Composting continues to gain importance throughout the world for conversion of organic by-products to new resources (de Bertoldi et al., 1996). In the USA more than 8500 composting sites were operating in 1997 (Compost. Counc., 1997). The number of sites for each major category of materials were: 15 for mixed municipal solid waste (MSW), 138 for food waste, 250 for municipal biosolids, 3316 for yard wastes, and >5700 for farm by-products. Of the farm composting operations, over 5000 (Kashmanian & Rynk, 1996) were composting animal mortalities in 1995 because conventional methods for rendering, incineration or burial were not available or more costly. Backyard composting by homeowners also has increased in recent years and some industries now use composting as a method for the destruction of toxic by-products, a process known as bioremediation. Regulations governing composting in the USA are set by individual states. Federal regulations identified as EPA 503 (Epstein, 1997) developed for biosolids typically serve as guidelines for state regulations, although some state regulations differ substantially.

THE COMPOSTING PROCESS

Composting is a biological decomposition process of organic materials in a predominantly aerobic environment. During the process, bacteria, fungi and other microorganisms including microarthropods, break down organic materials to stable, usable organic substances called composts. The process consumes O₂ and releases heat, water, and CO₂ (Golueke, 1972). The microorganisms use the most readily biodegradable substances as their food source. The compost that remains resembles humus and can be used as a soil conditioner, organic fertilizer or as a food base for new industries. Composting reduces the volume of the parent materials and pathogens are destroyed if the process is controlled properly. While composting does occur naturally, efficient composting requires the control of many factors to avoid nuisance problems such as odors and dust. A schematic of the composting process is presented in Fig. 10-1. Figure 10–2 illustrates material flow for the process.