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CHEESEMAKER EXAMINATION REVIEW

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1. FOREWARD

The purpose of this training manual is to acquaint a Cheesemaker license applicant with the topics covered in the Wisconsin Cheesemaker Exam.

An applicant's practical experience, review of this manual and careful reading of the regulations listed below will prepare an applicant to pass the licensing exam with a score of 70% or above.

This manual was prepared cooperatively with the University of Wisconsin – Madison, Center for Dairy Research and the Wisconsin Department of Agriculture, Trade and Consumer Protection.

2. DEFINITION:

The term "cheesemaker means a person employed or who may be employed in cheese factory who has charge of and supervision over the actual process of manufacturing cheese, and shall not include a person employed in a cheese factory for the purpose of assisting in the manufacture of such product. It does not include a person making cheese on that person's farm.

3. APPLICABLE LAWS AND REGULATIONS

- Wis. Stat. Chapter 97 - Food, Lodging, and Recreation
- Wis. Admin Code Chapter ATCP 69 - Buttermakers and Cheesemakers
- Wis. Admin Code Chapter ATCP 65 - Milk and Milk Products
- Wis. Admin Code Chapter 82 - Bulk Milk Collection, Sampling, and Transportation
- Wis. Admin Code Chapter 81 - Cheese Grading, Packaging and Labeling

4. QUALIFICATIONS

Wis. Admin. Code § ATCP 69.02(3)

A cheesemaker license application under sub. (2) shall include documentation approved by the department to show that the applicant meets at least one of the following requirements:

ATCP 69.01(3)(a) (a) The applicant has held a cheesemaker license in this state within 10 years prior to the current license application.

ATCP 69.01(3)(b) (b) The applicant has at least 18 months of work experience as a cheesemaker assistant. Work experience as a cheesemaker assistant shall be under the direct supervision of a licensed cheesemaker, shall be within 10 years prior to the current license application, and shall include at least one month of experience in the complete process of cheesemaking.

ATCP 69.01(3)(c) (c) The applicant has at least 12 months of work experience as a cheesemaker assistant under par. (b) and has one of the following educational qualifications:

ATCP 69.01(3)(c)1 1. The applicant has successfully completed a cheesemaking short course at the University of Wisconsin, or an equivalent course from an accredited post-secondary educational institution, within 10 years prior to the current license application.

ATCP 69.01(3)(c)2 2. The applicant has at any time obtained a 2-year or greater degree, with a food science or equivalent major, from an accredited post-secondary educational institution.

ATCP 69.01(3)(d) (d) The applicant has at least 6 months of work experience as a cheesemaker assistant under par. (b) and holds a 4-year or greater degree, with a food science or equivalent major, from the University of Wisconsin or another accredited post-secondary educational institution.

(e) Within 5 years prior to the current license application, the applicant has completed at least 240 hours of on-the-job training in the complete process of cheesemaking under the direct supervision of a licensed cheesemaker and has completed department-approved courses in all of the following subjects:

ATCP 69.01(3)(f)1. 1. Cheesemaking.

ATCP 69.01(3)(f)2. 2. Production of safe dairy foods.

ATCP 69.01(3)(f)3. 3. Hazard analysis critical control point (HACCP) process control.

ATCP 69.01(3)(f)4. 4. Principles of milk pasteurization.

ATCP 69.01(3)(f)5. 5. Dairy sanitation.

5. EXAMINATION

Wis. Admin. Code § ATCP 69.02(4)

An applicant for a cheesemaker's license, other than a renewal license, shall pass a written examination in order to qualify for the license. The license examination shall test the applicant's knowledge of cheesemaking and related matters, and may include questions related to any of the following:

(a) Laws related to cheesemaking, including standards of identity, food safety standards, labeling requirements and related matters.

ATCP 69.01(4)(b) (b) The fundamentals of cheesemaking, including all of the following:

ATCP 69.01(4)(b)1. 1. Preparation and care of equipment.

ATCP 69.01(4)(b)2. 2. Composition control.

ATCP 69.01(4)(b)3. 3. Preparation and use of starter.

ATCP 69.01(4)(b)4. 4. Pasteurization of milk, cream, and other dairy ingredients.

ATCP 69.01(4)(b)5. 5. Problems of acidity control.

ATCP 69.01(4)(b)6. 6. Common cheese defects and methods of overcoming them.

ATCP 69.01(4)(b)7. 7. Yeast, mold and bacterial control methods.

ATCP 69.01(4)(c) (c) Relevant arithmetical problems related to dairy plant operations, cheese production, plant efficiencies, and dairy product values.

ATCP 69.01(4)(d) (d) Practical working knowledge related to all of the following:

TCP 69.01(4)(d)1. 1. Testing milk and dairy products for bacteria, sediment and acidity.

ATCP 69.01(4)(d)2 2. Grading milk, cream and dairy ingredients.

ATCP 69.01(4)(d)3. 3. Analysis of cheese composition.

ATCP 69.01(4)(d)4. 4. Judging cheese samples.

ATCP 69.01(4)(d)5. 5. Fundamentals of pasteurization.

6. EXAM STUDY MATERIAL

Milk:

“Milk” is the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more healthy milking animals, and includes skim milk and cream. Milk shall contain not less than 8.25% milk solids not fat and not less than 3.25% percent milkfat.

Colostrum milk from cows affected by mastitis or cheese made from this milk shall not be offered for human consumption.

Milk rejected due to a violation of Wisconsin Administrative Codes is prohibited to be resold.

Cow, goat and sheep milk shall be handled separately prior to any commingling at the dairy plant for the manufacture into cheese.

Grade A unpasteurized milk received for processing at a dairy plant shall be kept at a temperature of 45°F (7.5°C) or lower until pasteurized unless the unpasteurized milk is received and processed at the dairy plant within 2 hours after milking.

[ATCP 65.40 Storing and handling milk and dairy products.](#) (2) STORAGE TEMPERATURES. (c) Except as provided under par. (e), unpasteurized grade B milk and other grade B dairy products received for processing at a dairy plant shall be kept at a temperature of 50°F (10°C) or less until pasteurized or, if pasteurization is not required, until processed

A milk shipment received in cans is considered a bulk load for drug residue testing purposes.

The proper procedure for sampling and testing for antibiotic residues if your plant is receiving can milk from multiple producers on one truck is: Collect a sample representative of each producer, a sample representative of the entire shipment, and test the sample representative of the entire shipment.

Water:

If a dairy plant uses water from a privately owned water system, the dairy plant operator shall at least every 6 months (biannually) collect and analyze a sample of the water for compliance with the microbial standards under [NR 809.30](#).

Cow water (water reclaimed from products in processing) may be used for the limited purposes of producing culinary steam, pre-rinsing food contact surfaces of equipment or utensils, or preparing cleaning solutions.

Pasteurization:

[ATCP 65.54 Pasteurization required.](#) (3) A dairy product, required to be pasteurized under sub. (1), shall be pasteurized by, or under the direct supervision of, a pasteurizer operator who has successfully completed any of the following:

(a) A pasteurization training course, of at least 8 hours duration, provided by the University of Wisconsin or an equivalent course approved by the division. (b) A competency examination approved by the division.

Pasteurization will **not** overcome poor milk quality for cheesemaking.

Pasteurization destroys all pathogenic bacteria.

Pasteurizing milk for cheesemaking kills undesirable microorganisms.

Pasteurization **does not** eliminate bacterial spores.

The phosphatase test is of value to public health because milk heated sufficiently to give a negative phosphatase test also has been heated sufficiently to destroy any pathogenic microorganisms that may be present. The enzyme phosphatase is destroyed by proper pasteurization, giving a negative phosphatase test.

Cheese made from raw or heat-treated (but not pasteurized) milk shall be held at least 60 days at a temperature not less than 35°F.

Pasteurization means heating every particle of milk to at least 145°F and holding it at this temperature for at least 30 minutes or heating by the high-temperature short-time (HTST) method so that every particle of milk is heated to at least 161°F for at least 15 seconds.

Pasteurization records and charts shall be maintained at the dairy plant for at least 2 years.

All components of the HTST connecting sanitary pipe and fittings shall be without dead ends, except for openings on sanitary fittings.

Higher temperatures of pasteurization are required for dairy products having higher viscosity.

Cheesemaking Operations:

A licensed dairy plant shall not legally manufacture and offer for sale human food which has not been properly protected against flies, filth, and other contamination, or unsanitary conditions.

The main purpose of milk clarification is to remove impurities in the milk. A milk separator separates milk into cream and skim milk.

Salt draws the whey out of the curd and serves as a factor in the control of acidity and moisture, thus the addition of salt to the cheese curd will impact the moisture content of the cheese.

Higher salt in the cheese lowers the water activity of the cheese.

Higher protein content of milk will increase the titratable acidity of the milk.

Increasing the casein to fat ratio of milk will decrease the fat in dry matter of cheese.

Thermometers used during cheesemaking shall be accurate because cook temperature can affect the body of the cheese.

The starter culture room should be isolated from the cheese make room.

The starter culture room walls and ceiling should be constructed for easy cleaning and sanitation.

It is recommended to use a starter rotation program to reduce the likelihood of developing bacteriophage infection.

Bulk cultures can be grown in reconstituted nonfat dry milk.

During cheesemaking, starter culture bacteria ferment lactose to lactic acid. This fermentation causes the pH of the cheese to drop.

Mesophilic starter cultures like moderate cook temperatures from 98-102°F and will begin to be inactivated at temperatures above 102°F.

Starter culture bacteria can be found in both the cheese curds and whey.

Two ways of controlling bacteriophage (“phage” is a virus that infects starter culture bacteria) in the cheese factory are by cleaning and sanitizing all equipment and rotating starter culture strains.

An active starter culture during cheesemaking is necessary to develop the flavor, body and texture of the cheese and outcompete undesirable organisms.

Always dilute the coagulant in water before adding to the cheese vat.

Rate of coagulation is increased by the addition of calcium chloride to milk.

Coagulation occurs more quickly at 100°F than at 90°F.

Acidity of the milk, amount of calcium chloride added, and temperature of the milk are all factors which affect the rate at which coagulant acts on the milk.

It is a good practice to quickly stir the milk evenly to most effectively coagulate the milk.

Adding water to the curd or whey in the cheese vat will reduce the acidity of the final cheese.

Cloudiness in raw whey is due to fat.

The determination of the buffering capacity of the milk is by use of the titratable acidity test.

It is essential to remove all milk stone from cheesemaking equipment because milk stone will support bacterial attachment and growth.

Spraying or immersing cleaned cheesemaking equipment in a 200 ppm chlorine solution can be utilized for sanitizing.

Shattered curd at cutting will increase fat lost into the whey.

At cutting, smaller curd particles will produce a lower moisture in cheese than larger particles.

Cutting the coagulum firmer will produce a higher moisture in cheese than cutting softer.

Excessive clumping of curd during the make process will result in mottled cheese.

A detectable off flavor in cheese can often be caused by milk which has been in direct contact with dirty equipment.

The rancid flavor defect found in milk is caused by lipolytic activity (the breakdown of milkfat).

Gas formation is a defect in cheese varieties such as Colby, Cheddar and Monterey Jack while eye formation is desirable in cheese varieties such as Swiss and Gouda.

It is desirable that the cheese curing room temperature be controlled.

Temperature abuse may cause free moisture accumulation in a packaged cheese.

Thorough cleanup of premises, tightly constructed buildings, and proper screening of all openings are measures taken to control flies and rodents.

Not all certified laboratories located in Wisconsin are approved for milkfat and milk quality testing.

Microbiology:

[ATCP 65.70 Milk quality standards for milk collected from a dairy farm.](#) (2) BACTERIAL COUNT. (a) *Limits*. The bacterial count of grade A milk, as determined by a standard plate count, plate loop count or other method approved by the division under this subchapter, shall not exceed 100,000 per ml. The bacterial count of grade B milk shall not exceed 300,000 per ml.

(4) SOMATIC CELL COUNT. (a) *Limits.* The somatic cell count of cow or sheep milk, as determined by a direct microscopic somatic cell count, an electronic somatic cell count, or other method approved by the division under this subchapter, shall not exceed 750,000 cells per ml.

Cooling will decrease the rate of bacterial growth.

Higher water activity increases bacterial growth in cheese.

Heterofermentative Lactobacillus microorganisms can cause gassy cheese defects.

Proteolysis is the breakdown of proteins into peptides and amino acids. Proteolysis softens the cheese body as it ages or ripens and may cause bitterness.

Foodborne illness linked to cheese may be associated with the growth of E. coli, Listeria, Salmonella, or Staphylococcus aureus.

Regulations:

97.17 Buttermaker and cheesemaker license. (1) In this section the terms “buttermaker” and “cheesemaker” mean a person employed or who may be employed in a butter or a cheese factory who has charge of and supervision over the actual process of manufacturing butter or cheese, and shall not include a person employed in a butter or cheese factory for the purpose of assisting in the manufacture of such product. This section shall not affect a person making up a product produced on the person’s farm, nor shall it be unlawful for a licensed cheesemaker employed in a licensed cheese factory to make butter or whey cream butter for the use or consumption only of the patrons thereof. (2) No person shall engage as a buttermaker or cheesemaker unless the person has a license from the department. The license shall be issued by the department under regulations that the department shall prescribe relating to the qualifications of applicants for licenses. The qualifications shall include the applicant’s record in operating and keeping in sanitary condition the butter or cheese factory in which the applicant has been employed.

(Employees may assist in the manufacture of cheese only under the supervision of a licensed cheesemaker).

ATCP 65.02 Milk producer licenses and permits; fees. (1) MILK PRODUCER LICENSE REQUIREMENT. (a) No person may operate as a milk producer offering milk for sale without an annual license from the department for each farm operated, as provided under s. 97.22 (2), Stats.

ATCP 65.24 Construction and maintenance (2) FLOORS. The floors of all rooms in which dairy products are processed, handled, or stored or in which dairy product containers, equipment, or utensils are cleaned and sanitized shall be all of the following: (a) Kept clean and in good repair. (b) Smooth enough to be easily cleanable. (c) Constructed of concrete or equally impervious and easily cleanable materials. **This paragraph does not prohibit tightly joined wooden floors in storage rooms used solely for the storage of dry ingredients or packaging materials, or both.** (d) Sloped to provide adequate drainage. This paragraph does not apply to floors in storage rooms used solely for the storage of dry ingredients or packaging materials, or both. (e) Equipped with an adequate number of trapped floor drains, so that any liquids draining onto the floors are promptly removed. **Floors in refrigerated storage rooms need not have floor drains if the floors are sloped to drain to one or more exits to prevent pooling of liquids.** This paragraph does not apply to floors in storage rooms used solely for the storage of dry ingredients or packaging materials, or both.

ATCP 65.24 Construction and maintenance (14) HANDWASHING SINKS IN PROCESSING AREAS. (a) Handwashing sinks shall be provided for use by all dairy plant personnel working in each processing room or area. The sinks shall be conveniently accessible, and shall be kept in a clean and sanitary condition.

ATCP 65.24 Construction and maintenance (19) CONSTRUCTION PLANS; NOTIFICATION; REVIEW. Before constructing, substantially reconstructing, or extensively altering a dairy plant, a dairy plant operator shall provide the division with complete plans and specifications for the construction, reconstruction, or alteration. Within 30 days after a dairy plant operator files plans with the division under this subsection, the division shall return its comments or objections, if any, in writing.

ATCP 65.28 Equipment and utensils. (2) PRODUCT CONTACT SURFACES. (a) Product contact surfaces of equipment and utensils shall be made of materials that are smooth, impervious, nontoxic, noncorrosive, nonabsorbent, and durable under foreseeable use conditions. A product contact surface shall be constructed of one or more of the following materials unless the division specifically authorizes another material in writing: 1. Stainless steel of the American Iron and Steel Institute 300 series, or an equally corrosion resistant metal. 2. Heat resistant glass. 3. Plastic, rubber, or rubber-like materials that are fat resistant and insoluble; that are resistant to scratching, scoring, decomposition, crazing, chipping, and distortion under normal use conditions; that do not impart chemicals, flavor, or odor to milk; and that maintain their original properties under conditions of repeated use.

ATCP 65.28 Equipment and utensils. (7) CLEANING AND SANITIZING EQUIPMENT AND UTENSILS. (c) A dairy plant operator shall clean and sanitize tanks used to store liquid dairy products whenever the dairy plant operator empties those tanks. Tanks used to store raw milk or grade A dairy products shall be emptied at least once every 72 hours.

ATCP 65.28 Equipment and utensils. (10) CLEANING COMPOUNDS, DETERGENTS, AND SANITIZERS; STORAGE AND LABELING. Cleaning compounds, detergents, and sanitizers used in a dairy plant shall be clearly labeled. When they are not being used, they shall be stored in designated areas and in an appropriate manner so that they do not contaminate dairy products, ingredients, equipment, or utensils.

ATCP 65.30 C-I-P systems. (2) (b) A dairy plant operator shall keep records on the cleaning and sanitizing of all C-I-P systems. The records shall identify every C-I-P system that has been cleaned and sanitized, **the date and time** when each C-I-P system was cleaned and sanitized, **the temperature of the cleaning and sanitizing solutions, and the length of time for which the C-I-P system was exposed to the cleaning and sanitizing solutions.** Records shall be made at the time the cleaning and sanitizing process is completed. Records shall be signed or initialed by a responsible person at the dairy plant. The division shall review the records as part of every routine inspection of the dairy plant.

ATCP 65.36 Receiving milk and dairy products. (7) CLEANING AND SANITIZING BULK MILK TANKERS. A dairy plant operator shall ensure that bulk milk tankers transporting milk or dairy products to or from a dairy plant are cleaned and sanitized after each day's use as required by s. ATCP 82.08.

ATCP 65.44 Dairy plant records. (1) MANDATORY RECORDS. (g) Cleaning and sanitizing records for all C-I-P systems, as required under s. ATCP 65.30 (2) (b). Records under this paragraph shall be retained for at least 2 years. Records may be stored in electronic form, with or without hard copy printouts, if the electronic records are readily accessible by a division

representative. (k) Temperature monitoring records made by the dairy plant operator, including records of dairy product temperatures, storage temperatures, and processing temperatures. Records under this paragraph shall be retained for at least 2 years.

ATCP 65.70 Milk quality standards for milk collected from a dairy farm. Milk received or collected from a dairy farm shall comply with all of the following standards at the time of receipt or collection: **(1) ADULTERATION AND ODORS.** The milk shall not be visibly or otherwise adulterated, have any objectionable odor, or be abnormal in appearance or consistency. **(2) BACTERIAL COUNT.** (a) *Limits.* **The bacterial count of grade A milk, as determined by a standard plate count, plate loop count or other method approved by the division under this subchapter, shall not exceed 100,000 per ml. The bacterial count of grade B milk shall not exceed 300,000 per ml.**

ATCP 65.72 Drug residue testing. (4) DRUG RESIDUE FOUND IN BULK LOAD; FOLLOW-UP TESTING. If a bulk load of milk yields a confirmed positive test result for drug residue under sub. (3), the dairy plant operator shall perform a drug residue test on each of the individual milk producer samples collected for that bulk load under s. ATCP 82.12. The dairy plant operator shall test each milk producer's sample before collecting any further milk from that producer. The drug residue test performed on each producer sample shall be sensitive to the same drug residue that was detected in the bulk load. **If a milk producer's sample tests positive for any drug residue, the dairy plant operator shall perform a confirmatory test using the same test method and sample. The dairy plant operator shall perform the confirmatory test in duplicate, with single positive and negative controls.** If either confirmatory test result is positive for a drug residue, the milk producer's sample is considered positive for that drug residue.

ATCP 65.80 Milk quality records and reports. **(2) RECORDS RETAINED BY DAIRY PLANT OPERATOR.** A dairy plant operator shall retain records required under this section for the time period specified under s. ATCP 65.44 and shall make the records available for inspection and copying by the division upon request.

ATCP 65.86 Milk component test methods. (2) MILKFAT TEST METHODS. (a) Milkfat tests shall be performed using the Babcock method, the ether extraction method, or another test method approved by the division.

ATCP 65.926 Dairy plant license and grade A permit suspension or revocation. **(2)** The department may suspend or revoke a dairy plant license or grade A dairy permit for a violation of Chapter ATCP 65 which may include unsanitary conditions of the dairy plant.

ATCP 65.927 Holding orders; identification and disposal of adulterated milk. **(1) HOLDING ORDER.** Whenever a division representative has reasonable cause to believe that milk or a milk product examined by the division representative is adulterated or misbranded and is dangerous to health or misleading to the injury or damage of a purchaser or consumer, the division representative may issue a temporary holding order to allow for further testing or examination of the milk or milk product, pursuant to s. 97.12 (2), Stats. A holding order shall be written and shall identify the milk or milk product that is subject to the holding order. The division may extend or terminate a holding order by written notice, as provided in s. 97.12 (2), Stats. A notice extending a holding order shall be signed by the division administrator, or a person authorized in writing by the division administrator. A holding order and every notice extending a holding order shall include a notice of the recipient's right to hearing under s. ATCP 65.928.

ATCP 82.04 Bulk milk weigher and sampler; license and grade A permit. (1) LICENSE REQUIRED. Except as provided under sub. (2), no person may do either of the following unless that person holds a valid bulk milk weigher and sampler license issued by the department under s. 98.146, Stats., and this section:

- (a) Weigh or measure milk, for payment purposes.
- (b) Collect test samples of milk required under s. ATCP 65.38.

(2) BUTTERMAKER OR CHEESEMAKER; EXEMPTION. Subsection (1) does not apply to a person who holds a valid buttermaker or cheesemaker license issued by the department under s. 97.17, Stats.

Follow the links for Bulk Milk Weigher and Sampler Training Manual & Video:

Bulk Milk Weigher and Sampler Training Manual
<https://datcp.wi.gov/Documents/BMWSTrainingManual.pdf>

Bulk Milk Weigher and Sampler Training Video
<https://www.youtube.com/watch?v=EtYFU-CZSvs>

ATCP 82.08 Cleaning and sanitizing bulk milk tankers. (4) CLEANING DOCUMENTATION. (a) No person may operate a bulk milk tanker unless a cleaning tag is attached that includes all of the following information:

1. The identification number of the bulk milk tanker, including grade A permit number if any.
2. The date and time of day when the bulk milk tanker was cleaned and sanitized.
3. The name and location of the facility where the bulk milk tanker was cleaned and sanitized and the facility's grade A permit number.
4. The signature or initials of the person who cleaned and sanitized the tanker.

The Food Safety and Modernization Act requires that all cheese production facilities to have a Food Safety Plan in place.

Cheese Grading:

Cheese manufactured in Wisconsin which carries a Wisconsin State Grade Label shall be graded by a Cheese Grader licensed and supervised by DATCP.

A standardized cheese which exceeds the upper limit for moisture shall disqualify the cheese to be labeled as Wisconsin State Brand or Wisconsin Grade A cheese.

Cheese Arithmetical Problems:

Cheese total solids:

100 - % moisture = % total solids

Example: If a vat of whole milk cheese has 38% moisture what is the percent total solids?

100 - 38% moisture = **62%**

Minimum fat content in cheese with required minimum standard of fat in the dry matter:

$$100 - \% \text{ moisture} = \% \text{ total solids} \times \text{minimum \% fat in the dry matter} / 100 = \text{minimum \% fat content of cheese}$$

Example: If Cheddar cheese has 37.5% moisture with a minimum standard of 50% fat in the dry matter, what would be the minimum fat content you would have in your cheese?

$$100 - 37.5\% \text{ moisture} = 62.5\% \text{ total solids}$$

$$62.5\% \text{ total solids} \times 50\% \text{ fat in dry matter} / 100 = \mathbf{31.25\%}$$

% Fat in the dry matter:

$$100 - \% \text{ moisture} = \% \text{ total solids}$$

$$\% \text{ fat} / \% \text{ total solids} \times 100 = \% \text{ fat in the dry matter}$$

Example: A vat of whole milk cheese contains 32.5% fat and 38.5% moisture. What is the % fat in the dry matter?

$$100 - 38.5\% = 61.5\%$$

$$32.5\% / 61.5\% \times 100 = \mathbf{52.8\%}$$

% Yield of Cheese:

$$\text{Cheese yield} = \frac{\text{weight of cheese} \times 100}{\text{weight of milk}}$$

Example: 8,500 lbs of milk testing 3.8% fat is made into 800 lbs of cheese. What is the yield of cheese per 100 lbs of milk?

$$\mathbf{9.4\%} = \frac{800 \text{ lbs of cheese} \times 100}{8,500 \text{ lbs of milk}}$$

% Salt-in-moisture Phase:

$$S/M = \frac{\% \text{ salt} \times 100}{\% \text{ moisture}}$$

Example: What is the % salt-in-moisture phase of cheese that is 40% moisture and 1.7% salt?

$$\mathbf{4.25\%} = \frac{1.7\% \times 100}{40\%}$$

END