

## Salt

Salt has been used to preserve meat products (i.e., salt-cured meats). Salt, which lowers the  $a_w$ , is often supplemented with other ingredients, such as nitrites, that aid in spoilage prevention. In all cases the salt is necessary to inhibit the growth of sporeforming bacteria, such as *C. botulinum*, and only enough heat is applied to kill the non-heat resistant vegetative cells. Strains of *C. botulinum* that grow in a suitable food containing 7 percent salt are known. For example, toxin was produced in experimentally produced turkey frankfurters with an  $a_w$  of 0.956 (7% NaCl) in 12 days at 27°C (81°F). The growth of these strains, however, is inhibited at a concentration of 10 percent, which is equivalent to a water activity of 0.935, when all other conditions are optimum. If conditions are not optimum for growth (e.g., low pH or temperature) then less NaCl is required to inhibit growth. For example, growth of *C. botulinum* may occur at an  $a_w$  of 0.96 (6.5% NaCl) at pH 7.0, but if the pH is reduced to 5.3, growth will be inhibited at an  $a_w$  of 0.97 (5% NaCl). The actual salt content of a meat product is not as important in inhibiting *C. botulinum* as the brine concentration (percent of salt in the aqueous portion of the meat). Toxin production is inhibited at a brine level exceeding 9.0%.