

Canning Vegetables to Prevent Botulism

What is Botulism? Botulism is a food poisoning caused by a toxin produced by the bacteria, *Clostridium botulinum*. *C. botulinum* and its spores are everywhere. It is prevalent in soil and water worldwide. The spores themselves are harmless; however, the heat-resistant spores survive cooking and boiling water bath canning processes. At temperatures between 40°F and 120°F, in an oxygen-free, low-acid environment, the spores convert to growing cells. As the cells grow, they produce a potent nerve toxin that can lead to extreme illness and even death.

C. botulinum can easily grow in low-acid canned foods that have not been prepared with proper canning procedures. During the canning process, oxygen is removed from containers. If proper temperatures to destroy the spores are not reached, they have a suitable environment to convert into growing cells and produce the deadly toxin. Scientifically proven pressure canning processes are designed to destroy *C. botulinum* spores.

To Prevent Botulism from Home-Canned Low Acid Foods:

- In home-canning vegetables, make sure you use proper equipment, proper containers and up-to-date procedures.
- Have your pressure gauge tested annually; make sure all parts of your canner (including vent holes, gaskets and pressure plugs) are clean, free from plugs and working properly.
- Can low-acid foods in a pressure canner. To be considered a pressure canner for USDA processes, the canner must be big enough to hold at least 4 vertical, quart-size jars with lids. Do not can low-acid foods in the oven or in a water-bath, open kettle or vegetable cooker.
- Can low-acid foods for the recommended time for the type of food and the size jar you are using.
- Follow a reliable recipe for canning. Do not use a recipe from your mother, your grandmother, your friend, your neighbor or the internet unless you are certain that it originally came from a reliable source and is unchanged. Some reliable sources include the HGIC, NCHFP, USDA, Cooperative Extension, So Easy to Preserve, and freshpreserving.com.
- Don't can products for which there is no recommended process. There is no approved process for canning pumpkin puree, pumpkin butter, sweet potato puree or yellow summer squash
- Vent your pressure canner for at least 10 minutes. Without proper venting, up to 30% of the sterilizing value may be lost from a 20-minute canning process (at 10 pounds pressure).
- Monitor your canner during the heat process. If pressure drops below the target any time during the process time, bring the canner back up to pressure and start timing the process over, from the beginning.
- Make appropriate altitude adjustments. As altitude increases, temperatures decrease at a given pressure. So as altitude increases, increase pressure. Directions for canning foods are usually for an altitude of 0 to 1000 feet. If you are canning at an altitude over 1000 feet, check for the altitude adjustments needed for canning for each food.
- Don't force-cool your pressure canner. Heating and cooling times are calculated into the process for killing *C. botulinum* spores.
- Before eating suspicious home-canned low-acid foods, heat to a rolling boil, then cover and boil corn, spinach and meats for 20 minutes and all other home-canned low-acid food for 10 minutes before tasting. Boiling will destroy any toxin present. Better yet, when in doubt, throw it out.
- Discard all raw or canned food that shows any sign of being spoiled.
- Discard all bulging or swollen cans of food and food from glass jars with bulging lids.
- Do not taste food from swollen containers or food that is foamy or has a bad odor.

More about Foodborne Botulism: Foodborne botulism produces symptoms that affect the nervous system; the toxin bonds to nerve endings. Symptoms include blurred or double vision, general weakness, poor reflexes, difficulty swallowing and may result in death. If untreated, botulism may result in death due to respiratory failure. Hospital care is necessary. Patients are treated with antitoxin to prevent further bonding of the toxin to the nerve endings. Recovery is slow and occurs only when the affected individual grows new nerve endings. Until that time, the patient is maintained so that they do not suffer from respiratory paralysis. In the past 50 years the percentage of patients who die from botulism has decreased from ~50% to 8%. A patient with severe botulism may require a breathing machine and intensive medical and nursing care for several months. Patients who survive botulism poisoning may have fatigue and shortness of breath for years. Long-term therapy may be needed to aid recovery. The good news is that, by using the right procedures, recipes, and equipment, botulism from home canned foods can be prevented.

Sources:

- [**HGIC 3680 Botulism**](#)
- [**HGIC 3030 Canning Foods - the pH Factor**](#)
- [**HGIC 3001 Finding Reliable Recipes for Safe Food Preservation**](#)
- [**HGIC 3025 Choosing the Right Canner for Home Canning**](#)
- [**HGIC 3040 Canning Foods at Home**](#)