

# Preserving with Salt



Cubic salt crystals (NaCl) from the Natural History Museum of Vienna.

Credit: By wloidi [CC BY-SA 2.0 (<https://creativecommons.org/licenses/by-sa/2.0/>)]

Human life has always depended on salt. Chemically, and culturally.

All animals need it for the function of blood, organs, muscles and nerves. Carnivores get it from eating other animals. Herbivores get it from salt licks and minerals in groundwater.

For millennia, humans have used salt to preserve meat—and still do today. This works because salt, in abundance, kills bacteria.

When we pack meat in salt, it draws water from the cells. Water naturally moves across cell membranes to try to reach an equilibrium of saltiness on both sides of the membrane.

This process dehydrates the meat, making it inhospitable for bacteria and parasites, which need water to live.

Culturally, salt has been equally important.

Salt-preserved meat and fish were crucial to our exploration of the globe, feeding sailors as they crossed oceans, and sustaining remote communities.

Wars were fought over salt, and access to it could influence the outcome.

As recently as the American Civil War, Union troops captured Confederate salt mines to limit their food supply and force them to the coasts to get salt—where they could be more easily attacked.

Settlers in the West often followed game trails to and from brine springs or salt outcrops. These became cattle trails, then wagon paths, then roads, sometimes even the highways of today.

Salt has literally shaped the course of human history.



BUREAU OF  
ECONOMIC  
GEOLOGY

# Background: Preserving with Salt

**Synopsis:** Salt has seasoned most of human history, providing food security for populations by preserving food for times when fresh food was not available. However, using it requires a delicate balance, because too much salt can kill us—or preserve us in some ancient cases from Egypt, Austria and Iran.

- Salt is one of the most common seasonings we use every day to bring flavor to our food. But unlike other seasonings, humans need salt to live; our blood, nerves, organs and muscles depend on it.
  - Our bodies can't manufacture this biological necessity, so we have always had to find it in the environment.
  - All animals need salt in their diet: Carnivores get it from the meat they eat and herbivores must seek out salt licks or mineral springs.
  - Rural roads around the world are related to the need for salt. Settlers found animal paths leading to salt licks and brine springs and turned these into trails, which became country roads with settlements along them. These settlements grew into the cities of today.
- Salt dehydrates food by drawing unbound water out of it through the process of osmosis, essentially causing the water to move across a cell membrane to equalize the amount of salt on both sides of the membrane.
  - If this happens too much, the cell can no longer stay alive or reproduce.
  - All types of life require water, including the microbes that can cause food poisoning.
  - Excess salt concentration, usually around a salinity of 20%, makes food an inhospitable place for bacteria.
  - Bacteria need unbound water for growth and for the chemical reactions that result in the decay of the food. The lack of available water kills bacteria.
  - Salt is an effective antiseptic, killing bacteria in wounds; you may even use it to treat a sore throat by gargling.
- Before refrigeration, people used the sun to dehydrate meat before it spoiled.
  - Alternatively, they would dry it over a fire, leading to smoked meats.
    - But at certain times and places, the sun was not reliable, so they needed another way to preserve food and turned to salt.
- Salt-cured fish and meats are delicacies that have been enjoyed for generations, including:
  - Nordic salmon gravlax
  - Salt cod
  - Parma ham
  - Corned beef (pea-sized chunks of salt are called "corns")
  - Dietary laws of both the Jewish (Kosher) and Muslim (Halal) faiths require the removal of blood from freshly slaughtered meats, usually by salting.
  - In the 19th century, it was discovered that salt mixed with nitrates colored salted meats red which was more appetizing than gray; these types of salts are known as "curing salts."
- If you want to salt meat or fish, here is how you can do it:
  - Rinse it in cold water.
  - Generously rub the entire surface of the meat with salt and cover it in a layer of salt about an inch (couple of centimeters) thick, then wrap it in cheesecloth.
  - Hang the meat in a cool location for a month or more.
  - Then wash the salt off the meat and enjoy it.
  - If you salt fish, soak it in water for 24-48 hours before eating to draw the salt back out of the cells of the fish.
- Often, access to salt determined who had power. Destinies were decided by access to the food security provided by salt during droughts, extreme winters, exploratory treks, marine voyages and overland migrations.
  - Thousands of years ago, wars were fought over access to Chinese salt flats.



## References: Preserving with Salt

[Off the Spice Rack: The Story of Salt | History.com](#)  
[A Brief History of Salt | Time Magazine](#)  
[The History of Salt in Ancient Civilizations | HistoryCooperative.org](#)  
[A Guide to Salting Food Preservation | Countryside.com](#)  
[Saltmen | Wikipedia](#)



Contributors: Mike Hudec (UT Austin Bureau of Economic Geology), Juli Hennings, Harry Lynch

EarthDate.org  
Fact Sheet:  
Episode **ED 149**

# Background: Preserving with Salt

- Some ancient Egyptians became wealthy as the world's earliest salt traders.
- In the sixth century, Moorish merchants traded an ounce of salt for an ounce of gold.
- The word "salary" comes from the Roman practice of using salt to pay soldiers, which also led to the modern colloquial phrase "worth his salt."
- In the American Civil War, Union forces targeted inland salt sources so Confederate forces had to depend on seaside salt sources to supply troops, tan leather and preserve food.
- Preservation by salt wasn't limited to food in ancient Egypt.
  - Mummies shipped down the Nile were packed in salt and taxed in the bracket called "salted meat."
- And in Austria, an ancient salt miner that suffered a mining accident was found entombed in a salt mine and naturally mummified.
  - The Dürnberg mine in the Austrian Alps is one of the oldest salt mines in the world, with more than 40 mi (65 km) of tunnels excavated for more than 7,000 years.
  - Inside the mine, in 1573, a mummified Celtic salt miner was discovered with his tools, wearing a red plaid woolen jacket, leather shoes, and a conical felt hat.
  - Once out of the salt, the mummy disintegrated, so written records of the find are all that is left.
- The Chehrabad salt mine in northern Iran was the site of another grisly discovery.
  - An Iron Age miner with a white beard and hair was found in 1993 during excavation. He was wearing a gold earring, leather boots and fabric shorts and was found in a 150-ft (45-m)-long collapsed tunnel.
  - Six mummies have been found since then; five are in museums in Iran, including a 16-year-old boy and a woman. The sixth was left in place in his salt mine tomb awaiting future recovery and forensic technologies.
  - Hair, flesh, bones and internal organs are intact in these mummies, along with ancient human and animal parasites discovered in nearby ancient soil deposits.
  - The miners suffered tragic deaths, including fractured skulls and broken backs, possibly related to earthquakes or mine failures. Three of the miners died around 400 BC, and two died between AD 224 and 651.



The head of Salt Man 1 excavated in 1993 from the Douzlakh salt at Chehrabad salt mine in Iran. This Iron Age miner died about 2,400 years ago and is displayed at the National Museum of Iran in Tehran.

Left Credit: Aali et al. (2012); Kurlansky (2002); Pollard et al. (2008) (Sail Surf ROAM/Facebook)

Right Credit: Hugues Desponts [Public domain]