



The Spoilers

Molds, yeasts, and bacteria are found everywhere—in the air and soil, on people and animals, on surfaces—proper food preservation methods must be used to prevent them from causing food spoilage.

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Andy Hirneisen, Penn State University

The principle causes of spoilage in home-preserved foods are microorganisms and enzymes. The effects of these microorganisms and enzymes can range from soft, slimy textures and unpleasant odors to food poisoning that can be deadly.

Molds

- can be recognized by their fuzzy masses that can be nearly any color. They need air and moisture, but not much, to

grow. They thrive in the acid conditions provided by food. Molds can easily be destroyed by the high temperatures used in processing canned foods either in the boiling water bath or pressure canner. Some molds produce mycotoxins which are harmful to eat. Mycotoxins are not visible as are the molds. This is why it is important to process all canned foods including pickles, jams, and jellies.

Yeasts

- usually appear in or on food as slimy masses, scum, or murkiness. Yeasts may cause foods to ferment and can be recognized by gas bubbles, froth, or foam. Yeasts are easily destroyed at temperatures between 140°F and 180°F.

Bacteria

- can be beneficial or dangerous in food preservation.

- Certain strains of bacteria start the fermentation process in making sauerkraut. Others can be extremely dangerous as in botulism poisoning.
- Each type of bacteria differs as to the temperature and environment in which it thrives. Some need oxygen to grow while others thrive in the lack of oxygen in a sealed jar.
- Most bacteria grow on low acid foods including vegetables and meats. While most bacteria are destroyed by heat, others form spores that can only be killed by a temperature higher than the boiling point of water. Because *Clostridium botulinum* bacteria grows in low acid vegetables and meats, they must be processed in a pressure canner where the temperature can reach at least 240°F.
- Bacteria can multiply rapidly with millions growing on a gram of food in just a few hours. At this concentration, they can spoil food or cause a foodborne illness quickly.
- Freezing food slows the growth of most bacteria. Care must be taken to prevent the growth of bacteria in food before it is frozen and after it is thawed.

Enzymes

- are naturally occurring substances in foods that promote the normal ripening process. If enzymes continue to work after the fruit or vegetable reaches its ideal maturity, they will cause undesirable changes in color, texture, flavor, and nutrition. Flavor changes caused by enzymes are sometimes described as hay-like, bitter, oxidized, or old. Enzymes can be inactivated by heating foods to 170°F to 190°F. Processing foods when canning or blanching vegetables for freezing stops enzyme reactions. Adding ascorbic or citric acid to fruits for freezing slows enzyme activity.

***Never taste food you suspect of being spoiled. If in doubt, throw it out!**