



University of Idaho  
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# Preventing Milk Adulteration And Contamination

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Adulteration and contamination of milk has been defined as the addition of ingredients changing the milk's volume or chemical composition. The most common contaminants or adulterants are water, drugs, sediment, teat dips, ointments, washing solutions, pesticides, feeds and feed additives.

## Water

The most common adulteration in milk is the addition of water. It may be put into the milk supply deliberately or through carelessness in draining pipelines, pumps, hoses, tanks or other equipment. Water can be easily and accurately detected by using a cryoscope which measures the freezing point of liquids. Pure water freezes at 32°F and undiluted milk at 31°F. Thus, the freezing point of milk to which water has been added rises and approaches that of pure water.

Adding water to milk decreases the solids-not-fat (SNF) and the nutritional value. The addition of water is especially detrimental to the quality of low fat and skim milk. The resulting fat, watery taste is much less desirable to the consumer.

Since cheese yield is directly related to SNF content, the processor loses yield in direct proportion to the amount of water added. Addition of 3 percent water means 3 percent less cheese; adding 5 percent more water means 5 percent less cheese.

Once water is added to milk, it cannot be removed. Prevent watered-down milk by:

- Not adding water intentionally.
- Not flushing milk lines until pipes are switched to drain.
- Not rinsing the top of the bulk tank while open. Wipe up excess water from rinsing with paper towels.
- Drying teats thoroughly before attaching milking units.
- Being sure the bulk tank is drained after washing and before milking.
- Ensuring that employees and milk haulers are not adding water to increase volume.
- Checking all pipes and hoses to be sure they are drained completely.

## Drugs

Milk must be discarded if it contains detectable drug residues. Milk from one cow injected with 100,000 units of penicillin is contaminated as long as 24 hours later, even when mixed with milk from 1,000 other cows. Improved detection methods are reducing the levels at which antibiotics can be detected.

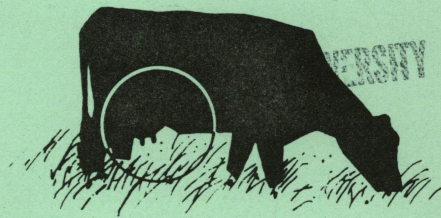
Three major concerns related to antibiotics in milk are:

1. A small percentage of the population may develop serious allergic reactions to even minute

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quantities of antibiotics in milk and dairy products.

- Some pathogenic bacteria develop a tolerance to certain antibiotics.
- Traces of antibiotics may inhibit or alter certain bacteria species used in starter cultures for making cheese or cultured dairy products.

Certain antibiotics inhibit bacterial growth and make standard plate counts useless.

Drugs may get into milk by various means. The most common means is failure to observe proper withdrawal times. Read the label. Observe withdrawal time on all drugs given, including feed medications, intrauterine injections, parenteral injections, oral boluses and others.

Commercial products have been tested and should be used whenever medication is indicated. Home remedies should be discouraged since it is impossible to know the withdrawal time of drugs "brewed up" on the farm.

Drugs may accidentally be introduced into the feed, which endangers the cow as well as the milk. Quality control must begin on the farm. Dairy men must establish programs which ensure that milk containing drugs does not enter the food chain. Here are some suggested guidelines:

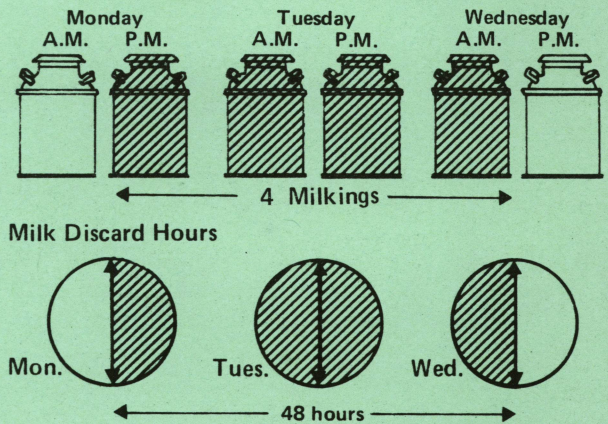
- Use tested commercial drugs which have known residue pictures and established withdrawal times.
- Follow label instructions for all products used in and out of the udder.
- Remember that withdrawal times vary with different drugs; read the label and observe the established withdrawal time.
- Withhold milk from all four quarters of a treated cow. Antibiotics infused into one quarter can reach other quarters through the bloodstream.
- Do not feed cows commercial hog, poultry or calf feeds; antibiotic levels may be higher than allowable for cows.
- As an additional precaution to avoid shipment of contaminated milk, mark and identify treated cows. If possible, separate treated cows and milk them last.

- Check with your dairy or health authorities if you have questions.

### Withdrawal Times And Cow Identification

Each withdrawal day is a full 24 hours, starting with the last time an animal received the drug. Fig. 1 is an example of the preslaughter withdrawal time.

The following illustrations show how milk discard times should be calculated.



Drug tested milking cows should be identified. Dye or paint sticks can be used; but these marks may be difficult to remove and can be confusing when more than one person is milking the herd.

One practical method for marking fresh cows or milking cows being treated with drugs is by wrapping colored tape loosely around the cow's tail above the switch with the fresh or treated date recorded on the tape. The tape is easily removed

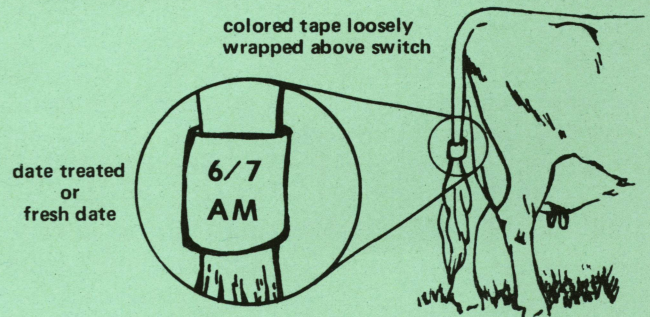
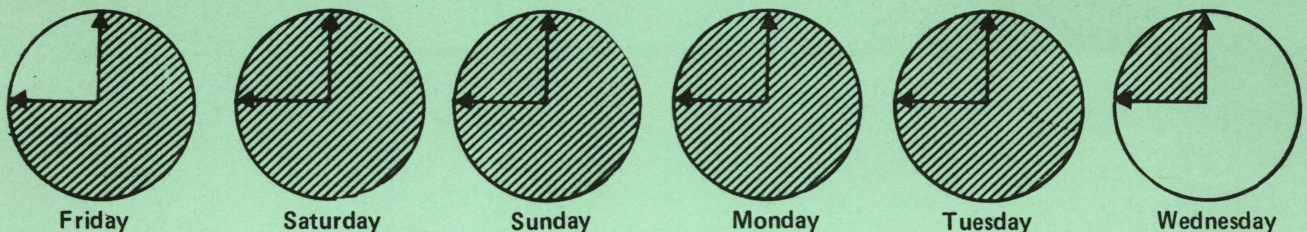


Fig. 1. A drug with a 5-day preslaughter time is withdrawn from the animals at 9 a.m. on Friday. At 9 a.m. on Saturday, the treated

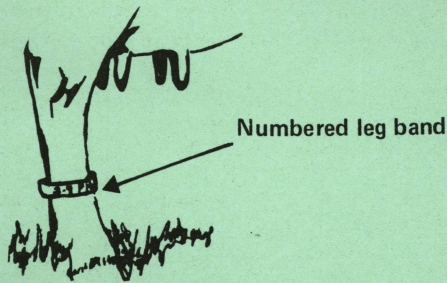
animals have completed their first withdrawal day. The fifth withdrawal day will end at 9 a.m. on Wednesday.





when the date is reached. This method is impractical in barns where the tail is covered by the milk stalls.

Numbered leg bands can be used in elevated milking barns for recording treatment dates or for cow identification.



### Teat Dips and Washing Solutions

Iodine, which is used extensively in dairy operations, can cause contamination from teat dips, udder balms and washing solutions. Properly cleaning and drying the udder before milking can prevent these residues from entering the milk channel.

### Sediment

Reduce sediment by providing proper bedding, well-drained corrals, clean barns and milking stations. Wash milking units after each milking and wash, dry and prestrip cows before milking. Strain or filter milk to remove any remaining sediment.

### Pesticides

Herbicide and pesticide residues on feeds are the most common problem in this area. All chemical herbicide and insecticides must be applied according to label directions when used for forage that will be fed to dairy cattle. Be careful in buying feeds to ensure they are free of contamination residues.

Need for fly control can be reduced by cleanliness, sanitation and manure removal. Chlorinated hydrocarbon insecticides have been replaced by organic phosphates with small residue amounts. These can generally be metabolized to harmless products and not secreted in the milk.

### Iodine

Iodine is needed in Idaho dairy rations. However, because of some current implications in human health, iodine levels of milk must not exceed recommended rates. When more than one feed supplement containing iodine is fed, the cumulative total must be considered. Iodine used in treatment of "foot rot" or "lumpy jaw" may also cause excessive iodine in the milk.

### Colostrum

Colostrum in milk from fresh cows should not be allowed to enter the milk chain. Identify fresh cows, and discard their milk the first 3 days of lactation.

### Mold Toxins

The most commonly encountered mold toxins are aflatoxins; these and other mycotoxins may be found in cottonseed and other concentrate feeds. However, cottonseed must be certified aflatoxin-free to enter Idaho. Other feeds which may contain mycotoxins should not create problems if care is used in harvesting, storing and feeding.

### Summary

Adulteration and contamination of milk are of great concern in Idaho because of the potential economic impact on the dairy industry. As a producer, it is vital to ensure that only good, clean, wholesome milk leaves the farm for the consuming public.



This College of Agriculture publication is one in a series on dairy herd management to reduce mastitis incidence and improve milk quality. Other titles you will want to get are:

- CIS 621 Milking Equipment Design, Operation and Maintenance ..... 10 cents
- CIS 622 Milking Procedures to Maximize Production ..... 10 cents
- CIS 623 Milk Quality Reports ..... 10 cents
- CIS 624 Mastitis and Somatic Cells in Milk ..... 10 cents
- CIS 625 Cleaning and Sanitizing Milking Equipment ..... 5 cents
- CIS 627 Heritability, Mastitis Incidence and Milk Production ..... 5 cents

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