



Colorado State University Extension

Play it Safe!

Safe Changes and Substitutions to Tested Canning Recipes

Karen Blakeslee, Kansas State University
Julie Garden-Robinson, North Dakota State University
Barbara Ingham, University of Wisconsin-Madison
Marlene Geiger, Iowa State University

The safety of the food that you preserve for your family and friends is important. You can make some changes and substitutions to research-tested recipes while still protecting your family by following a few simple rules.

Understanding the Risk

The safety of home-canned foods depends on the pH, or acidity, of the product and the heat process that is used. Before any changes are made to a tested recipe, it is important to understand the impact the change will have on either the pH or the processing time and temperature.

Acid foods, such as many fruits and pickled products, have a pH of 4.6 or below and may be safely canned in a boiling water bath or an atmospheric steam canner* at roughly 212 F. The acid in the recipe will prevent the germination of spores of *Clostridium botulinum*. When canning low acid foods (those with a pH above 4.6), high temperature is needed to destroy the spores of *Clostridium botulinum*. The process temperature when canning low-acid foods ranges between 240 F and 250 F for sufficient time to destroy botulinum spores.

Some factors that impact the processing time and temperature when canning include:

- **Density or thickness of the food.** Many ingredients such as sugar, salt or starch, or even the type of ingredients (starchy lima beans versus non-starchy green beans) may impact the viscosity (thickness) of a food and alter the rate of heat penetration.
- **Size, shape and temperature of food pieces.** It takes longer for acid to penetrate into a whole cucumber versus a cucumber slice. Heat penetration is different in a jar of raw-pack versus hot-packed meat.
- **Size and shape of jars or containers.** Both the size and the shape of the jar impact the rate of heat penetration into the container. **Do not** use a jar size larger than what is recommended in recipes. **You may** use a smaller size. For example, you **may** use a 12-ounce jar in place of a pint (16-ounce) jar and use pint processing recommendations.

*Steam Can It Right! Guidelines for Safely Using a Steam Canner for Home Food Preservation. North Central Food Safety Extension Network (NCFSEN). https://www.ncrfsma.org/files/page/files/fn2065_steam_can_it_right_fillable.pdf

NDSU

EXTENSION



Safe Changes or Substitutions that May be Made to Tested Canning Recipes

Fruit and Fruit Sauces

Sugar added to canned fruits helps preserve color and firm texture, and adds flavor.

You may:

- **Replace one-half of the sugar with honey.**
- **Reduce or eliminate sugar in home canned fruits and sauces.** Fruit canned in water lacks taste and may rapidly lose color and texture; water-canned fruit will spoil more quickly once opened.
- **Replace a sugar syrup with a light fruit juice such as white grape juice or apple juice.**

Important note: There are no tested recipes available for safely canning elderberries, or white-fleshed peaches and nectarines at home.

There are no tested recipes for using Sucralose, Stevia or other sugar substitutes in home canning, as they do not provide the preservative properties of sugar and may cause flavor changes. Add after jar is opened.

Jams and Jellies

Jams and jellies are processed in a boiling water or steam canner. Follow a tested recipe for the form (liquid, powdered) and type (regular, low-sugar, no-sugar) of pectin that is recommended.

You may:

- **Add** a small amount (1 teaspoon or less) of herb or other flavoring to a fruit jam or jelly recipe, for example, when making basil strawberry jam or vanilla cherry jelly.
- **Substitute** peaches for nectarines, or apples for pears, and vice versa with the same tasty result.
- **Use unsweetened**, frozen and thawed fruit or canned fruit in place of fresh in jam or jelly recipes. Do not use pre-sweetened fruit. For best results, measure frozen fruit before thawing. Canned fruit should be drained before measuring.
- **Use honey** in making jams or jellies. In a product made with pectin, replace up to 1 cup sugar with 1 cup honey for every 6-pint recipe; be sure to adjust the amount of liquid in the recipe. In recipes with **no added pectin**, honey can replace up to half of the sugar; decrease the amount of liquid by the amount of honey added.
- **Use regular pectin purchased in bulk.** Use 6 tablespoons bulk regular powdered pectin for every individual box of pectin.

Kitchen tip: Avoid the temptation to double jam and jelly recipes – unless you like syrup! Heating times and temperatures may vary from the original if recipes are doubled. You **may** can jam and jelly in pint jars when specified in the recipe. See nchfp.uga.edu for more information.

Important note: There are no tested recipes available for safely canning elderberries, or white-fleshed peaches and nectarines at home.



Meat

Meat is low in acid and must be canned in a pressure canner.

You may:

Add one of the following without changing the processing time:

- 1 teaspoon per pint or 2 teaspoons per quart of dried seasoning, onion, or garlic.
- 1 tablespoon per pint or 2 tablespoons per quart of fresh seasoning, onion, or garlic.

For safety, you may not:

- **Add meat to a recipe** unless the recipe allows this addition. For example, do not add meat to spaghetti sauce unless a tested recipe allows for this ingredient.
- **Add thickeners** such as flour, cornstarch, rice, pasta or barley to canned meat products.
- **Add fat** to canned meat products.

Kitchen tip: Add meat to sauces or thicken soups and stews when foods are prepared for the table.

Safe Changes or Substitutions that May be Made to Tested Canning Recipes (continued)

Pickles and Relishes

Pickles and relishes may be safely processed in a boiling water or steam canner.

You may:

- **Reduce sugar or salt** in tested quick-process pickle recipes. You may **not change** the amount and type of salt for fermented vegetables such as sauerkraut or genuine dill (crock) pickles.
- **Substitute cider vinegar** (5% acetic acid) for distilled white vinegar (5% acetic acid), and vice versa. Do not use other types of vinegar in pickling unless allowed in a tested recipe.
- **Add a clove of garlic or a small dried hot pepper** to each jar in any tested pickle recipe without impacting the processing time.
- **Substitute zucchini or summer squash** for cucumber in any approved relish recipe. You may substitute English or grocery store cucumbers for pickling cucumbers, but the quality of the product may be inferior.
- **Add calcium chloride** for crispness. Do not use pickling lime unless allowed in the tested recipe.

Kitchen tip: The high salt necessary for fermentation when making sauerkraut is easily removed by rinsing prior to serving. Research has shown that a quick rinse with water in a colander reduces the sodium in sauerkraut by 30% to 40%.

See **Pickle Recipes for Special Diets** https://nchfp.uga.edu/how/diet_pick.html for tested no-sugar and reduced-sodium pickle recipes.

Kitchen tip: Try refrigerating a favorite pickle recipe that isn't safe for canning. Store in the refrigerator for up to two weeks.

Salsa

Salsa is a mixture of high-acid ingredients such as fruit or tomatoes and low-acid ingredients such as peppers and onions. **There are no approved recipes for canning salsa in jars larger than a pint.**

You may:

- **Substitute sweet peppers** for hot peppers, and vice versa, measure for measure when preparing home-canned salsa using a tested recipe. The same is true for onions, as red, white and yellow onions are interchangeable, measure for measure.
- **Reduce or eliminate** the sugar or salt in any tested salsa recipe.
- **Reduce** the amount of low-acid ingredients such as onion, celery or green peppers.
- **Substitute tomatillos** for tomatoes as long as the total amount remains the same.
- **Use any tomato variety or color.**

For safety, you may not:

- **Thicken salsa before canning.**
- **Add ingredients** such as corn or black beans to any salsa recipe, or substitute corn or black beans for other ingredients such as peppers or onions.
- **Reduce the type or amount of acid**, such as lime juice or vinegar, in a tested recipe. If it tastes too tart, add a bit of sugar.
- **Increase the amount** of dried or fresh herbs, garlic or spices in a tested salsa recipe.
- **Reduce the amount** of tomatoes.



Kitchen tip: Refrigerate or freeze a salsa recipe that cannot be safely canned. Store in the refrigerator for up to two weeks. If salsa from a tested recipe is thinner than you prefer, strain the salsa before serving or using as an ingredient.

Safe Changes or Substitutions that May be Made to Tested Canning Recipes (continued)

Tomatoes

Tomatoes are the most popular home-canned item. Many tested recipes allow you to choose either pressure canning or boiling water or steam canning for tomatoes.

Acid must be added to tomato products: Add ¼ teaspoon **citric acid** or 1 tablespoon **bottled lemon juice** to each pint of home-canned tomatoes. Add ½ teaspoon citric acid or 2 tablespoons bottled lemon juice per quart. Acid must be added for all varieties and all colors of tomatoes, regardless of whether you are canning in boiling water, a steam canner or pressure processing.

You may:

- **Add a small amount of sugar** to offset any perceived flavor change in tomato products with added lemon juice. The addition of citric acid does not generally alter the flavor of tomatoes.
- **Safely reduce or eliminate salt or sugar** in tested home-canned tomato recipes.

For safety, you may not:

- **Add low-acid ingredients** such as peppers, onions or celery to home-canned tomato products unless specifically allowed in a tested recipe.
- **Thicken** tomato products with flour or cornstarch to create a condensed soup. Thickening a tomato product will make it unsafe for canning. If desired, strain home-canned tomatoes before adding to soups or stews; thicken canned tomatoes when foods are prepared for the table.

Kitchen tip: When processing pints and quarts of tomatoes together, process at the time given for quarts.

Vegetables

Vegetables are low in acid and must be canned in a pressure canner.

You may:

- **Create vegetable mixtures** as long as there is a tested recipe for each vegetable that you are combining in the mixture **and** you follow the processing time for the vegetable that has the longest time listed.
- **Add a small amount of garlic** (up to 1 clove per jar) to canned vegetables without impacting the processing time.

For safety, you may not:

- **Thicken** canned vegetables or soups with flour or cornstarch, or add rice, pasta or other starchy ingredient. If you thicken vegetables, an unsafe product will result.

Kitchen tip: For best results, avoid canning vegetable mixtures. Invariably, vegetables with a shorter process time will be over-processed when the mixture is canned. Instead, try freezing the bounty of your garden. Tested recipes are available to ensure high-quality frozen garden produce.



iStock.com

References:

Modifying Canning Recipes. South Dakota State University Extension. (2021) <https://extension.sdstate.edu/modifying-canning-recipes>

What Can you Change in a Canning Recipe? (2019) Penn State University Extension.

<https://extension.psu.edu/what-can-you-change-in-a-canning-recipe>

Safe Substitutions. University of Wisconsin-Madison. (2020).

Funding for this project was made possible by the U.S. Department of Agriculture's Agricultural Marketing Service through grant 21SCBPND1069. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.

Information in this publication is provided purely for educational purposes. No responsibility is assumed for any problems associated with the use of products or services mentioned. No endorsement of products or companies is intended, nor is criticism of unnamed products or companies implied.