

PASTEURIZERS



What is Pasteurization?

Pasteurization is a process that kills harmful bacteria by heating a liquid to a set temperature for a specific period of time.

- Does not affect vitamins A, D, and B or calcium levels when working properly
- Kills approximately 98-99% of the bacteria in the liquid



For milk fed to calves, the accepted bacterial count after pasteurization is 20,000 colony-forming units per mL (cfu/mL); however, if the milk has a bacterial count of 3 million cfu/mL before pasteurization, the bacterial count after pasteurization will still be 30,000-60,000 cfu/mL. **It is very important that the milk has a fairly low bacterial count before pasteurization, since pasteurization does not equal sterilization.**

Types of Pasteurization:

There are two main types of pasteurization used for milk: **low-temperature long-time** (commonly referred to as “batch pasteurization”) and **high-temperature short-time** (commonly called “flash pasteurization”). Batch pasteurizers consist of a tank that heats the milk to 145°F and keeps it at that temperature for 30 minutes. The milk needs to be stirred during heating to prevent curdling and allow uniform heat distribution so the entire volume of milk reaches 145°F. It can take several hours to heat and then cool large volumes of milk. In general, batch pasteurizers are less expensive but can be harder to clean. Flash pasteurizers heat the milk to 161°F for 15 seconds and then cool it for feeding or storage. Milk usually flows through heating tubes, allowing for very fast pasteurization and consequent cooling. They are usually more expensive than batch pasteurizers but allow for faster milk delivery. They often have a built-in, automated clean-in-place (CIP) system as well. **Regardless of the system used, the temperature should be regularly monitored to ensure proper pasteurization function.**

Benefits of Pasteurization:

- Pasteurization allows a farmer to use non-saleable milk to feed calves
- Eliminates or decreases the use of milk replacer
 - Save approximately \$34 per calf at weaning
- Able to use non-saleable milk from fresh cows, high SCC cows or treated cows
- Improved calf health and growth over non-pasteurized milk or commercial 20-20 milk replacer
- Lowers treatment costs and death loss from common calf diseases



For more information contact:
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Please Note:

If using milk from treated cows, it is important to remember that the calves will receive a small dose of antibiotic and thus should be considered “treated.” Watery, chunky, red-colored, or odd-looking milk should never be fed to calves as it can lead to severe scours.

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What about Colostrum?

Colostrum can be heat-treated at 140°F for 60 minutes to decrease the bacterial count significantly without affecting the antibody content. By lowering the bacterial count, calves will absorb more antibodies from the colostrum and will be healthier. DO NOT heat colostrum to pasteurization temperatures as it will destroy all of the antibodies and form a thick jello-like material that is impossible to get through a nipple or tube. Some pasteurizers have a built-in colostrum heat treatment option. The temperature should be closely monitored to make sure it does not rise above 141°F as this will damage the antibodies.



Handling Considerations:

- Any milk that will be used for calves should be handled just like saleable milk
- Milk should be collected into clean containers and either pasteurized immediately or chilled to 45°F to prevent bacterial growth and spoilage
- After pasteurization, milk should be chilled rapidly to feeding temperature or refrigerated
- All feeding buckets should be clean
- Monitor milk solids routinely to ensure that the milk remains consistent
- Milk solids should remain over 12.5% and can be measured with a Brix refractometer

Please Note:

If using a refractometer, 2% should be added to the reading to estimate total solids. For example, if the Brix refractometer measured 10%, the actual solids is 12%. Milk replacer or milk balancer can be added to increase the solids content to the recommended level of 12.5% - 16%.

If there is not enough non-saleable milk to feed all the calves, it is recommended that the youngest calves receive pasteurized milk, while older calves receive milk replacer. Calves should not be switched back and forth between pasteurized milk and milk replacer, as this can lead to nutritional scours.

UV Light Treatment Facts:

UV light treatment has some very appealing benefits, including considerable energy savings due to the fact that ultraviolet light is used instead of heat. However, it cannot be considered true pasteurization because the bacteria are not killed directly.

What does UV Light Treatment do exactly?

- Damages bacterial DNA, preventing the bacteria from growing
- Can damage milk protein and fat, while potentially leaving the bacteria untouched
- Difficult for UV light to penetrate through the fat in milk
- Does not kill the bacteria responsible for causing Johne's disease in cattle
- Less than 50% of UV treated samples reduced the bacterial count to acceptable levels
- Antibody level will decrease by 43-50% when using UV treatment for colostrum
- Milk has to be warmed to feeding temperature after UV light treatment

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