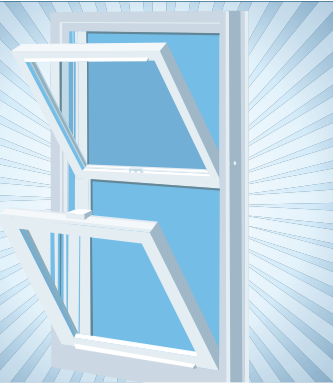


# Opening the Windows of Curiosity

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## How food spoils

Whether it is plant or animal, all foods will eventually spoil if they are not somehow preserved. Some foods, like nuts and grains, can be stored for months before they go bad. Others, like milk or meat, are only good for a day or two (if not preserved) before they spoil.

**Pests and microorganisms** are the two main reasons that food spoils. Insects and rodents can damage or ruin crops by eating them and also by spreading diseases. **Bacteria, molds and yeasts** are examples of microorganisms that can spoil food. When microorganisms multiply and grow in food, they can cause the flavor and smell of the food to change.

When bacteria multiplies, it produces acids, gases and other chemicals that can be poisonous. Molds are a kind of fungus that grow best on moist food in warm temperatures. Yeasts create alcohols and organic compounds called **esters** that can make food taste bad.

Food does not always taste or smell bad when it has spoiled. A bacteria called *Clostridium botulinum* can cause a sometimes fatal form of food poisoning called **botulism** without noticeably changing the flavor or odor of the food.

## Did you know?

Before refrigeration was invented, people used ice or snow to lengthen the storage time of perishable foods. Cold storage areas were built in basements or cellars, lined with straw and packed with ice. The ice was transported from mountains or harvested from local lakes or rivers.

In 1767, Lazzaro Spallanzani, an Italian naturalist, experimented with heating meat in sealed jars. He discovered that this process preserved food for several weeks.

The ancient Egyptians practiced large-scale food preservation. Giant silos were filled with grain and sealed. The grain could be kept for years without going bad.

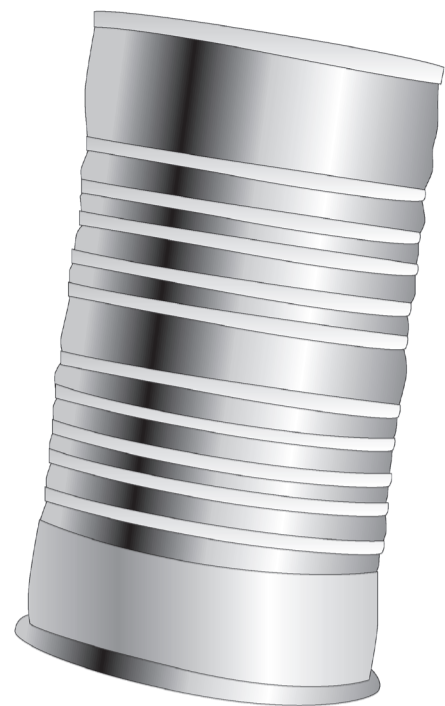
## WORLD OF WONDER

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# FOOD PRESERVATION

## When good food goes bad

Food preservation is the process of preventing the natural decay of food. Prehistoric people dried nuts, fruits and plants for later use. People who lived in the north took advantage of Mother Nature's winter refrigerator and stored food in protected shelters. Without food preservation, famine would happen more often, people would get sick from eating food that had gone bad and cities could not depend on food supplies from urban areas.



## Preservation methods

**Curing** is done by adding ingredients like salt, spices, sugar, sodium nitrate and sodium nitrite. It is one of the oldest methods of food preservation and is still used in the production of many cold meats, fish and some vegetables. Meats and fish can also be cured with **smoke**.

**Canning** is one of the most common methods of food preservation. Foods are sealed in airtight containers and heated to kill the microorganisms that cause spoilage. Canning works very well to preserve food, but the process tends to change the texture, color and sometimes the flavor of food.

**Cold storage or refrigeration** at or near 32°F (10C) keeps foods fresh by slowing the growth of microorganisms. Refrigeration allows food to keep its original flavor, color and nutrition.

**Freezing** prevents the growth of microorganisms and stops the breakdown of nutrients. Because many foods contain a lot of water, they freeze solidly at 32° to 25°F (0° to -4° C). Freezing preserves the nutrients of food better than any other preservation method.

**Drying** is another ancient form of food preservation. Heat is used to remove water from the food; microorganisms need moisture to grow. There are many ways to dry food: sun drying, tray drying, tunnel drying, pulse-combustion drying and drum drying.

**Freeze-drying** is a commercial process that removes water from food while it is still frozen.

**Additives** are chemicals which prevent food spoilage. There are hundreds of food additives, including natural preservatives.

**Irradiation** uses an ionizing radiation that produces electrically charged particles. This process kills bacteria and insects with little or no change to the food.

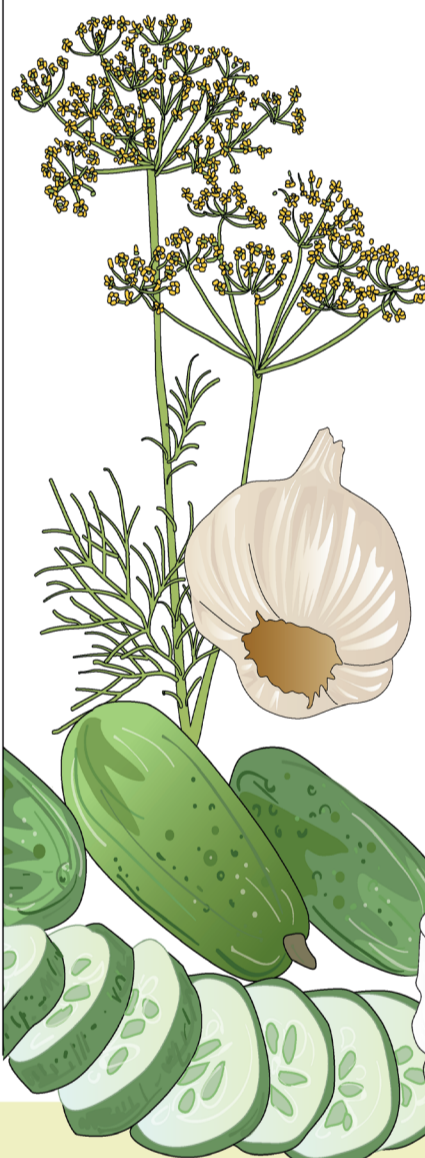
Food can also be **pasteurized**, **fermented** and **fumigated** to aid in preservation.

## Make fridge pickles at home

Fridge pickles are stored in the fridge and not canned for shelf storage. This easy recipe will make a small batch (one quart, or two pints) of pickles that will be ready to eat in just three days. Choose fresh cucumbers and vegetables.

### Ingredients

- Pickling cucumbers and/or other veggies like broccoli, cauliflower and carrots
- 1 cup apple cider vinegar or white vinegar
- 1 tablespoon Himalayan or pickling salt
- Garlic cloves, peeled (2 per jar)
- Fresh dill, large bunch
- 1/4 teaspoon crushed red pepper (optional)
- 1 teaspoon dill seed or mustard seed
- 1/2 teaspoon black peppercorns



## Step-by-step pickle instructions

**Step 1:** Wash and cut up your vegetables and pack them into a clean jar.

**Step 2:** Add spices, fresh or dried, directly to the jar. For a quart jar, use anywhere between 1/4 and 1/2 tsp of whole dried spices like peppercorns, fennel, cumin, coriander, dill and cloves.

**Step 3:** Combine 1 cup vinegar, 1 cup filtered water and 1 tbsp of non-iodized salt in a medium saucepan and bring to a boil. (Get an adult to help you if you are not used to using a stove.) (You can add 1 or 2 tbsp sugar if you like a sweet pickle, but the above is a standard tart pickle recipe — taste the brine to see if you like it.)

**Step 4:** Pour the boiled brine into the jar over the vegetables.

**Step 5:** Put a lid on the jar and place in the fridge for three days. Two weeks is better, and three weeks is best.

**Step 6:** Serve and eat! Yummy!

SOURCES: World Book Encyclopedia, World Book Inc.; <https://en.wikipedia.org>; <https://www.britannica.com>; United States Department of Agriculture; <https://nchfp.uga.edu> <https://extension.illinois.edu/food-preservation>; <https://cceclinton.org>

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