

Bacteria

Bacteria are the most important and troublesome of all the microorganisms for the food processor. Bacteria are single-celled living bodies so small that individually they can be seen only with the aid of a microscope. They are among the smallest living creatures known. The cells of bacteria vary in length from 1/25,000 to 1/1,000 of an inch. The number of these tiny microorganisms that could be placed on the head of a pin would equal the population of New York City! Viewed with a microscope, bacteria appear in several shapes or forms, but are primarily either round in shape (called "cocci") or rod-shaped (called "rods").

Reproduction of bacterial cells

Bacteria reproduce by division, which microbiologists call fission. When a bacterial cell is ready to divide, the cell material gradually increases until its volume is almost doubled. The cocci shapes become oval while rod shapes stretch to nearly twice their length. The cell then constricts in the middle. This constriction deepens until the cell contents are held in two distinct compartments separated by a wall. These two compartments finally separate to form two new cells, which are duplicates of the former cell and each other. Since the reproduction of bacteria increases the numbers, it is often referred to as "growth."

Experiments conducted to determine the growth rate of bacteria under favorable conditions have found that each cell divides, on the average, about every 20 or 30 minutes. At this rate of cell division, each single cell will produce four cells at the end of the first hour. At the end of two hours, each cell will have produced 16 new cells. After 15 hours, each parent cell will have produced 1,000,000,000 (one billion) cells identical to the original. For example, if there were 75,000 bacteria per square inch on a conveyor belt, by the end of one hour there could be 300,000 bacteria per square inch of that belt. At the end of a three-hour shift, the bacteria count per square inch of belt surface could be 4,800,000.

Bacterial growth becomes limited without a constant supply of available fresh food. Also, large numbers of bacteria result in an accumulation of substances that are byproducts of bacterial growth and that also inhibit growth. With cessation of growth due to pollution of their environment, the cells may die. However, if the microorganism is a type that forms resistant but dormant spores, these cells can remain alive under conditions that kill other cells.