Milk Quality and Products Career Development Event

A maximum of 50 teams total (junior high and high school combined). There is a limit of two teams per chapter. First-come, first-served determined by when skills registration was submitted.

Clothing should be worn that can be easily cleaned. Each contestant may carry a clipboard to facilitate completion of scorecard and an unopened bottle of water. Contestants may not take a notebook or written material into the contest. The contest consists of five parts:

1. Ten milk samples to be scored on flavor (taste and odor)
2. Milk fat content of fresh milk products
3. Four milk samples evaluated using California Mastitis Test method
4. Ten cheese samples to identify and classify characteristics of cheeses using the supplied matrix.
5. 30 item multiple choice test covering milk quality production and milk marketing.

Milk Flavor Identification and Evaluation *(120 Points — 6 points per flavor ID, 6 points per intensity score)*

• Ten milk samples will be scored on flavor defect (taste and odor) using the computerized scorecard. All samples of milk are prepared from pasteurized whole vitamin D milk. (Six points per correct answer.)

• Participants are to use whole numbers when scoring "Defect Intensity." If no defect is noted, participants should check "No defect" and score as a ten. (Six points per correct answer.)

	Scores*		
Defects	**Slight**	**Definite**	**Pronounced**
Acid	3	2	1
Bitter	5	3	1
Feed	9	8	5
Flat/Watery	9	8	7
Foreign	5	3	1
Garlic/Onion	5	3	1
Malty	5	3	1
No defect	10	10	10
Oxidized	6	4	1
Rancid	4	2	1
Salty	8	6	4

Scores may range from 1 to 10 on a quality basis:

10	Excellent (no defect)
8 to 9	Good
5 to 7	Fair
2 to 4	Poor
1	Unacceptable/unsalable

Product Identification — Dairy versus Non-Dairy *(100 points — 6 points identification, 4 points fat content)*

• A total of 10 samples consisting of dairy and non-dairy products will be given to identify. Select the correct milk-fat content score for each sample in the next section of the scantron.

• The following products may be included among the samples:

- Dairy Products: nonfat (skim) milk (.05%), low fat milk (1.0%), reduced fat milk (2%), milk (3.25%), half and half (10.5%), butter (80%), sour cream (18%), flavored milk (0.05%–3.25%) light whipped cream (30%), heavy cream (36%).
- Non-Dairy Products: margarine, non-dairy creamer, non-dairy sour cream, non-dairy milk, non dairy flavored beverage and non-dairy whipped topping. All of these are to be categorized as non-dairy fat in the fat content section of the scantron.

California Mastitis Test *(32 Points)*

• The California Mastitis Test will be scored using even numbers from 0 to 8 inclusive. (See below for the Scoring Guide for the California Mastitis Test.)

• Four samples of milk will be evaluated for abnormality, using the California Mastitis Test method. The test will be performed by a contest volunteer. Students will only observe and score each sample.

**CMT Samples are scored 0-8 in 2 point increments. Individual results are compared to official results to determine the final score. A deduction of 2 points is assigned for each increment deviation from the official score.

CMT Test Score	Appearance	Participant Score	* Somatic Cell Count
Negative	Mixture liquid, no precipitate	0	0
T	Slight precipitate tends to disappear with paddle movement	2	200–300,000
1	Distinct precipitate but does not gel	4	400–500,000
2	Distinct gel formation	6	1,2000,000 – 1,500,000
3	Strong gel formation, which tends to adhere to paddle. Forms distinct central peak	8	0ver 5,000,000

Cheese Identification *(100 Points)*

• Ten cheese samples for identification will be selected from those listed. Cubes of the cheeses will be available for tasting. **Note:** More than one sample of a given cheese may be used. A score of four points is given for each variety correctly identified. Uncolored cheeses may be used. (40 points possible)

• In addition to identifying cheese samples, participants will classify characteristics of identified cheeses using the following matrix. Participants will have six characteristics to select for each of the 10 identified cheese samples. An example cheese characteristic problem can be found below. (60 points possible).

Cheese Characteristics Matrix

A description of major varieties of cheeses popular among American consumers.

Variety	Moisture (%) (Maximum)[1]	Fat (%) (Minimum)[2]	Pasta Filata[3]	Brine/ Surface Salted	Ripened by	Origin
Blue/Bleu	46	50	no	yes	mold	France
Brie	52.5	20	no	no	bacteria & mold	France
Cheddar Mild	39	50	no	no	bacteria	England
Cheddar Sharp	39	50	no	no	bacteria	England
Colby	40	50	no	no	bacteria	US
Cream	55	33	no	no	unripened	US
Feta	60	42	no	yes	bacteria	Grease
Gouda/Edam	45	48	no	yes	bacteria	Netherlands
Havarti	54	30	no	no	bacteria	Denmark
Gruyere	39	45	no	yes	bacteria	Switzerland
Monterey Jack	44	50	no	no	bacteria	US
Mozzarella	60	45	yes	yes	bacteria	Italy
Muenster	46	50	no	no	bacteria	France
Parmesan	32	32	no	yes	bacteria	Italy
Processed American	40	50	no	no	bacteria	US
Provolone	45	45	yes	yes	bacteria	Italy
Queso Fresco	59	18	no	no	unripened	Mexico
Ricotta	73	4	no	no	unripened	Italy
Swiss	41	43	no	yes	bacteria	Switzerland

[1]Some cheeses have a range in moisture permitted, but these are the highest permitted amounts.

[2]Some cheese standards use percentage by weight of total solids (e.g., cheddar) while others use percentage by weight of the cheese (e.g., cream).

[3]Curd is stretched in hot water to align the protein molecules and provide stretch to the curd

Cheese Characterization Example Problem

Participants will be given information for each of the 6 specific characteristics and will need to identify which of the 10 samples meet that characteristic standard.

A sample matrix problem is provided below. Please note: characteristics given will change each year.

Cheese characteristics include:

A. Maximum Moisture
B. Minimum Fat
C. Pasta Filata (yes or no)
D. Brine (yes or no)
E. Method of ripening
F. Country of Origin

At the contest, students will be provided something like this:

A. Moisture: 39%
B. Fat: 33%
C. Pasta filata: yes
D. Brine: no
E. Ripened by: mold
F. Origin: France

Students will need to select which of the 10 samples have each of those characteristics. Each sample that meets the qualifications should be marked on the scantron in the section below the identification.

Written exam *(60 Points)*

The written test will consist of 30 multiple choice items taken from a bank of questions that will be posted on the Michigan FFA web-site. These questions will cover the areas of milk quality production and milk marketing.

SCORING

The event will be worth 1,648 total points.

Activity	Point Explanation	Samples	Individual Points	Team Points
Milk flavor identification	12 points/sample (6 points for flavor defect, 6 points for intensity)	10 samples	120	480
Product identification	10 points/sample (6 points for identification 4 points for milk fat)	10 samples	100	400
California Mastitis Test (CMT)	8 points/sample (2 points per increment**)	4 samples	32	128
Cheese type identification	10 points/sample (4 points per type 6 points for characteristics)	10 samples	100	400
Written exam	2 points per question	30 questions	60	240
		Total Possible Individual Points	412	1,648
			TOTAL POINTS PER TEAM	1,648

TIEBREAKERS

Rule for breaking a tie between two teams or two individuals. Tiebreakers are:

1. Milk Flavor
2. Cheese Identification
3. Milk fat content

REFERENCES

http://www.ams.usda.gov/dairy/judgscor.pdf

California Mastitis Test can be ordered from NASCO at: http://www.enasco.com/farmandranch/

Using the California Mastitis Test published by the University of Missouri-Columbia Extension Division, Columbia, Missouri 65211.

Dairy Facts – International Dairy Foods Association, 1250 H Street, N.W. Suite 900, Washington, DC 20005. Phone – 202-732-4332 – www.idfa.org

Dairy Foods – Producing the Best, Dr. Robert Marshall, Instructional Materials Laboratory, 1400 Rock Quarry Rd., Q138, University of Missouri, Columbia, MO 65211

The Dairy Practices Council: Guidelines – www.dairypc.org

#21 – Raw Milk Quality Tests

#24 - Troubleshooting High Bacteria Counts of Raw Milk

#38 – Preventing Off-Flavors and Rancid Flavors in Milk

Pasteurized Milk Ordinance – http://www.fda.gov/food/foodsafety/Product-SpecificationInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMSModelDocuments/default.htm

Code of Federal Regulations Title 21, Part 133 – Cheeses and Cheese Products – http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRsearch.cfm?CFRPart=133

TIPS FOR PREPARING SAMPLES

Methods of preparation of milk samples (1 pint or 500 ml) for training to detect important off flavors of milk

Defect	Method of Preparation
Acid	Add lactic acid 0.1 to 1.0%; Add 1 to 1.5 ounces of fresh cultured buttermilk to a quart of fresh pasteurized/homogenized milk. (Prepare 24 to 48 hours prior to use.
Bitter	Add 1 (NoDoz®) or similar brand caffeine tablet to about 1 oz. of water and let it dissolve for 30 minutes. Then add the "caffeine solution" to a quart of fresh pasteurized/homogenized milk.
Feed	Suspend 1/2 cup silage or alfalfa hay in 2 cups of water in a side arm flask. Stopper the top of the flask. Place tubing on the side arm and extend it into the milk. (See Figure 1.) Heat slowly to drive volatiles into the milk where they will condense. Remove the tubing from the milk before removing the flask from the heat source or the milk will be drawn back into the suspension. or For simplicity - Add 1/2 ounce (1 tablespoon or 15.0 ml) of molasses and mix with one quart of pasteurized/homogenized milk
Flat/watery	Add 10 to 15% water. (4 to 6 ounces of distilled water to a quart of fresh pasteurized/homogenized milk.)
Foreign	Add 1-teaspoon (5 to 6 ml of 2-fold or double) vanilla extract per quart of milk. Old method is Adding 1 ml laundry bleach, but be aware that flavor changes with time.
Garlic/onion	Add about 0.2 grams of garlic or onion salt or 3 drops of garlic or onion extract to a quart of pasteurized/homogenized milk. Optional: Use garlic powder or cut up onion. If cut up onion is used, filter through a coffee filter or cheesecloth and allow sitting for 30 minutes.
Malty	Add ½ ounce (15 grams) Grape Nuts® or Grape Nuts Flakes® breakfast cereal to 3 ounces (about 100 ml) of milk and allow to sit for 20 to 30 minutes to create a stock solution. This stock solution should then be strained through cheesecloth, a coffee filter, etc. (in a funnel) into another container. ***Add 1 ounce of the stock solution to a quart of milk.*** Alternately - Add 1 to 1.5 teaspoons (5 – 7 ml) of unflavored malted milk powder (available at some grocery stores) to a quart of pasteurized/homogenized milk
Metallic/ oxidized	Expose one quart of pasteurized/homogenized milk in a clear glass or plastic (polyethylene) milk container to direct sunlight for 30 minutes to one hour. Note: This is the most common form of oxidized milk found in homogenized milk. Do not use a container that is colored (yellow) and keep the milk cool by placing it in ice. Samples prepared in this way will likely develop the generic (metal-induced) off flavor within 36 to 48 hours after light exposure. Alternately - Metal-induced oxidized samples may be prepared by preparing 100 ml of 1 percent CuSO4.5H2O as a "stock copper solution" and kept refrigerated. Add 0.5 to 1 ml of the "stock copper solution" to a quart of pasteurized/homogenized milk. Note: Prepare 24 to 48 hours prior to use.
Rancid	Add ½ ounce (15 grams) of blue cheese to a quart of pasteurized/homogenized milk and allow it to sit for 30 minutes. Strain through cheesecloth or coffee filter. Add 10% raw milk to warm (100°F) pasteurized homogenized milk and refrigerate overnight. Heat momentarily to 160°F to produce a safe product, and cool before tasting.
Salty	Add 0.5g table salt to a quart of fresh pasteurized/homogenized milk.
No Defect	Use fresh pasteurized/homogenized milk that has not been exposed to any of the treatments named.