



**Cornell University**  
New York State Agricultural Experiment Station

# Yogurt Production

## Fact Sheets for the Small Scale Food Entrepreneur

*Published by:*

*The Northeast Center for Food Entrepreneurship at the New York State Food Venture Center, Cornell University,  
<http://www.nysaes.cornell.edu/necfe/>*

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## YOGURT PRODUCTION

Yogurt is a fermented milk product with a custard-like consistency which differentiates it from other fermented milk products. The Code of Federal Regulations defines it as the food produced by culturing cream, milk, partially skimmed milk, or skim milk used alone or in combination with a characterizing bacterial culture that contains the lactic acid-producing bacteria, *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. Yogurt is more nutritious than many other fermented milk products because it contains a high level of milk solids in addition to nutrients developed during the fermentation process. In the U. S. market place, yogurts fit into four major niches based on final product properties: children's yogurt (extremely mild and sweet), breakfast yogurt, dessert yogurt and health yogurt (high acid with a pH value as low as 3.5).

Typical yogurt manufacturing entails the following:

1. The process begins with milk with a fat level from 2.0-3.5%.
2. The serum solids content of the milk is increased to 10.5-11.5% through a standardization process by adding condensed skim milk or nonfat dry milk.
3. Milk is homogenized and heated to 185° to 195°F (85-90.5°C) for 30 to 60 minutes for pasteurization.
  - The high heat treatment improves the body of the yogurt and limits whey expulsion.
4. The milk is cooled to 104 to 106°F (40 to 41°C) and is inoculated with a lactic acid producing culture.
5. Acid production is monitored and data (time/temperature/pH) is recorded.
6. The inoculated milk is incubated in a vat (stirred) or placed in consumer-sized sterile packages (set) to incubate in a temperature controlled environment.
  - To attain yogurt with a pH of 4.0 the cooling process should begin when the fermenting milk reaches a pH of 4.3-4.4.
7. To extend the shelf life of the product, yogurt can be heat treated after culturing is complete, destroying viable microorganisms.

**Flavoring Options:** Flavoring can be added to the chilled fermented yogurt. This is referred to as **Swiss-style** yogurt. **Sundae-style** yogurt results when fruit or fruit flavoring is added to the bottom of the consumer package, followed by the inoculated base, and then incubated until the predetermined acidity level is attained. Flavoring ingredients can also be added after pasteurization or ultra-pasteurization.

Several optional ingredients can also be added to yogurt as specified in the Code of Federal Regulations.\* All ingredients used for production must be safe and suitable. Before the addition of any bulky flavors, the yogurt must contain not less than 3.25% milk fat, and not less than 8.25% milk solids non fat (MSNF), and must have a titratable acidity of not less than 0.9%, expressed as lactic acid. The ingredients can be homogenized but must be pasteurized or ultra-pasteurized prior to the addition of bacterial culture.

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Major quality control points for yogurt manufacture include:

Ingredients:

- Use of milk that is of good initial quality, free from antibiotics.
- Storage of milk at proper temperatures and for no longer than predetermined time periods.
- Use of high quality ingredients (to be added after heat treatment) which conform to microbiological criteria with respect to quality and absence of pathogens.

Process:

- Ensuring that milk is correctly standardized and that the materials used for standardization are of good quality.
- Ensuring that appropriate pressure is used during the homogenization process.
- Ensuring that heat treatments are correctly applied and equivalent to pasteurization.
- Verifying that fermentation proceeds to a predetermined acidity (pH) level.
- Ensuring that the product cools according to a predetermined pattern
- Ensuring that handling is limited to avoid contamination of and damage to the final product.
- Ensuring even distribution of added ingredients and consistent filling.

Suppliers of starter culture and/or technical services include:

New England Cheesemaking Supply  
Company  
P.O. Box 85  
Ashfield, MA 01330  
(413) 628-3808

Chr. Hansen Ingredient Technology  
1595 MacArthur Blvd.  
Mahwah, NJ 07430  
(800) 343-4680  
[www.chr-hansen.com](http://www.chr-hansen.com)

ABC Research Corp.  
3437 SW 24<sup>th</sup> Ave.  
Gainesville, FL 32607  
(352) 372-0436  
[www.foodingredientsonline.com](http://www.foodingredientsonline.com)

Kusel Equipment  
820 West Street  
Watertown, WI 53094  
920-261-4112  
[sales@kuselequipment.com](mailto:sales@kuselequipment.com)  
[www.kuselequipment.com](http://www.kuselequipment.com)

**(Footnotes)**

\* See CFR volume 21, section 131.200 or access via the internet at [www.access.gpo.gov/nara/cfr](http://www.access.gpo.gov/nara/cfr) (select search by keyword, enter “yogurt.”)

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