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HOW TO MAKE  
*Sour Milk Drinks*  
on the Farm and in Milk Plants



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HOW TO MAKE SOUR MILK DRINKS ON THE FARM  
AND IN MILK PLANTS

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Cultured buttermilk is a product made by souring skim or whole milk. The souring process is brought about by the action of lactic acid bacteria on milk sugar. Milk may become contaminated with other bacteria that produce off-flavors. Therefore, it is necessary to destroy the undesirable bacteria by heating the milk. In this pasteurization process the lactic acid bacteria are also killed. In order to have milk containing only the desirable bacteria it is necessary to add a pure strain of the desirable bacteria to the milk after the undesirable bacteria have been destroyed. The preparations containing these desirable bacteria are known as cultures.

Cultures may be purchased in dry or liquid form from commercial laboratories or dairy supply houses. If commercial cultures are not available, a pint or quart of high-quality raw milk may be used. In this method of preparing the starter, the bacteria normally found in milk are allowed to develop. However, there is no assurance that the milk will not contain some undesirable bacteria. Two or more of these "natural" cultures should be prepared and then only the best one selected for use. Allow the bacteria to multiply by keeping the bottle of milk at 68° to 72° F. until the milk has curdled, which usually requires 12 to 16 hours. Use the bottle which has the best flavor and the most uniform curd (without any gas holes or whey separation) to inoculate the starter.

A starter is a batch of milk which has been inoculated with a culture of lactic acid bacteria of either the commercial or natural type. The commercial cultures contain bacteria that are inactive, and if not used in a reasonable length of time, the bacteria may die. When these bacteria are placed in milk, they begin to develop and multiply. Therefore, the starter is a source of supply of active bacteria. By transferring small amounts of starter each day to fresh pasteurized milk, it is possible to maintain this starter source almost indefinitely. This type of starter is very commonly referred to as the "mother" starter, used to inoculate the milk that is to be soured for buttermilk.

The following directions are recommended in making the "mother" starter:

First Day's Procedure:

1. Fill a clean, scalded, quart milk bottle or fruit jar two-thirds full of fresh clean milk. Double cap, or cover with parchment paper.
2. Heat the bottle and contents to 180° F. or above in hot water or steam for not less than one hour. Do not put a thermometer in the bottle. The temperature may be judged by the temperature of a bottle of water heated along with the milk.
3. Cool the bottle of milk to 70° F.
4. Pour the entire contents of the purchased culture into the bottle of cooled milk, cover the bottle, and mix thoroughly by giving it a swirling motion. Do not allow milk to come in contact with the cover.
5. Hold the bottle at a uniform temperature of 68° F. to 72° F. until the milk is curdled, which usually takes from 12 to 16 hours. The coagulum at this time should be firm and free from gas or whey. After curdling takes place, cool in ice water and set in a cool place, 50° F. or lower, until ready to use.

### Second Day's Procedure:

1. Fill two or three bottles two-thirds full of milk, heat, cover and cool as outlined for the first day.

2. Open the first day's culture and pour off the top inch. Cover the bottle again and shake thoroughly to break the curd. Use a scalded spoon and transfer one teaspoonful into each of the newly prepared bottles.

3. Hold these bottles at 68° F. to 72° F. until curdled; then cool and store in ice water.

### Third Day's Procedure:

1. Prepare bottles the same as for second day.

2. Open the previous day's bottles and pour off the top inch, as before. Cover and shake until contents are smooth. Examine by tasting, using a scalded spoon (always dip the spoon in the scalding hot water after each tasting). Select the starter which has the cleanest flavor and transfer one teaspoonful to each of the newly prepared bottles.

Hold as before at 68° to 72° F. until curdled; then store in a cold place. Additional transfers should be made daily, following the same procedure. After the transfer has been made, the mother starter can be used to inoculate the large starter or for making the cultured buttermilk.

### Methods of Making Cultured Buttermilk

Cultured buttermilk is usually made from fresh skim milk. However, it may be made from whole milk, part skim milk and part whole milk, skim milk powder, or normal buttermilk with cream or butter added. These special buttermilks have a better flavor and appearance and rightfully demand a higher price. The type of buttermilk to be made will depend on local demands and the availability of ingredients.

The procedure for making these various types of buttermilk are outlined below:

#### Making the Usual Type of Buttermilk

1. Sterilize a well-tinned ten-gallon can by placing it over a steam jet or in boiling water.

2. Use fresh skim milk or whole milk. Do not fill can completely full since expansion due to heat will cause it to overflow.

3. Place can in tank or tub that has both steam and cold water connections. The overflow should be 4 to 6 inches below top of can. (A wood barrel can be sawed off to make a satisfactory tank.)

4. Heat milk to 180° F. and hold at this temperature for one hour. Cool with water or ice to 70° F.

5. Add one pint of high-grade starter and stir well with sterilized utensil.

6. Allow to set, undisturbed, in a room with uniform temperature or in water tank, at 68° to 72° F. for 12 to 16 hours, in which time it should thicken or coagulate, and should have a clean acid flavor.

7. Cool to 50° F. or below by placing can in ice water or cold storage room. If stirred at all during the cooling process, it should be stirred only enough to hasten the cooling.

8. If lumpy after cooling, pour the buttermilk through a wire gauze strainer; it is then ready for bottling and delivery to the trade. Straining is usually not necessary.

A pint of this buttermilk may be used as the starter for the next batch. If this procedure is used, however, it will probably be necessary to secure a new starter each week. If the buttermilk has an undesirable flavor or body, it should not be used for starting a new batch.

After cultured buttermilk is bottled, keep it cold the same as any other milk. Observe the same sanitary regulations as apply to fresh milk.

#### Making Cultured Buttermilk from Skim Milk Powder

In making cultured buttermilk from skim milk powder the following steps are recommended:

1. Sterilize a well-tinned ten-gallon can.
2. Weigh out 60 pounds of water into the can. Heat to 70° F. in a tank or tub. Add 7 pounds of skim milk powder. Good quality spray process powders normally give the best results. The powder should be added in two or three installments while the water is being well-agitated to avoid lumping.
3. Pasteurize at 190° for 30 minutes. Cool to 70° F.
4. Add one pint of high grade starter and stir well with sterile utensil.
5. Allow to ripen in the usual manner except that the development of a higher acidity is considered desirable. A final acidity of from .95 to 1% is recommended.
6. Proceed as usual in the rest of the process.

#### Making Creamed Buttermilk

In some localities a creamed buttermilk has become very popular. This buttermilk is made in the normal manner except that sufficient cream is added to raise the fat content to 1.5 to 2.0%. The cream should be fresh and of very high quality. It should be added at the time of cooling.

#### Fat Granules or Flakes in Buttermilk

To meet the demands in certain markets for "old fashioned" buttermilk, with visible fat granules, the processing of cultured buttermilk has been modified. This type of buttermilk is made by adding 1.5% to 2.0% fat. The three principal means of adding this fat are:

##### Vogt Spray Method

Melt the desired quantity of butter and color with butter color at the rate of 5 to 8 times more coloring than would be used in butter-making. Heat the butter to 180° F. and then cool to 120° F. Sprayed onto the cold buttermilk just prior to bottling. Use a sprayer or a perforated can or trough. If a sprayer is used it should have a nozzle large enough to allow the proper size particle to pass and should be of sanitary construction. A spray can or trough may be easily constructed by merely punching holes of appropriate size in the bottom of the can or trough. The buttermilk should be well agitated during the spray process.

This method gives a flat flake which stays evenly suspended throughout the product. The finished product usually has a more desirable appearance than can be obtained by either of the following two methods. Whey is less apt to separate and there is less danger of foaming in this method.

### Granule Addition Method

In this method a certain amount of cream is churned until the proper size granules develop. Color is added if necessary. The granules should be between the size of clover seed and small wheat kernels. Obtaining the proper size of granule requires a skillful operation on the part of the churn operator. The churning temperature should be approximately 55° F. Drain the granules and either add them directly to the buttermilk or wash and keep immersed in ice water. Add the desired quantity of granules after the buttermilk has been cooled and just prior to bottling.

This method gives better results than the churn method. Whey does not separate as much and granules are more apparent.

### Churn Method

Use a good quality of part skim milk and part whole milk containing about 2% fat. Pasteurize at 160° to 170° F. for 30 to 45 minutes. A small amount of butter color may be added so that the butter granules will show up. The milk is ripened in the usual manner.

When ripening is complete, cool the buttermilk to churning temperature, 55° to 60° F.; then churn until butter granules of the desired size are obtained, which usually requires 15 to 20 minutes.

Careful control is necessary to get the butter granules the right size and to prevent separation of the whey. Excess churning will thin the body and also increase the separation of the whey. If the temperature is too high, the butter will churn too quickly, making it difficult to obtain the proper size granules.

Since churns are difficult to sterilize, off flavors often develop in this type of buttermilk.

### Making Gelatinated Buttermilk

To improve the quality of buttermilk by preventing whey separation, some manufacturers have very successfully used gelatin.

Approximately .25% of good grade edible gelatin should be used. To avoid trouble in dissolving the gelatin, sprinkle the powder on the surface of the skim milk before pasteurization.

Caution! Do not add too much gelatin since it is apt to cause an objectionably high viscosity.

### Making Acidophilus Cultured Buttermilk

This product has gained much prominence because of its therapeutic effects rather than its appeal to the palate. The souring of the milk is caused by the action of *Lactobacillus Acidophilus*. This bacillus, when implanted in the intestinal tract of man, drives out putrefactive and other types of organisms, an action likely to have beneficial effects on health.

Because *Lactobacillus Acidophilus* grows very slowly and is easily crowded out by other bacteria, it is essential to keep the milk free from contamination. The milk must be sterilized rather than just pasteurized. If possible it should be sterilized under pressure. After inoculation, the sterilized milk is incubated at about 100° F. from 12 to 18 hours.

## Double-Cultured or Bulgarian Buttermilk

Double-cultured buttermilk, commonly called Bulgarian buttermilk, has met with favor in certain localities because of its characteristic flavor and a therapeutic effect attributed to the *Lactobacillus bulgaricus*. This product requires two batches of cultured buttermilk, regular and Bulgarian, which are later mixed in proportions to suit local trade. The ratio may vary from one part of Bulgarian to ten parts of regular, to one part to forty.

### Steps in Making a Quart of Bulgarian Starter

1. Pasteurize one quart of high quality milk at 190° F. for 30 minutes.
2. Cool the bottle of milk to 100° F.; add a bottle of Bulgarian culture.
3. Ripen for 10 to 12 hours at this temperature until the starter is thoroughly solid and thick throughout.
4. Cool down below 50° F. and keep there until ready for use.

### Steps in Making the Bulgarian Buttermilk

1. Pasteurize 40 quarts of selected milk in a previously sterilized container, at 190° F. for 20 to 30 minutes.
2. Cool to 100° F. and add one quart of starter.
3. Hold at 100° F. until milk becomes thick throughout and the proper acidity has been reached. A final acidity of 1.35% or higher is normal. It usually takes 12 to 14 hours to ripen.
4. Cool to 50° F. or below.
5. Mix the desired quantity of Bulgarian buttermilk with regular cultured buttermilk.

CAUTION: Both types of buttermilk should be 50° F. or below when mixed.