NAPAR
in alliance with FMI FOOD MARKETING INSTITUTE

March 27, 2008

Mr. Vincent J. Fusaro
Section Head
Standardization Section, Fresh Products Branch
Fruit and Vegetable Programs
Agricultural Marketing Service
U.S. Department of Agriculture
1400 Independence Avenue, SW., Room 1661
South Building, Stop 0240
Washington, DC 20250-0240
Fax: (202) 720-8871
http://www.regulations.gov

Re:
U.S. Standards for Grades of Table Grapes (European or Vinifera Type)
Docket # AMS-FV-07-0140
Federal Register, Vol. 73, No. 38, February 26, 2008, pages 10185-10187

Dear Mr. Fusaro,

The North American Perishable Agricultural Receivers (NAPAR) is a national trade association located in Washington, DC, representing independent produce wholesale receivers. NAPAR members are predominantly small businesses with combined annual sales in excess of $4 billion. NAPAR formed an operating alliance with the Food Marketing Institute in 1999, enabling it to function independently while expanding the services to its members.

On behalf of our members, I appreciate the opportunity to submit comments to USDA and hope our perspective is helpful in determining if there is a need to proceed with a revision to the U.S. Grade Standard for Table Grapes.

NAPAR surveyed its members, soliciting their input on the probable impact these changes would have on their business operations. Members responded with very strong opposition to the proposal because it would establish a special 5% allowance for shattered table grapes in consumer containers for en route, or at destination. Its impact would not only affect shatter, this proposal also raises the tolerance level for other defects, like scarring and discoloration. Moreover, the independent wholesale/terminal market segment is disproportionately impacted and the proposal does not take into

North American Perishable Agricultural Receivers
2345 Crystal Drive, Suite 800, Arlington, VA 22202-4801
Phone: (202) 220-0670, Fax: (202) 220-0870

account recent scientific research, indicating shattered table grapes are more susceptible to microbiological contamination, resulting in reduced shelf life. Overall, this proposal will have a negative impact on our members and significantly weaken the U.S. No.1 Grade.

PACA Good Delivery Tolerances
Under this proposal, shattered berries would not be scored against the current 12% total tolerance for defects in the U.S No.1 grade until the amount of shattered berries first exceeds the special 5% allowance, thus increasing tolerance to 17%. An additional tolerance of 3% would be added to the total in situations where PACA "good delivery" tolerances apply, for a grand total of 20%.

As wholesale receivers, our members would be held to the U.S. Grade Standards and have to accept from 17% to 20% shatter at the wholesale receiving point. Additional time would be required for them to resell the grapes to a retailer, during which time the shatter process will continue. By the time the grapes make it through the retailer's distribution process, several days could pass. It is entirely possible that shatter could far exceed 20% by the time the grapes are purchased by a consumer.

Tolerance Increases for Other Defects Too
Currently, in order to meet U.S. No.1 Grade, the tolerance allows for 12% total defects. Grapes arriving with 5% shatter can also have up to 7% of additional defects like scarring and discoloration and still pass inspection.

Under this proposal, up to 5% shatter wouldn't be scored, which means that up to 12% (15% for "good delivery") of the grapes could also have defects such as scarring and discoloration, and the load would still qualify for U.S. No.1.

Independent Wholesale Receivers would be Hardest Hit
A sizeable majority of table grapes in consumer packages are being sold through the larger retail chains and major wholesale companies, which typically have their own specifications regarding the amount of shatter and other defects they will accept. Most of their specifications are far more stringent than those required in the US #1 grade. Grapes not meeting these tight corporate specifications likely end up in the hands of smaller independent wholesale receivers. These receivers, because of market pressures, are held to the U.S. Grade Standards. Therefore, increasing the tolerance for shatter/defects in the U.S. #1 grade will have disproportionately higher impact on independent wholesale receivers. The aggregated volume of the independent-wholesale-receiver channel represents a relatively small percentage of the total volume of table grapes sold in consumer size containers.

More Susceptible to Microbiological Growth and Reduced Shelf Life
Experience has taught our members that shatter table grapes have a shorter shelf life than those remaining firmly attached to the stem. For this reason, loads containing higher

amounts of shatter command lower prices in the market than those with very little. Grapes that naturally detach from the stem are past their prime and beginning their slide toward spoilage and decay. As shatter berries age, we now know they are more susceptible to microbiological contamination, which further reduces their shelf life.

In the absence of any other scientific information on table grape shatter, NAPAR commissioned Deibel Laboratories to conduct microbiological tests on 14 varieties of table grapes to determine any differences in microbiological growth between shatter and bunched grapes. These tests revealed a noticeable difference at refrigerated temperatures and determined that shatter grapes provided greater opportunity for bacterial growth and therefore shortened shelf life. The Deibel Laboratories study is also submitted for your evaluation.

A 5% Allowance Weakens the Standard

Adding a 5% allowance for shattered berries to an existing tolerance of 12%, amounts to a whopping **41.7%** increase in allowable shatter/defects for the U.S.No.1 Grade. An earlier proposal to create a special 10% allowance for shatter was withdrawn by USDA on 6/29/07. In its own statement in the Federal Register at that time, USDA, AMS indicated that a 10% allowance for shatter would "weaken the standard and reduce consumer confidence of the grade." Although a 5% allowance would only weaken the standard half as much, it still weakens it - by up to 41.7%.

I don't believe proponents of this proposal intended to put independent wholesale receivers at a distinct competitive disadvantage, nor did anyone intend for the proposal to increase the tolerance for defects other than shatter, but those are the consequences. No one benefits by trying to force consumers to accept containers of table grapes with 20%, or more, rolling around the bottom of bag. We all lose when the integrity of the grade is weakened.

I hope these insights are helpful and please feel free to contact me directly if NAPAR can provide further assistance during this process

Sincerely,

Patrick A. Davis
President

Attachment

North American Perishable Agricultural Receivers
2345 Crystal Drive, Suite 800, Arlington, VA 22202-4801
Phone: (202) 220-0670, Fax: (202) 220-0870

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

GRAPE SHATTER STUDY

BY

CHARLES T. DEIBEL
DEIBEL LABORATORIES, INC.

JANUARY 17, 2008

Objective

This study was performed to determine the potential shelf life differences between bunch and shatter grapes, in light of new USDA proposed regulations to relax standards of the allowable shatter sold to consumers.

Definitions

Grape – refers to a single whole grape
Bunch – those grapes still attached to the grape stem
Shatter – those grapes that have detached from the bunch
Ambient – temperature ranges for this experiment between 22-27^{0}C
Refrigerated – temperature ranges for this experiment between 3-8^{0}C

Materials and Methods

Twenty seven cases of bunch grapes were sent refrigerated to the Bethlehem, PA laboratory, representing approximately 14 varieties of grape, outlined below:

Prima Thompson Seedless Grapes PLU#4022 (5 cases total)
Expo Fresh Table Grapes PLU#4499 (3 cases)
Ito Red Seedless Grapes PLU# 4499 (1 case)
Premium Son's CA Table Grapes PLU # 4499 (1 case)
Pacific California Table Grapes PLU# 4499 (1 case)
Tri Boro Crimson Seedless Grapes PLU#4056 (2 case)
Red Seedless Grapes PLU# 4636 (1 case)
RP Premium California Table Grapes PLU#4022 (5 cases)
V.V.Z Table Grapes PLU#4056 (1 case)
Air Chief Thompson Seedless Grapes PLU# 4022 (2 case)
Top Brass Slide Grapes PLU#4499 (2 case)
Patricia Table Grapes PLU#4022 (1 case)
Ballantine Grapes 125171 PLU # 4499 (1 case)
Jenelle Levin Grapes PLU # 4022 (1 case)

Each case contained between 5-10 bags of bunch grapes, depending on the size of the grape, sealed in ~2.5mil gas permeable plastic bags; most had holes. Most of the cases had opened bags, with shatter grapes at the bottom of the cases, and in the delivery vehicle. Whenever possible, opened bags were not used in the experiment.

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

Each case was laid out on a sterilized lab workbench, and the shatter grapes were aseptically collected and divided roughly into two sterile whirlpak bags. Four bags of bunch grapes were set aside for the experiment.

Two different temperature ranges were used for this experiment, simulating refrigerated and ambient conditions; the bunch grapes and shatter grapes were divided roughly in half, with each half set into the appropriate corresponding temperature for the duration of the experiment. Samples were pulled at Day 0, 5, 10, 15, 20 and 25. On each pull day, samples were analyzed for total Aerobic Plate Count (bacteria), and Yeast & Molds (fungal organisms), using methods from the FDA Bacteriological Analytical Manual, Revision 1, 1999. Due to high microbial counts, testing was halted on Day 10 for all ambient temperature grape samples. Refrigerated grapes were tested through Day 25.

Samples were collected using appropriate aseptic technique. Approximately 5 grapes of each type (Shatter versus Bunch) and each temperature range were analyzed per pull day. The total grape gram weight per pull was recorded, as well as the total number of grapes used in each pull. Grapes were homogenized at a 1:10 ratio using Butterfields Buffered Phosphate Diluent (BUT) based on their gram weight. Results for each analyte were recorded as "CFU per gram" and "CFU per grape".

It is our practice to approximate the shelf-life of a sample by using the highest bacterial or fungal count, as this presents the largest organoleptic abuse to the product. In this experiment, both the APC and yeast counts were used to determine the effects of shatter on shelf life.

Results and Discussion

Data Analysis

It has been our experience, in past shelf studies on fruits and other raw produce, that microbial counts tend to be highly variable and the data do not show simple and straightforward patterns. This variability results from the fact that the microbial profile from one piece of fruit to another can be very different. Even pieces of fruit in the same bunch, case, or bag can have very different microbial types and levels when compared to each other. As a result, a group of grapes pulled from a bunch on study day 5 can have inherently different microbial levels from neighboring grapes pulled on days 0 or 10, completely independent of any time related changes that are also occurring.

To offset this variability, it is necessary to calculate trend lines for each data set to get a clear picture of any trends present in the data. For this study, data from each grape type was averaged (if more than one case of the type was received), entered into a spreadsheet and graphed. From the graphed data, trend lines were calculated and used for subsequent interpretation.

Data Consideration

For this study, we determined aerobic plate count (APC), yeast, and mold levels for each of the grape sample pulls. As stated above, we chose to use the APC and yeast data as the best indicators of effects on product shelf life. Mold data proved to be especially sporadic and did not lend any insight as to the objectives of the study. Therefore, mold data were not included in analysis. Furthermore, spoilage

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

determination is often based on the presence of visible mold growth, a phenomenon that does not always correlate well with mold plate counts.

Results were determined in cfu/gram and cfu/grape for each of the tests performed. All data is available on the attached raw data sheet. For the sake of analysis and interpretation, however, only results in cfu/gram were considered. This unit of microbial measurement is a recognized standard in all food microbiology. Likewise the determination of cfu/grape depends on the relative sizes of the grapes used for each pull. This adds an extra level of variation to a set of already highly variable data. We did not want our data affected by grape size, since it was not a parameter considered for this study. Therefore, while cfu/grape counts are available, they were not used for evaluation of the data.

Effect on Shelf Life – The APC Results

As stated above, we chose to use both APC and yeast results as indicators of shelf stability. Table 1 summarizes the aerobic plate count (APC) results for the 14 grape types at both ambient and refrigerated temperatures. Conclusions were made based on the position of graphed trend lines at Day 25 of the study. Table 2 shows relative support for the hypothesis (that shatter grapes provide greater opportunity for bacterial growth and therefore shortened shelf life) for both temperature levels. For the ambient data sets, the hypothesis was supported for only four (4) of the fourteen (14) grape types: Ito Red Seedless, Tri Boro Crimson Seedless, Red Seedless, and Top Brass Slide. For the refrigerated data sets, the hypothesis was supported for eleven (11) of the fourteen (14) grape sets, with the grape types Pacific California Table, Red Seedless, and V.V.Z. Table not supporting the hypothesis.

It is our belief that at ambient temperatures, microbial growth is so rapid on the product, that a distinction between shatter and bunch grapes can not be made. This is why only four (4) of fourteen (14) grape types expressly support the shatter vs. bunch hypothesis. In the refrigerated grapes, however, microbial growth is slower, and the effects of other factors (like shatter vs. bunch) can be seen more clearly. Indeed, under refrigerated conditions, we see eleven (11) of the fourteen (14) grape types supporting our hypothesis that shatter grapes have higher bacterial growth independent of the day the samples were pulled. It is also worth noting that this product is meant to be held at refrigerated temperatures, thereby making the refrigerated data more appropriate to real-world grape storage conditions in the market and the consumer's home or establishment.

Based on the data observed, shatter grapes have higher bacteria levels at the conclusion of the study than bunch grapes. We can therefore say that shatter grapes are more likely to undergo bacterial spoilage. This statement only holds for grapes held under refrigeration. For grapes held under ambient conditions, bacterial growth was so rapid, that the distinction between shatter vs. bunch could not be made.

Effect on Shelf-life – The Yeast Results

Yeast results assisted in determining whether shatter grapes had a potentially shorter shelf life than bunch grapes. Table 3 summarizes the yeast results for the 14 grape types at both ambient and refrigerated temperatures. Conclusions were made based on the position of graphed trend lines at Day 25 of the study. Table 4 shows relative support for the hypothesis, that shatter grapes have a potentially shorter shelf life, for both temperature levels. For the ambient data sets, the hypothesis was

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

supported for only three (3) of the fourteen (14) grape types: Expo Fresh Table, Top Brass Slide, and Ballantine. For the refrigerated data sets, the hypothesis was supported in only five (5) of the fourteen (14) grape sets: Prima Thompson Seedless, Expo Fresh Table, Tri Boro Crimson Seedless, Air Chief Thompson Seedless, and Top Brass Slide.

Based on these results, we cannot support the conclusion that shatter grapes have a higher yeast counts than bunch grapes. The conclusion was not supported in either temperature scenario. Yeast growth was very pronounced under all experimental variations: grape type, temperature and shatter vs. bunch. This was especially true closer to the end of the study.

Organoleptic Observations

Table 7 shows results of an organoleptic analysis performed at the lab during grape sampling. Values given demonstrate overall appearance of the grapes on a given sampling day and at a given temperature. No specific observations of individual grape types were conducted. The organoleptic data show, overall, that shatter grapes seemed to degrade in appearance more rapidly. These subjective data are being provided for informational purposes only, and were not used as a part of results analysis.

Recommendations for Future Studies

As stated above, shelf study data on raw produce (including grapes) is consistently highly variable and difficult to interpret. There are ways to control this variation. One of which is the use of trend lines, as employed in this study. Another is the use of multiple data sets for a given product type, whose results can be averaged or otherwise calculated together to reduce the impact of outliers. In this study, there were six (6) grapes types for which we had more than one case and results could be averaged (Table 5). Those grape types for which we could average results were consistently more likely to support the hypotheses. (Table 6). Likewise, those grape types for which we had only one case and could not average the data were consistently less likely to support the hypotheses (Table 6). It is therefore our recommendation that future studies include multiple cases of the same grape types, so that results can be averaged and hopefully will produce more favorable data.

Conclusion

Based on the results of this study, it is my professional opinion as a HACCP expert and an expert in pathogenic microbiology, that the shatter grapes would have shorter shelf life periods, as the shatter grapes were more likely to produce higher bacterial counts when compared to the bunch grapes at refrigerated temperatures. No distinction can be made at this time between shatter and bunch grapes at ambient temperatures or in regards to yeast or mold growth.

Charles T. Deibel
President
Deibel Laboratories, Inc.

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

Table 1. Summary of aerobic plate count (APC) trend data and whether or not the hypothesis, that shatter grapes support increased bacterial growth, was supported.

Grape Type	Analysis	Temperature	Significant (>1 log) difference between shatter and bunch grapes at Day 25?	Hypothesis Supported?
Prima Thompson Seedless	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Expo Fresh Table	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Ito Red Seedless	APC	Ambient	Yes	Yes
	APC	Refrigerated	Yes	Yes
Premium Son's CA Table	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Pacific California Table	APC	Ambient	No	No
	APC	Refrigerated	No	No
Tri Boro Crimson Seedless	APC	Ambient	Yes	Yes
	APC	Refrigerated	Yes	Yes
Red Seedless	APC	Ambient	Yes	Yes
	APC	Refrigerated	No	No
RP Premium California Table	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
V.V.Z Table	APC	Ambient	No	No
	APC	Refrigerated	No	No
Air Chief Thompson Seedless	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Top Brass Slide	APC	Ambient	Yes	Yes
	APC	Refrigerated	Yes	Yes
Patricia Table	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Ballantine	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes
Jenelle Levin	APC	Ambient	No	No
	APC	Refrigerated	Yes	Yes

Table 2. Relative support of hypothesis, that shatter grapes support increased bacterial growth, in ambient vs. refrigerated grapes.

Test	Temperature	Number of Data Sets Supporting Hypothesis
APC	Ambient	4/14
APC	Refrigerated	11/14

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

Table 3. Summary of yeast trend data and whether or not the hypothesis, that shatter grapes have a potentially shorter shelf life, was supported.

Grape Type	Analysis	Temperature	Significant (>1 log) difference between shatter and bunch grapes at Day 25?	Hypothesis Supported?
Prima Thompson Seedless	Yeast	Ambient	No	No
	Yeast	Refrigerated	Yes	Yes
Expo Fresh Table	Yeast	Ambient	Yes	Yes
	Yeast	Refrigerated	Yes	Yes
Ito Red Seedless	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
Premium Son's CA Table	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
Pacific California Table	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
Tri Boro Crimson Seedless	Yeast	Ambient	No	No
	Yeast	Refrigerated	Yes	Yes
Red Seedless	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
RP Premium California Table	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
V.V.Z Table	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
Air Chief Thompson Seedless	Yeast	Ambient	No	No
	Yeast	Refrigerated	Yes	Yes
Top Brass Slide	Yeast	Ambient	Yes	Yes
	Yeast	Refrigerated	Yes	Yes
Patricia Table	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No
Ballantine	Yeast	Ambient	Yes	Yes
	Yeast	Refrigerated	No	No
Jenelle Levin	Yeast	Ambient	No	No
	Yeast	Refrigerated	No	No

Table 4. Relative support of hypothesis, that shatter grapes have a potentially shorter shelf life, in ambient vs. refrigerated grapes

Test	Temperature	Number of Data Sets Supporting Hypothesis
Yeast	Ambient	3/14
Yeast	Refrigerated	5/14

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

Table 5. The effect of averaging more than one data set on hypothesis support

Grape Type	# of Cases	Temperature	APC Hypothesis Supported?	Yeast Hypothesis Supported?
Prima Thompson Seedless	5	Ambient	No	No
	(avg)	Refrigerated	Yes	Yes
Expo Fresh Table	3	Ambient	No	Yes
	(avg)	Refrigerated	Yes	Yes
Ito Red Seedless	1	Ambient	Yes	No
	(non-avg)	Refrigerated	Yes	No
Premium Son's CA Table	1	Ambient	No	No
	(non-avg)	Refrigerated	Yes	No
Pacific California Table	1	Ambient	No	No
	(non-avg)	Refrigerated	No	No
Tri Boro Crimson Seedless	2	Ambient	Yes	No
	(avg)	Refrigerated	Yes	Yes
Red Seedless	1	Ambient	Yes	No
	(non-avg)	Refrigerated	No	No
RP Premium California Table	5	Ambient	No	No
	(avg)	Refrigerated	Yes	No
V.V.Z Table	1	Ambient	No	No
	(non-avg)	Refrigerated	No	No
Air Chief Thompson Seedless	2	Ambient	No	No
	(avg)	Refrigerated	Yes	Yes
Top Brass Slide	2	Ambient	Yes	Yes
	(avg)	Refrigerated	Yes	Yes
Patricia Table	1	Ambient	No	No
	(non-avg)	Refrigerated	Yes	No
Ballantine	1	Ambient	No	Yes
	(non-avg)	Refrigerated	Yes	No
Jenelle Levin	1	Ambient	No	No
	(non-avg)	Refrigerated	Yes	No

Table 6. Summary of hypothesis support in total, non-averaged, and averaged data sets.

Test	Temperature	Number of Total Data Sets that Supported the Hypothesis	Number of Non-Averaged Data Sets that Supported the Hypothesis	Number of Averaged Data Sets that Supported the Hypothesis
APC	Ambient	4/14 (28.6%)	2/8 (25%)	2/6 (33.3%)
APC	Refrigerated	11/14 (78.6%)	5/8 (62.5%)	6/6 (100%)
Yeast	Ambient	3/14 (21.4%)	1/8 (12.5%)	2/6 (33.3%)
Yeast	Refrigerated	5/14 (35.7%)	0/8 (0%)	5/6 (83.3%)

DEIBEL LABORATORIES

1885 West Market Street, Bethlehem, PA 18018, ph: (610) 317-2300, fax: (610) 317-0300, www.DeibelLabs.com

Table 7. Summary of Organoleptic (Visual) Observations

Test	Bunch Refrigerated	Shatter Refrigerated	Bunch Ambient	Shatter Ambient
Day 0	1	1	1	2
Day 5	1	1	2	4
Day 10	1	1	3	5
Day 15	1	2	N/A	N/A
Day 20	2	2	N/A	N/A
Day 25	2	3/4	N/A	N/A

KEY: 1 – Appearance of a normal, fully formed grape
2 – Slightly bruised, no detectible off odor.
3 – Slight smashed appearance, no detectible off odor
4 – Appearance is approaching inedible, slight off odor
5 – Appearances inedible, with strong off odor