



Making Yogurt at Home

E. Russell-Campbell, M.S., and C.L. Hicks, Ph.D. Dept. of Animal Sciences
F.T. Maruyama, Ph.D., R.D., Home Economics Extension

Yogurt making is an ancient craft and a modern science. This nutty tasting, smooth gel results from the growth of two bacterial strains (*Lactobacillus bulgaricus* and *Streptococcus thermophilus*) in warm milk. These bacteria utilize the milk sugar (lactose) and produce acid. The acid in turn causes the milk protein to form a gel that traps all the other ingredients of the mix.

Desired consistency and flavor of yogurt vary with region and personal preference. This fact makes it a candidate for home production and, with a few basic kitchen utensils and ingredients, you can easily prepare it following the recipe given here. Yogurt-making machines are available for the incubation step, but they are an unnecessary expense. They usually allow you to prepare individual servings or smaller amounts and free up the kitchen sink, factors you may want to consider.

You can make your yogurt from milk of varying fat contents. Whole milk (3.25% fat), milk of fat levels of 2%, 1%, and .5%, and skim milk (less than .05% fat) are usually readily available and produce yogurts of corresponding fat content. The cream in unhomogenized milk will rise to the top somewhat during the incubation process, but virtually all commercial milk has been homogenized. Most health- and calorie-conscious consumers today prefer yogurt with less fat. However, the lower-fat yogurts may not be as smooth and their flavor may not be as full because of the missing flavor compounds found in milkfat.

Adding nonfat dry milk to yogurt gives it a desirable viscosity, smoothness, and consistency. You can add as little as 1% or as much as 6%. A level of 5% is recommended to prevent the separation of liquid whey from the curd (this separation is called syneresis).

Unlike cottage cheese, yogurt may be made from commercially pasteurized milk available in grocery stores. For best results, re-pasteurize the milk by bringing it to 160°F and holding it at that temperature for one minute. In this recipe the nonfat dry milk and the container are both pasteurized. You can pasteurize in a microwave oven with a temperature probe in place or by holding the milk in a double boiler on the rangetop at the same temperature and time.

When making yogurt at home the most reliable source of starter is usually a commercially produced plain yogurt. Some major brand-name companies have higher quality standards than others and their cultures can usually be trusted for purity of bacterial strains. Trial and error and personal preference will determine a trustworthy source of culture.

Recipe for Plain Yogurt

The calorie content of this plain yogurt, using skim milk and 5% nonfat dry milk, is 130 Calories per cup. Because there is no separation of curd from whey as happens when making cheese, yogurt yields a slightly higher volume than the amount of milk used in the recipe. This recipe calls for 1/2 gallon of milk to produce approximately 1/2 gallon of yogurt. The refrigerator shelf-life is 2 to 3 weeks.

Equipment

- 1/2 gallon (or larger) microwaveable container
- Microwave oven with a temperature probe
- or
- 1/2 gallon kettle and a larger kettle to be used as a rangetop double boiler for pasteurization
- Large kettle or sink to be used as a water bath for incubation
- Fahrenheit thermometer
- Wire whisk or spoon for stirring

Ingredients

Milk, 1/2 gallon
Instant nonfat dry milk solids, 1 1/2 cups
Commercially produced plain yogurt (starter culture), 3 tablespoons

Procedure

1. Warm milk to about 120°F and stir in instant nonfat dry milk.
2. Heat mixture to 160°F in a microwave oven or double boiler and hold at that temperature for 1 minute.
3. Cool milk to 102°F and add the starter culture.
4. Stir with a wire whisk to incorporate culture.
5. Hold at 102°F by placing the container in a sink full of 105°F water. During incubation the water in the sink should come up to the level of the milk. It will not matter if the water cools over time.
Incubate for 3-4 hours until tiny flakes of coagulum appear when the yogurt is dripped down the side of a clear glass. At this point the milk will be starting to thicken just slightly.
6. Refrigerate the mixture at once when you observe the above conditions. Note that the body of milk is liquid but thickened at this point. Acid is being produced very rapidly and refrigeration is important to dramatically slow this process. The milk will coagulate further as it cools in the refrigerator.
7. The following morning, remove the yogurt from the refrigerator and break the gel by whipping with a wire whisk. The yogurt is now ready to eat. Note that this is a very smooth, free flowing yogurt. If you prefer firmer yogurt, do not break the gel until you are ready to eat it. Be aware, however, that some syneresis may occur and the yogurt might be slightly grainy.
8. The incubation process in a yogurt maker will take much longer, but the same recipe can be used. The temperature will vary depending on the brand of yogurt maker but will be lower than the 102°F recommended here. Use the guidelines accompanying the yogurt maker to determine the incubation period, which will vary according to desired firmness.
9. This recipe may be halved or doubled.

Flavoring

You can use plain yogurt in recipes, or you can sweeten or flavor yogurt in a variety of ways. Adding sugar when the milk is first warmed to 120° is the simplest way to sweeten it. The sugar must be added at this time so that it will dissolve, otherwise, the yogurt will have a granular texture. Mixing the nonfat dry milk and the granulated sugar together will facilitate the dissolving process. Add sugar according to your taste preference. Sweetness of 3.5% (1/3 c. per half-gallon) is a reasonable level to try first. Children, in particular, may not like the tartness of unflavored yogurt so you may want to introduce it to them in a sweetened form.

You may also flavor a portion of yogurt at the time it is to be eaten by stirring in a desired amount of fruit, honey, or cereal. Add these flavorings immediately before serving, otherwise undesirable flavor changes may occur from the growth of yeasts and molds, even with refrigeration.

Problems

An undesirable characteristic of yogurt may be the excess development of acid resulting in a flavor that is too "sharp." Excess acid results when the *L. bulgaricus* becomes dominant. Therefore, it is wise to use fresh starter rather than maintaining the same culture from one batch to the next.

Other common faults are grainy texture and "wheying off" (water separation) both caused by excessive or uneven incubation temperatures, insufficient and delayed cooling, or careless handling of the gel. A bitter "off" flavor may be caused by an undesirable bacteria in an unsanitary milk supply.