



Use Tested Recipes to Preserve Foods

All reliable recommendations for canning include process directions that have been determined or based upon laboratory testing.

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Thermocouple for testing temperature inside jar: National Center for Home Food Preservation

Exact time and temperature combinations of tested canning processes are needed to assure the destruction of microorganisms that may be present in filled jars. Variables that determine the amount of heating needed to kill bacteria, molds, and yeasts include the consistency of the food, its acidity, and the presence of nutrients that support bacteria growth such as proteins and sugars. Other influences on the amount of heat delivered to the food in the jars are: size and shape of the jar; size, shape and texture of food pieces; solid to liquid ratio; temperature of the food when it goes into the jar; and temperature

inside the canner. The transfer of heat through liquid will be much faster than through pureed or mashed food.

Determining Process Times

The processing time for a food is determined experimentally through two-step heat penetration testing.

1. Temperature measuring devices called thermocouples are inserted through the lid into the food inside the jar. The thermocouples are connected by wires to a monitor, which records the temperature at the ends of the wires. Temperatures are recorded throughout the heating process of the jars; this allows for identification of the “cold spot” or slowest heating location in the jar.
2. Once the cold spot is located, additional data is collected in order to calculate the process time for the food being tested. This takes into account specific conditions such as a particular jar size in a particular type of canner. The process time is the time needed to achieve a certain level of “lethality”, or killing of a number of target pathogens or spoilage organisms for that particular food.

The processing time in low acid foods needs to ensure that the minimum temperature and time combination to destroy spores of *Clostridium botulinum* is reached so that the food will be safe when stored on the shelf. In acid foods, the target microorganisms are primarily those that spoil food such as yeast, molds and spoilage bacteria.

There is no easy formula to determine processing times. Experimentation and analysis that takes into account how each food product heats in a particular canning situation, as well as any variation that changes the pH, consistency, texture, distribution of solids and liquids, or other factors that result in a “new product” must be tested. Experimentally determining safe processing times for home canned foods is a lengthy, expensive and time-consuming process. This is why there are fewer approved recipes available than people would like.

Preserving Favorite Recipes

If you desire to preserve one of your own recipes that does not have a matching canning process, choose the closest approved procedures for canning and follow these instead. After canning, when you are ready to consume or reheat the food,

you can add your special ingredients to adjust the recipe to your taste. Another alternative is to make up and freeze your recipe with all the ingredients you like.

Likewise, there are products available commercially that are not suitable for home canning. The commercial food manufacturing industry tests their products for safety; they do not have a blanket processing method or formula for adjustments without collecting heat penetration data. Just because a canned food is made commercially and found on a store shelf does not mean a home canning process is available for the same or similar item. **Home preparation methods and canning procedures differ from commercial processes.**

More information on research testing of recipes is available in the report [“Backgrounder: Heat Processing of Home-canned Foods”](#) by Elaine M. D’Sa and Elizabeth L. Andress