edu

- click on "Meats"
- provides meat identification information and quizzes

6a. Meat Judging Videos

CEV Multimedia lists 40 video tapes on carcass and wholesale cut judging, beef grading, and retail cut identification. Costs range from $49 to $79 per video. For a current CEV catalog contact: CEV Multimedia, P.O. Box 65265, Lubbock, TX 79464; 800-922-9965, 800-243-6398 (fax)

6b. The Meat Science Laboratory

holds a number of **CEV videos**, and will loan them out. (Call Laura Trumble to reserve tapes for a 10 day period - 608-262-0463)

Beef Grading - Yield	(#247)	35 tes
Beef Grading - quality	(#245)	30 minutes
Carcass Judging	(#258)	23 minutes
Lamb Carcass Judging	(#269)	51 minutes
Retail Cut Judging	(#270)	28 minutes
Beef Retail Cut ID*	(#252)	41 minutes
Pork Retail Cut ID*	(#253)	27 minutes
Lamb Retail Cut ID*	(#254)	17 minutes

7. Loin Eye Grids

Beef Ribeye Grids - $2.50 each- Pork/Lamb Grids - $.50 each
Art Services, 3015 Earl Place N.E., Washington, D.C. 20018; 202-526-5607

Iowa State University, Extension Distribution Center, 119 Printing and Publications Bldg.,Kooser Drive, Ames, IA 60011; 515-294-5247. (Dennis Buege can provide you with one grid of each type upon request.)

8. Backfat/Grading Rulers (stainless steel)

- Nasco, 901 Janesville Avenue, Fort Atkinson, WI 53538; 920-563-2446
- Beef USDA yield grade ruler (preliminary yield grade/inches), P4G/inches (#CO2615) - $2.05 each
- Pork backfat ruler, inches (#COO155) - $2.00 each
- Lamb yield grade ruler, inches (#C16281) - $1.95 each

To order more copies of this book call or write:

Wisconsin Farm Center
2811 Agriculture Drive
PO Box 8911
Madison, WI 53708-8911

1-800-942-2474

center@datcp.state.wi.us