

Lecture 26: From Donkeys to Zebras

Microbial Fermentations are used to produce and preserve many foods.

I. Dairy Fermentations

A. Used to produce _____, buttermilk, sour cream and _____.



B. Performed by the _____ which include species in the genera *Lactobacillus*, *Lactococcus*, *Leuconostoc* and *Streptococcus*. These bacteria ferment the milk sugar, _____, to lactic acid. The lactic acid production lowers the pH and _____.

D. Provide a way to _____, while at the same time providing products with various _____.

E. History

1. As long as 1000 years ago, people began learning methods to _____.

2. These “sour” milks have varied from country to country and have used as their source animals from _____¹.

a. The Russian *kumiss* is made from _____.

b. The Swedish *surmjÖlk* comes from _____.

c. _____ is made from cow, goat or sheep milk and originated in the Caucasus Mountains. Like kumiss, it may contain up to 2% alcohol. Originally kefir was produced in leather sacks and hung by the door. People passing by would massage the sack and stimulate fermentation².

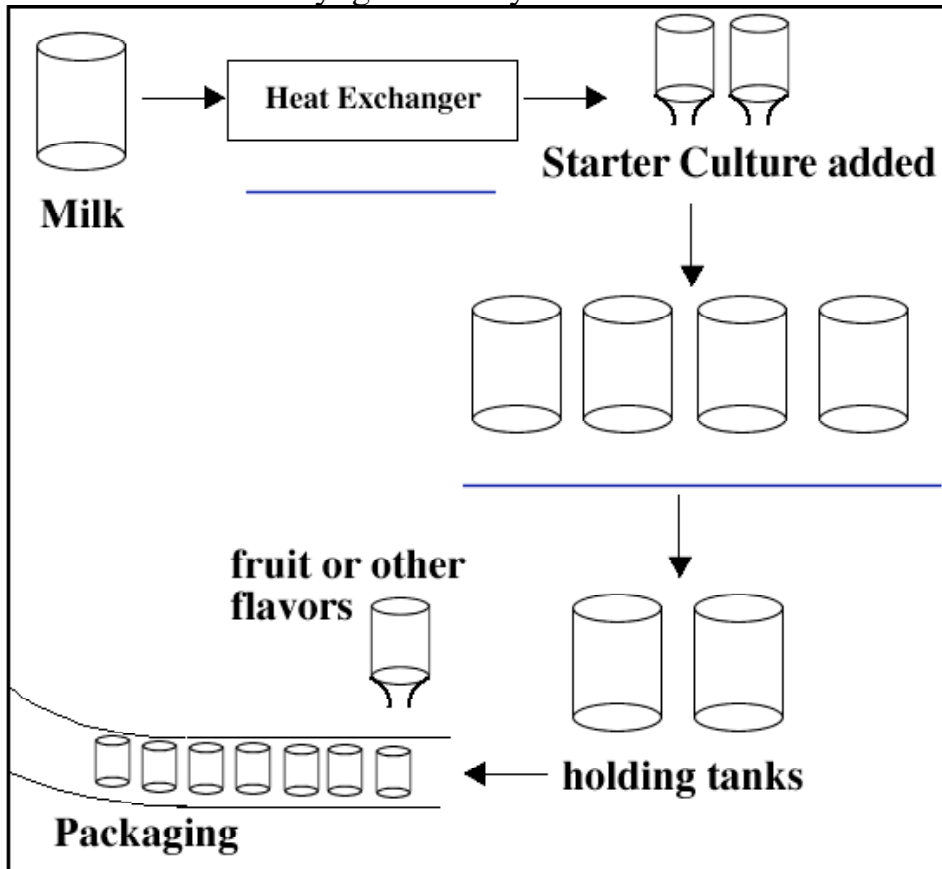
¹ The Microbiology of Fermented Foods by Brian J.B. Wood

² Prescott text (seventh edition) p. 1040

3. For many years, the _____ was unknown. The initial microbial inoculation came from _____ used to make the products. Successive batches were inoculated with _____.

II. Yogurt

- A. One of the _____ fermented milk product in the U.S.³
- B. Produced both commercially and by individuals (yogurt-making kits).
- C. A virtual tour of a yogurt factory



³ Prescott text (seventh edition) p. 1038

Procedure: _____

_____ on _____ at 44°C
nonfat or lowfat milk (heat on bunsen burner to 85°C) → ice to 43°C or lower → *S. thermophilis* grows faster and renders the milk

Inoculate with an 1:1 culture of _____



photo taken by Rachel
Stain made by Brandon Scott (TA)

_____ ↓
L. bulgaricus further _____ the milk. The acidity causes the _____ and _____ form a semi-solid curd.

_____ are added.

↑
Eventually the two species ferment all the lactose to lactic acid. They also produce _____ (*S. thermophilis*) and _____ (*L. bulgaricus*) that _____.

III. _____

Live cultures in fermented milk products may provide health benefits⁴.

- A. control of diarrhea
- B. _____ effects (some lactobacilli have antitumor compounds in their cell walls)
- C. improvement of inflammatory bowel disease
- D. help maintain the normal balance of microbes in the gut and improve _____

⁴ Prescott (seventh edition) p. 1039