Salt as a Meat Preservative

Salt is one of the earliest and most widely used methods of fresh meat preservation. Salt became popular because of its effectiveness in inhibiting spoilage and the relatively low cost of the treatment. Over the years, salt has been used in a variety of ways but always with the same purpose in mind—to increase the shelf life of a fresh meat product.

Objective:

Explain why salt is commonly used as an effective meat preservative.

Key Terms:

- dehydration
- plasmolysis
- proteolytic enzymes
- terminal treatment

Using Salt to Preserve Meat

Salt and other chemical preservatives are commonly used on meat products when terminal treatment is not a suitable preservation method. Terminal treatment refers to a process such as heating, drying, freezing, fermenting, or refrigeration. Years ago, when refrigeration was not widely available, the use of salt was the only method most people had for keeping fresh meat more than a few days. In present times, salt is sometimes used to reduce the intensity of a terminal treatment needed to preserve meat.

Not only does salt inhibit the growth of microorganisms in a meat product, but it also enhances the flavor, making the product more palatable. Salt acts as a preservative by causing dehydration, or the removal of moisture from a molecule. As this moisture is removed, microbes that depend on a water supply in the fresh meat are held in check. By reducing the
amount of water present in the food source, microbes cannot reproduce and spread, ultimately spoiling the meat.

Salt also has the ability to cause an increase in the osmotic pressure created in the aqueous (liquid) environment surrounding a microbial cell. As the osmotic pressure around the cell increases, a condition known as plasmolysis takes place in the cell. **Plasmolysis** is a partial dehydration of a microbe cell, in which the protoplast of the cell

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**UNdER INVESTIGATION…**

**LAB CONNECTION: Salt as a Meat Preservative**

Salt has the distinction of being quite possibly the first intentional food additive used as a preservative. Since ancient times, salt and other substances have been added to meat products to preserve freshness, extend the life of the product, and enhance flavor.

Today, salt is still commonly used as a method of preservation, sometimes in combination with smoking, drying, and pickling. The demand for meat products in areas of the world that cannot produce them has led to advancements in the preservation and shipping of these products. Meat has continual demand as a staple in the diets of many people.

Without the use of salt and other additives, meat products would be available only to people who lived short distances from meat sources. Curing agents have allowed meat to be produced and distributed anywhere, preserving the products for those in places where meat sources are few.

An experiment can be set up to determine how well fresh fish is preserved by salt. Three samples are prepared. One is fish alone. A second is fish with salt. The third is fish with sand. The samples are placed in sealable plastic bags, stored at room temperature, and observed daily.

An experiment can demonstrate the effectiveness of salt in delaying the spoilage of fish.

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**FIGURE 1.** Salt can affect the osmotic pressure of the liquid surrounding microbial cells. (Courtesy, USDA)
shrinks away from the cell wall. The shrinking occurs when liquid inside the cell moves out into the surrounding solution. As the protoplast and the cell wall of the microbe separate, the microbe is destroyed, and spoilage is delayed.

Oxygen will also play a role in the spoilage of meat products. As salt is added to a product, it lowers the amount of oxygen that can be dissolved into the meat moisture. This lowered amount of oxygen will also increase the shelf life of meat by reducing the oxidation of the fat in the meat product.

As if salt did not have enough functions in meat preservation, salt also interferes with enzyme activity. Salt will inhibit the action of proteolytic enzymes, which are enzymes that catalyze, or speed up, the breakdown of proteins into simpler substances. Food spoilage is the result as these proteins begin to decompose a meat product.

**Summary:**

Salt is commonly used on meat products when terminal treatment is not a suitable preservation method. It also enhances flavor. Salt acts as a preservative by inhibiting the growth of microorganisms in a meat product, by causing dehydration, by increasing the osmotic pressure around a microbial cell, by helping decrease oxidation, and by interfering with enzyme activity.

**Checking Your Knowledge:**

1. Describe the use of salt in relation to terminal treatment.
2. What is plasmolysis?
3. Name five ways salt acts as a preservative.

**Web Links:**

- University of Minnesota Extension—Nitrite in Meat
  [http://www.extension.umn.edu/distribution/nutrition/DJ0974.html](http://www.extension.umn.edu/distribution/nutrition/DJ0974.html)

- Rustico Cooking—Cured Meats
  [http://www.rusticocooking.com/curedmeats.htm](http://www.rusticocooking.com/curedmeats.htm)

- Agricultural Career Profiles
  [http://www.mycaert.com/career-profiles](http://www.mycaert.com/career-profiles)