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# Dairy Guidelines

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## HOMEMADE CULTURED MILK PRODUCTS

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### Introduction

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There is little doubt that fermented milks have been consumed since man first milked cows. Prior to modern times there were no means nor knowledge of, the necessity for proper sanitation, adequate refrigeration, or heat treatment of milk to prevent spoilage. Milk left unconsumed would naturally ferment, and the characteristics of the resulting product were dependent upon the microorganisms present in the original milk.

It wasn't until about 100 years ago that man first discovered these microscopic organisms, and learned they were responsible for the many favorable and unfavorable changes that occur in raw milk and other foods. Since that time, man has learned how to best control fermentations and to produce uniform, high-quality products.

Modern methods for making fermented milk products in dairy processing plants are highly technical. They involve extreme precautions to protect all ingredients from contamination with microorganisms which may cause difficulties during manufacturing or defects in the finished product.

The simple procedures described in this publication for making cultured buttermilk, sour cream, and yogurt in the home take advantage of knowledge employed by the highly-trained dairy plant processor. This is accomplished by recommending the homemaker buy some of the freshly-made products produced by the plant. These products can be used as bacterial starters to ferment like products in the home.

### The Nature of Fermentations

The term "cultured," as it applies to dairy products, means controlled fermentation (by known types of harmless, active bacteria) to produce products having desirable flavor and body characteristics.

Anyone acquainted with the production and care of milk knows that if it is not handled under strict sanitary conditions, and if it has not been refrigerated properly, it will quickly spoil. The type of fermentation which takes place under such conditions, however, may differ widely from one experience to the next. The nature of natural fermentation is related to the microorganisms present. These fermentations are desirable in most cultured dairy products:



1. Lactic Acid Fermentation--Some microorganisms break down lactose (milk sugar) to produce lactic acid, which is a sour compound. When enough acid has been developed, it will coagulate (clabber) the protein of the milk.
2. Citric Acid Fermentation--Other microorganisms produce certain aroma and flavor compounds from citric acid which are pleasing to the consumer. Thus, a good type of fermentation would involve some of these types of microorganisms as well as lactic acid-producing microorganisms.

#### Controlled Fermentation Is Necessary

Pure cultures of bacteria are necessary to develop the desired flavor and aroma in dairy products. Dairy plant laboratories obtain these pure cultures from specialized laboratories and grow them under strict sanitary conditions, using utmost precautions to prevent contamination with other microorganisms. These cultures are used as "starters" to ferment commercially processed cultured buttermilk, sour cream, yogurt, cottage cheese, and other cheeses.

Before such products are cultured with a starter, the raw milk or cream must be heat-treated to destroy microorganisms which may be present. The elimination of undesirable microorganisms prevents their interfering with proper fermentation and the development of desirable flavor and aroma. Milk and cream used for homemade cultured products should also be heat-treated to destroy troublesome microorganisms and to make good-flavored, wholesome products. Products made by dairy plants, since they contain pure cultures of the right kinds of bacteria, are ideal for use as starters for homemade products. Purchase the freshest products to be used as starters, since bacteria become less active with age.

#### Churned Sour Cream Buttermilk

Buttermilk from the churning of raw milk or cream that has soured naturally is no longer available from dairy plants in Virginia and most other states. Few plants process butter today, and it is difficult to obtain a uniformly high-quality buttermilk from the churn. Homemakers who desire churned buttermilk can obtain a fairly good-quality product if they: (1) pasteurize the milk or cream to be churned; (2) culture the milk or cream with a commercial starter; (3) 3 tbsp. starter culture for 1 gal. of milk or cream); and (3) set the milk at 68° to 74° F. to clabber prior to churning. After churning, the buttermilk should be quickly cooled to temperatures below 50° F. and kept cold.

#### Cultured Buttermilk

Cultured buttermilk is usually made from skim milk or reconstituted, nonfat dry milk. Whole milk, buttermilk, or partially skimmed cultured buttermilk can also be made using the same process. The butterfat will rise to the top during the time the milk is ripening. However, after the milk has ripened, adequate agitation will disperse the cream uniformly throughout the buttermilk. Butterfat adds additional flavor to the finished product, which many consumers prefer over a skim milk buttermilk.

The following steps are recommended for making cultured buttermilk:

1. Use a clean container and fill it nearly full with skim milk, reconstituted skim milk, whole milk, or partly skimmed milk. Do not fill the container because expansion during heat treatment may cause it to overflow.
2. Set the container on a rack in a larger container. Add water to the large container until the level is higher than the level of milk in the smaller container. Place a lid over the container of milk.
3. Heat the milk to 180°F. and hold at this temperature for 30 minutes. Cool with water or ice water to 70°F.
4. Add 3 tablespoons of starter culture to each gallon of milk used (2 tsp. per qt.). Mix thoroughly for one minute.
5. Set the container again in the larger container. Fill the larger container with water regulated to 68°F. during summer or 72°F. during winter. Cover the milk and allow it to set undisturbed for 12 to 16 hrs., or until it is curdled and has developed a pleasing sour flavor. Because of the setting time involved, it's best to set the milk in the evening, so it may ripen overnight.
6. Cool the cultured milk to below 50°F. by placing the container in a pan of ice water. Stir the milk during cooling only enough to obtain a smooth body. Refrigerate the cold buttermilk in its original container, or store it in sterilized bottles. The cultured buttermilk will develop its maximum flavor and aroma 24 hours after cooling and bottling.

A cup of this buttermilk may be saved in a sterile jar and used as a starter for the next batch of buttermilk. However, it is best to obtain a new starter at least once a week.

#### Cultured Cream

Cultured cream, more commonly known as commercial sour cream, consists of cream treated and soured in such a manner that a pleasing acid flavor is produced. Its thick body makes it useful as a spread.

Many Europeans for ages have used sour cream as a common food in their daily diets. American dairy processors serving large populations of European origin, were the first to find good markets for this product. In recent years, the popularity of sour cream has grown tremendously. It is especially useful as a base for all sorts of appetizing dips, as a dressing for baked potatoes, and as a base for blue-cheese salad dressing. Cultured cream can be made easily in the home with the following procedure:

1. Use fresh, sweet, light cream (about 20% butterfat).
2. Add 3 tbsp. of nonfat dry milk to each quart of cream used. Mix it thoroughly with the cold cream until all lumps have disappeared.
3. Pasteurize the cream by heating to 180°F. in a double boiler over boiling water. Hold it at this temperature for 30 minutes. Keep the cream covered while it is being pasteurized. Cool quickly to 70°F.
4. To each quart of pasteurized cream, add 3 tbsp. of cultured buttermilk starter. Mix the starter into the cream thoroughly and allow to set at 70°F. until it is sour. Ripening will require about 6 or 7 hours if an active starter is used.



5. When the desired acid flavor has been obtained, place the cultured cream in the refrigerator to age for 12 to 24 hours. Aging increases the thickness of the cream, making it more desirable for spreading.

The cream may be added to the final container immediately after the starter has been added. Ripening and aging processes carried out in these containers will prevent excessive agitation, which may damage the thick body of the sour cream.

### Yogurt

Yogurt is a coagulated, sour dairy product made from fresh, whole milk with added solids, either from nonfat dry milk or evaporated milk. It is a popular dairy food in southeast Europe, southern Asia, and northern Africa. The bacterial culture used in making yogurt differs from those used in making most other cultured dairy products. These bacteria grow best between 105° to 110°F., a temperature at which the growth of most other bacteria is retarded.

Yogurt may be made easily in the home by the following procedure:

1. Add one ounce of nonfat dry milk or one 13 oz. can of evaporated milk to 3/4 qt. of clean, fresh milk in the top part of a double boiler.
2. Heat the fortified milk to 190° to 205°F. and hold it at that temperature for one hour. Keep the cover on the double boiler during pasteurization.
3. Cool the milk to 120°F. and pour it into a clean quart jar or other suitable container that has been sterilized in boiling water or by steaming. Cool to 110°F.
4. Add 3 tbsp. of yogurt milk obtained from the local grocery. Mix it thoroughly with the milk. Cover.
5. Place the jar in a pan of water which is maintained at 108°F. Allow the milk to ripen at that temperature until it is thick and has developed a tart, acid flavor. The ripening period requires 3-1/2 to 5 hours.
6. Remove the ripened yogurt from the water bath and place it in the refrigerator to chill and store until used.

Yogurt may be eaten "as is"; as a custard with berries, peaches, or apple pie; seasoned with salt and chives or chopped green onions; as a topping for fruit; or served with sweets such as honey, maple syrup, jelly, or molasses. Anyone who likes buttermilk will like yogurt.