PREPARATION OF SAMPLES FOR LABORATORY FAT ANALYSIS (Ground, linked, and other non-canned products)

Purpose

This Instruction defines the Meat Grading and Certification (MGC) Branch procedures for the selection and preparation of ground, linked and other non-canned product samples for laboratory fat analysis.

Policy

It is the policy of the MGC Branch to select samples in accordance with universally recognized protocols, maintain sample integrity, and prepare samples for laboratory analysis in accordance with procedures approved by the Association of Official Analytical Chemists (AOAC). See **Exhibit A**.

Scope

This Instruction applies to any contractor or subcontractor who supplies meat products for contracts requiring fat content analysis certified by the MGC Branch.

Responsibilities

Contractors will:

1. Provide facilities and equipment necessary for preparing samples for laboratory analysis, including:
   a. Adequate and secure freezer facilities for sample storage.
   b. A commercial food processor, approved by the AOAC (i.e., Robot Coupe or equivalent must be used), for USDA purchases.
   c. Sample jars capable of preventing moisture loss or gain. Jars **must** meet the following specifications:
      - 6-ounce (70mm), white or clear polypropylene jar.
      - Plastic or metal screw-on lids.
   d. FreezSafe polyfoam mailing containers (or equivalent) and refrigerant packs or dry ice for sample shipment.
   e. A plastic or rubber spatula with a 2-inch by 4-inch blade.
   f. Plastic bags, knives, etc.
2. Provide a plant employee trained in laboratory sampling and sample preparation procedures capable of operating and cleaning the food processing equipment.
3. Pay for all costs associated with the laboratory analysis.

Note: All fat samples not prepared using an AOAC food processors or equivalent will be subject to a $45.00 per sample processing fee by the Agricultural Marketing Service Laboratory.

Meat Graders will:

1. Establish plant specific sampling protocol in the Quality Manual.
2. Randomly select 4 filled shipping containers.
3. Randomly select an area within each shipping container and collect a 2-pound sample.
4. Monitor sample preparation by:
   a. Monitoring placement of the sample into the food processor.
   b. Ensuring that any fat that collects on either the inner wall or the bottom of the food processor and any connective tissue that collects around the blade are incorporated into the sample.
   c. Instructing the plant employee to interrupt processing and press the sample to the bottom of the bowl with a spatula and blend the sample uniformly if the sample forms into a ball above the blades.
   d. Ensuring the bowl and blades are thoroughly washed between each sample preparation.
5. Prepare the Sample Label Stickers and attach to the applicable Original, Reserve, and Vender (optional) Lab sample jars. It is not necessary to place the vendor samples in sample jars unless requested to do so by the vendor. See **Exhibit C**.
6. Fill the sample jars ½ to 2/3 full with emulsified sample and close. **Do not tape the lid closed or apply a shield stamp to the lid.**
7. Offer the Vendor sample(s) to the vendor after completion of the production lot.
8. Prepare the samples for mailing by:
   a. Completing the MGC 110 electronic template located at \\sdenvls0000a\weblinks\templates.htm. Include the Official USDA Meat Grading Sample Bag (Sample Bag) number on the MGC 110. See **Exhibit B**.
   b. Securing the completed MGC 110 and the Original and Reserve samples in the Sample Bag. Follow the step-by-step instructions printed on the bag.
   c. **Ensuring that samples are solidly frozen prior to mailing.**
   d. Placing the Sample Bag(s) into the mailing container, with frozen refrigerant packs or dry ice. **Ensuring that Sample Bags do not come in direct contact with dry ice.** Dry ice will cause the words "*VOID Tampering Detected*" to appear on the Sample Bag. If dry ice is used, wrap the Sample Bag with paper towels, butcher paper, or similar material.
   e. Securely closing the mailing container. **Do not tape or use a shield stamp to seal the container.**
9. Ensure samples are shipped only by guaranteed Next Day delivery (not 2-day) courier service. Contractors will provide return address and postage labels, so that the mailing containers can be returned via Next Day delivery.
10. Ensure samples are sent to the correct laboratory.
    a. Ship samples derived from plants located East of the Mississippi River to:

       USDA, AMS, Science and Technology
       610 North Main Street
       Blakely, GA 31723
       Phone (912) 723-4570
       Fax (912) 723-3294

    b. Send samples to the Blakely Laboratory Monday through Friday.

c. Ship samples derived from plants located West of the Mississippi River to:

USDA, AMS, Science and Technology
107 South 4th Street
Madill, OK 73446
Phone (580) 795-5615
Fax (580) 795-3645

d. Send samples to the Madill Laboratory Monday through Thursday.

11. Place the Reserve samples in a secure freezer. Reserve samples may be analyzed only when:
    a. The Original sample was lost.
    b. The Original sample was unsuitable for analysis.
    c. Authorized by the contractor.

    Note: When the Reserve sample is analyzed, the results are final.
12. Once the lot has been shipped, return any corresponding samples to the contractor.

Laboratories will:

1. Contact a designated Office of Field Operations (OFO) employee immediately via phone or e-mail, and send a follow-up notification by fax, if samples are unsuitable for testing.
2. Provide analytical results electronically to the designated OFO employees by 5:00 PM EST, Monday through Friday.
    a. Designated OFO employees include: Pat Griffith, Cindy Shattuck, James Jones, and Lucille Lucero.
    b. They may be reached by:
        1). E-mail at: Pat.Griffith@usda.gov, Cindy.Shattuck@usda.gov, JamesA.Jones@usda.gov, and Lucille.Lucero@usda.gov.
        2). Phone (303) 294-7676.
        3). Fax (303) 294-7523.
3. Transmit analytical results completed during a weekend no later than 9:00 AM EST of the following Monday or the first official business day of the week.

Designated OFO employees will:

1. Monitor the movement of samples submitted to AMS Laboratories.
2. Ensure analytical results are submitted to the Area Offices in a timely manner.
3. Manage and maintain Laboratory Analysis Files, which are accessible to designated persons at: \\SDENVLS0000A\LabAnalysisFiles\CompleteReports.

_____

Larry R. Meadows, Chief
Meat Grading and Certification Branch
Livestock and Seed Program

Exhibit A

39. Meat and Meat Products

David L. Soderberg, Chapter Editor
U.S. Department of Agriculture

39.1.01

AOAC Official Method 983.18
Meat and Meat Products
Preparation of Sample
Procedure

To prevent H_2O loss during preparation and subsequent handling, do not use small samples. Keep ground material in glass or similar containers with air- and H_2O-tight covers. Prepare samples for analysis as follows:

(**a**) *Fresh meats, dried meats, cured meats, smoked meats, etc*.-Separate as completely as possible from any bone; pass rapidly 3 times through food chopper with plate openings ≤1/8" (3 mm), mixing thoroughly after each grinding; and begin all determinations promptly. If any delay occurs, chill sample to inhibit decomposition.

Alternatively, use a bowl cutter for sample preparation (benchtop model, 1/2 HP; 14 in. bowl, 22 rpm; two 3.5 in. knives, 1725 rpm; Model 84145, Hobart Corp., 711 Pennsylvania Ave, Troy, OH, 45374, or equivalent). Chill all cutter parts before preparation of each sample.

Food Processor-FirstActionl990.-Benchtop model, 110/120 V, 60 Hz, 1 hp,7.5 A, 1725 rpm, fan-cooled motor, 4 qt bowl; Model R4Y, Robot Coupe, USA, Inc., Jackson, MS, or equivalent. (Caution: Do not remove cutter bowl lid or cutter bowl from base until motor has come to full stop. Do not put hand, finger, or any object into bowl while motor is running. Unplug appliance before servicing or cleaning.)

Precut sample, up to 2 lb, to maximum dimension ≤2 in., and transfer to bowl for processing. Include any separated liquid. Process 30 s, then wipe down inner side wall and bottom of bowl with spatula (use household plastic or rubber spatula with ca 2 in. by 4 in. straight-edge blade) and transfer gathered material to body of sample. Continue processing another 30 s and wipe down as before. Repeat sequence to give total of 2 min processing and 3 wipe downs.

Take particular care with certain meat types such as ground beef to assure uniform distribution of fat and connective tissue. At each wipe-down interval, reincorporate these into sample by using spatula to remove fat from inside surfaces of bowl and connective tissue from around blades. If sample consolidates as ball above blades, interrupt processing and press sample to bottom of bowl with spatula before continuing.

Reference: JAOAC **72**, 777(1989).

(**b**) *Canned meats*.-Pass entire contents of can through food chopper, bowl cutter or food processor, as in (a).

(**c**) *Sausages*.-Remove from casings and pass through food chopper, bowl cutter or food processor, as in (a).

Dry portions of samples of (a), (b), and (c) not needed for immediate analysis, either in vacuo <60° or by evaporating on steam bath 2 or 3 times with alcohol. Extract fat from dried product with petroleum ether (bp <60°) and let petroleum ether evaporate spontaneously, finally expelling last traces by heating short time on steam bath. Do not heat sample or separated fat longer than necessary because of tendency to decompose. Reserve fat in cool place for examination as in chapter on oils and fats and complete examination before it becomes rancid.

Reference: JAOAC **66**, 759(1983).

39.l.02

AOAC Official Method 950.46
Moisture in Meat

A. Drying in Vacuo at 95-100°
--Final Action

Proceed as in **934.01** (*see* 4.1.03). (Not suitable for high fat products such as pork sausage.)

B. Air Drying
--First Action
--Final Action 1991

(**a**) With lids removed, dry sample containing ca 2 g dry material 16-18 h at 100-102° in air oven (mechanical convection preferred). Use covered Al dish ≥50 mm diameter and ≤40 mm deep. Cool in desiccator and weigh. Report loss in weight as moisture.

(**b**) With lids removed, dry sample containing ca 2 g dry material to constant weight (2-4 h depending on product) in mechanical convection oven or in gravity oven with single shelf at ca 125°. Use covered Al dish ≥50 mm diameter and ≤40 mm deep. Avoid excessive drying. Cover, cool in desiccator, and weigh. Report loss in weight as moisture. (Dried sample is not satisfactory for subsequent fat determination.)

References: JAOAC **33**, 749(1950); **36**, 279(1953).

39.1.03

AOAC Official Method 985.14
Moisture in Meat
and Poultry Products
Rapid Microwave Drying Method

First Action 1985
Final Action 1991

A. Principle

Moisture is removed (evaporated) from sample by using microwave energy. Weight loss is determined by electronic balance readings before and after drying and is converted to moisture content by microprocessor with digital percent readout.

Exhibit B

UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURE MARKETING SERVICE LIVESTOCK AND SEED PROGRAM MEAT GRADING AND CERTIFICATION BRANCH	DATE SAMPLED	SAMPLE BAG NUMBER
LABORATORY SAMPLING FORM FOR MEAT PRODUCTS	DATE MAILED	PRODUCTION CERTIFICATE NO.
	DATE VENDOR NOTIFIED OF RESULTS	SPECIFICATION / NAME OF PRODUCT/COMMODITY CODE

APPLICANT NUMBER		ANALYSIS REQUESTED ("X" APPLICABLE BOXES)	
APPLICANT	ESTABLISHMENT NO.	X	FAT
			MOISTURE
RECEIVER OR BUYER			SALT
			OTHER (SPECIFY)
SIGNATURE OF PERSON SAMPLING PRODUCT	NAME OF PERSON SAMPLING PRODUCT *(PRINT)*		

	ORIGINAL SAMPLE		RESERVE SAMPLE
SAMPLE 1			MOISTURE
SAMPLE 2			
SAMPLE 3			SALT
SAMPLE 4			
AVERAGE			

SEND LABORATORY RESULTS TO : *(Name and address)*

MGCB Denver Office of Field Operations
Telephone (303) 294-7676
FAX (303) 294-7523
Pat.Griffith@usda.gov
Cindy.Shattuck@usda.gov
JamesA.Jones@usda.gov
Lucille.Lucero@usda.gov

CONTRACT NO.	LOT NO.	NO. OF UNITS PRODUCED	NO. OF POUNDS	NO. OF SAMPLES
				4

COMMENTS / FINDINGS (RECORD RESULTS HERE FOR ANALYSIS OTHER THAN FAT, MOISTURE, OR SALT)

STORAGE FREEZER: _____

EQC CODE: _____

TIME IN FREEZER: _____

RESERVE MAILED: _____

SHIPPING DATES: _____

_____

72 HOUR TEMP CHECK

DATE: _____ TEMP. 1 _____

EQC CODE: _____ 2 _____

TIME: _____ 3 _____

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		1		Lot Number	
Original	X	Reserve		Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		1		Lot Number	
Original		Reserve	X	Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		2		Lot Number	
Original	X	Reserve		Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		2		Lot Number	
Original		Reserve	X	Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		3		Lot Number	
Original	X	Reserve		Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		3		Lot Number	
Original		Reserve	X	Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		4		Lot Number	
Original	X	Reserve		Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		4		Lot Number	
Original		Reserve	X	Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		MICRO		Lot Number	
Original	X	Reserve		Vendor	

Bag Number					
Establishment Number				Specif-cation	
Contract Number				Sample Date	
Sample Number		MICRO		Lot Number	
Original		Reserve	X	Vendor	