

FOOD PRESERVATION FOR SPECIAL DIETS

ADJUSTING SUGAR AND SODIUM WHEN PRESERVING AT HOME



Home food preservation can be an excellent option for people who want to reduce the amount of sugar or sodium in their diets. At harvest, foods are naturally low in sodium and added sugars (Figure 1). When fresh foods are processed commercially, both sugar and sodium are added because they function as preservatives (Figure 2). By processing fresh foods at home, you can modify the amounts of sugar and sodium, giving you the chance to prepare foods that interest you and meet your personal dietary goals.

This publication provides a synopsis of the changes you can safely make to the sugar and sodium content when preserving foods at home (Figure 3). It also describes the few instances where these ingredients cannot be altered because they are essential to the outcome or the safety of the product.

Recipe Modification: Thinking it Through

Anytime you modify or eliminate an ingredient, the final product will be different than what the originator of the recipe intended. Depending on the role of the ingredient in the food, you can expect changes in the flavor, color, or texture of the final product. The more drastic the alteration of ingredients, the more different the final product will be from the original recipe version. Sometimes, reducing the amount of an ingredient, rather than eliminating it from a recipe completely, will produce a more acceptable product.

Keeping this in mind, you can either (1) reduce the amount of an ingredient, (2) eliminate the ingredient, or (3) substitute with an alternative ingredient.

Taste and personal preference are involved in all food choices. Approaching modifications using baby steps is a good idea. Try preparing a single batch of a modified recipe, and let your family and friends do a taste test. Make notes of any alterations so that

you can refer to them the next time you prepare the recipe. You may have to make the recipe a few times before you get the results you want. Find the combination that works best for you.



Figure 1. Fresh foods are naturally low in sugar and sodium. Photo credit: iStock photo ID: 187679009.



Figure 2. Commercial processing methods increase the sugar and sodium content of fresh foods. Photo credit: Bigstock: 368155798.



Figure 3. It is safe to alter sugar and sodium content in most home-canned foods. Photo credit: iStock photo ID: 000055674980.

When making a recipe adjustment, you might find there is no acceptable replacement for the original version of a recipe. In this case, your best option might be to adjust how much of the food you eat, or how often you eat it. This option might be more satisfying than attempting to alter a favorite recipe.

Some food preservation recipes have been developed with special diets in mind. For example, the [USDA Complete Guide to Home Canning](#) (2015) offers some pickling recipes that are low sodium and no added sugar. Major canning companies offer a wide variety of options for reduced and no sugar fruit spreads.

Sugar in Home Food Preservation

Recipes for home food preservation use sugar to enhance the flavor, color, and texture of foods or to keep fruit spreads from spoiling. White table sugar is the most common form of sugar used in home food preservation. However, some recipes call for brown sugar, honey, or corn syrup, which are also considered sugars.

All fresh fruits can be dried, frozen, or canned without the addition of sugar. However, there will be some noticeable changes in the fruit. One of the most obvious is texture. Sugar helps fruit hold its shape. The sugar diffuses into the fruit tissue, keeping it firmer. Removal of sugar will result in a softer textured fruit, especially after canning or freezing. Because sugar helps preserve the natural color of fruits, there may be some darkening with storage, especially of light-colored fruits. From the standpoint of flavor, the fruit will be less sweet, but that is not necessarily negative as this allows more of the natural fruit flavor to come through. All of the changes described above are quality changes, the safety of the final product is not impacted by any of these factors.

Canning Fruits

Processing fruits in a boiling water canner requires a cover liquid, which is the liquid that surrounds the fruit pieces in the jar (Figure 4). While the liquid is essential, the sugar is not a necessary ingredient in the liquid. It is perfectly safe to can fruits without the addition of sugar. Cover liquids can be plain water or unsweetened fruit juices. When using fruit juices, select those with a flavor and color to complement the fruit you are canning. Juices to consider are apple, white grape, pineapple, and orange juice. Juices can be diluted to the sweetness you desire. Juice made from the fruit being canned is also an option. Juices for the cover liquid can be fresh, frozen, or canned. Removal of sugar from the cover liquid does not alter the processing time.

For light-colored fruits, the addition of an anti-darkening agent will help preserve the natural color. Using the hot-pack method will also enhance color retention of fruits canned without sugar (Figure 5). To use the hot-pack method on fruit, preheat prepared food to boiling, then simmer two to five minutes, or as directed in the instructions. Promptly fill into hot canning jars and process immediately.

Another option for lowering sugar content is to use a lighter weight sugar syrup as the cover liquid. Table 1 provides measurements for preparing syrups ranging from very-light to heavy. Other sweeteners, such as light corn syrup or mild-flavored honey, are also acceptable.



Figure 4. Processing fruits requires a cover liquid, but sugar is not a necessary ingredient in the cover liquid. Photo credit: Colorado State University (CSU) image library.

Table 1. Preparing sugar syrups for canning.

Measures of Water and Sugar						
		For 9-Pint Jars*		For 7-Quart Jars		
Syrup Type (Weight)	Approx % Sugar	Cups Water	Cups Sugar	Cups Water	Cups Sugar	Fruits Commonly Packed in Syrup
Very Light	10	6 ½	¾	10 ½	1 ¼	Approximates natural sugar level in most fruits.
Light	20	5 ¾	1 ½	9	2 ¼	Use this syrup for very sweet fruit.
Medium	30	5 ¼	2 ¼	8 ¼	3 ¾	Sweet apples, cherries, berries, grapes.
Heavy	40	5	3 ¼	7 ¾	5 ¼	Tart apples, apricots, sour cherries, gooseberries, nectarines, peaches, pears, plums.
Very Heavy	50	4 ¼	4 ¼	6 ½	6 ¾	Use this syrup for very sour fruit.

*This amount will also fill four one-quart jars.

Nonnutritive Sweeteners

Sucralose is a heat-stable artificial sweetener that can be used to prepare the cover liquid for canning fruit; brand names include Splenda, SucraPlus, and many others. When canning with a heat-stable artificial sweetener, consult the manufacturer's recommendation for the proper amount to use. Other artificial sweeteners should be added after opening the jar and before serving. Bitterness and off-flavors may develop when saccharin-based sweeteners are used in canning. The sweetness of aspartame decreases when heated and continues to deteriorate over time. Note that sugar substitutes impact flavor only, where sugar impacts flavor, color, and texture. Before canning, cook a few pieces of fruit in the canning liquid. Cool and taste. This will give you an idea of how your canned fruit will taste.

Recipe Modification in Action

Let's review the options for altering the sugar content of home-canned foods. You can (1) reduce the amount of the ingredient, (2) eliminate the ingredient, or (3) substitute with an alternative ingredient.

When canning pears, to reduce the amount of sugar, choose a light or very light sugar syrup for the cover liquid. There is still some sugar, but considerably less than the heavy or very heavy syrup option. To eliminate it altogether, can the pears in plain water. To substitute with an alternative ingredient, consider canning pears in a fruit juice, such as white grape juice.



Figure 5. To use the hot-pack method on fruit, heat prepared fruit to boiling, then simmer two to five minutes (left photo), or as directed in the instructions. Promptly pack into hot canning jars and process immediately (right photo). Photo credits: CSU image library.

Drying Fruits

Dried fruits do not normally have sugar added (Figure 6). Simply prepare as described in your owner’s manual, and dry on dehydrator trays until leathery and pliable. Cool, package, label, and store in a dark, dry location.

Freezing Fruits

Sugar is not a necessary ingredient when freezing fruits. As a result, there are several options for reducing the amount of sugar. Fruits can be frozen with or without the addition of sugar, or with whatever level of sugar you would like to add. Some fruits hold up better when frozen in sugar syrups. The syrups used for freezing fruits are prepared the same as syrups for canning (Table 1). Alternative cover liquids can also be used and include unsweetened fruit juice or water. Select fruit juices with a flavor and color that will complement the fruit. Expect fruits frozen without sugar to be softer in texture and have more liquid separation when thawed. Serve frozen fruits with a few ice crystals to compensate for the softened texture.

Nonnutritive sweeteners (e.g., saccharin, aspartame, sucralose, Splenda) can be used in place of sugar when freezing fruits. Consult product label for information on how much to use. Artificial sweeteners have a sweet flavor but do not furnish the other beneficial effects of sugar, including firmness, thickness of syrup, and color protection (Figure 7). Consider using an anti-darkening agent for light-colored fruits. Using fruits while still slightly frozen will help offset the change in texture.

A dry, unsweetened pack is good for small fruits, such as berries. Freeze small, whole fruits individually on a cookie sheet, then pack into containers, label, and seal (Figure 8).



Figure 6. Dried fruits do not normally have sugar added. Photo credit: CSU image library.



Figure 7. Peaches frozen without sugar (left) and with sugar (right). Photo credit: National Center for Home Food Preservation image library.

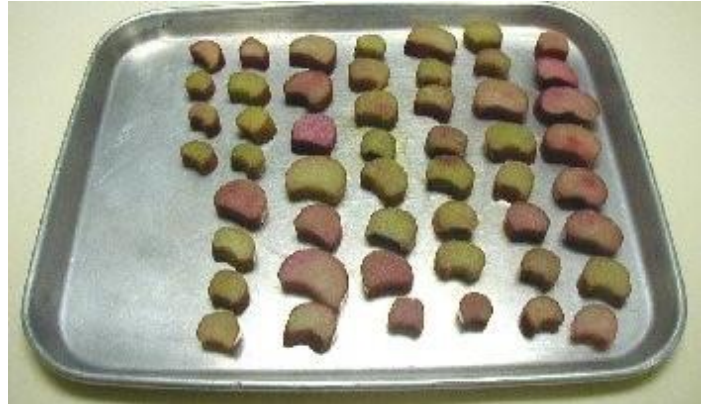


Figure 8. Fruits can be frozen on trays without sugar (top photo), then packed into containers (bottom photo). Photo credit: National Center for Home Food Preservation image library.

Fruit Spreads

When preparing jams and jellies using a traditional recipe or conventional pectin, the addition of sugar is critical to the success of the product. If you decrease the sugar, the product will not gel, and you will end up with a runny product. On the plus side, it is perfectly safe and can still be used as a fruit syrup. Because of the high sugar content of fruit spreads, consumers have expressed interest in products and recipes that produce good-tasting fruit spreads with reduced or no sugar (Figure 9).



Figure 9. Options exist for making good-tasting jams and jellies with low or no sugar. Photo credit: Bigstock: 401635931.

Low and No Sugar Fruit Spreads

There are a variety of products available in the marketplace that allow you to prepare fruit spreads with low or no sugar. Modified pectins gel with lower sugar concentrations, or, in some instances, with no sugar (Figure 10). These products allow for flexibility in the amount and type of sweeteners you use for preparation, even allowing for use of sugar substitutes. You will find modified pectin next to the traditional pectin in the grocery store. Look for “low or no sugar” on the package. Follow manufacturer’s instructions for preparation and processing low and no sugar fruit spreads.

Nonnutritive sweeteners

Artificial sweeteners (i.e., sugar substitutes) are acceptable when using a low- or no-sugar pectin. Follow manufacturer’s suggestions for amounts that will result in the best-quality product. Artificial sweeteners cannot be substituted for sugar in a fruit spread made with a traditional pectin recipe because the sugar is necessary for the formation of the gel.

In cooked jams or jellies, use a heat-stable sweetener, such as sucralose (e.g., Splenda) or stevia. A saccharin-based sweetener may create a bitter taste in a product that is heated. Do not use aspartame for a cooked product because it loses its sweetness when heated and sweetness will continue to dissipate with storage.



Figure 10. Modified pectin will gel at low-sugar concentrations or without sugar added. Look for “no sugar needed” on package label. Photo credit: Lizann Powers-Hammond, WSU Extension.



Figure 11. Low-sugar fruit spreads are more susceptible to spoilage once they are opened because there is less sugar to inhibit the growth of spoilage microorganisms. Photo credit: Bigstock: 344429680.

Storage of Reduced Sugar Spreads

Low-sugar fruit spreads are more susceptible to spoilage once they are opened because there is less sugar to inhibit the growth of spoilage microorganisms (Figure 11). Fruit spreads made with reduced sugar should be stored in the refrigerator and eaten within three to four weeks. Discard if any signs of mold growth appear.

Sodium in Home Food Preservation

For people who want to reduce their sodium intake, a few adjustments when preserving foods at home can help meet that dietary goal. With home food preservation, sodium is most often added as salt. In a few instances, some recipes for specialty products call for the addition of bouillon, or commercially canned tomato products, which contribute to the sodium content of the final product.

The words “salt” and “sodium” are often used interchangeably, but they do not mean the same thing. “Salt” is the term commonly used for sodium chloride (NaCl), which is table salt. Sodium chloride is just 40% sodium and 60% chloride by weight. One teaspoon of table salt contains 2,325 mg of sodium.

Canning Vegetables

When canning vegetables, meat, poultry, or seafood, salt is added for flavor only. This includes tomatoes and tomato products, including salsa. Salt is not necessary for the safety of any of these products. To reduce sodium when canning low-acid foods, follow recommended canning procedures and processing times, but simply omit the salt or add a reduced amount to the canning jar (Figure 12). If you use salt substitutes, add them to the food after opening the jar, just before serving. Dried herbs and spices can be added to a jar before canning. Do not add fresh herbs or spices.

Freezing and Drying Vegetables

Vegetables for freezing and drying do not normally have salt added (Figure 13). To freeze, prepare as normal: blanch, cool, package, label, and freeze. For drying, blanch and place on dehydrator trays, drying until all moisture has been removed. Cool, package, label, and store in a dark, dry location.

Recipe Modification in Action

Let’s review the options for altering the sodium content of home-canned foods. You can either (1) reduce the amount of sodium, (2) eliminate it from the recipe, or (3) substitute it with an alternative.

Canning instructions call for the addition of one teaspoon of salt per quart jar of vegetables. With the goal of preserving green beans and limiting the amount of sodium, you can alter how much salt is added. To reduce the amount, cut the measurement of salt in half. There is still some sodium, but less than called for in the original recipe. To eliminate sodium, simply can the beans in plain water. To substitute with an alternative ingredient, add dried herbs or spices for seasoning.



Figure 12. Salt can be reduced or eliminated when canning vegetables or tomatoes at home. Photo credit: CSU image library.



Figure 13. Frozen vegetables do not normally have salt added. Photo credit: CSU image collection.

Pickling Vegetables

Adjustment of salt in pickles depends on the type of pickle being prepared. The salt content of a fresh-pack pickle can be adjusted provided certain conditions are met (Figure 14). However, the amount of salt called for in fermented (brined) pickles and sauerkraut cannot be adjusted. The level of salt in those products is critical to the safety of the product.

Adjustments to Fresh-pack Pickles

Fresh-pack pickles are prepared by covering a vegetable with a brine made of vinegar, seasonings, and spices. For fresh-pack recipes, in order to safely reduce the salt, it must meet the following criteria:

- The brine has a minimum 1:1 ratio of vinegar to water. More vinegar than water is acceptable, but not less.
- The vinegar is at least 5% acidity.

When these conditions are met, salt is not essential for the safety of the final product.



Figure 14. The salt content of a fresh-pack pickle can be adjusted, provided certain conditions are met. Photo credit: Shutterstock: 598295921.

Short-brining

Some fresh-pack pickle instructions call for a presoak step. If the recipe instructions call for salt to be used in a presoak or for pretreatment of the cucumbers or other vegetables (called short-brining), this salt level cannot be altered (Figure 15). This step is critical for an acceptable texture of the final product.



Figure 15. If the instructions call for short-brining, the salt level of the brine cannot be altered. Photo credit: Bigstock: 224020561.

Spices for Low Salt Pickles

The flavor of low salt or salt-free pickles will be more acceptable if other seasonings are increased to compensate for the reduction in salt (Figure 16). Dried spices can be safely added to any fresh-pack pickle recipe to improve flavor. Peppery-hot, sweet, and sweet-sour pickles are good flavors for salt-free pickles.

Salt Substitutes

Salt substitutes can be used in quick pickle recipes when they meet the criteria listed above. However, salt substitutes sometimes develop a bitter taste in a canned food. Also, salt substitutes are often a mixture of sodium and potassium chloride, presenting taste properties that differ slightly from pure sodium chloride, so pickles may not have a fully traditional taste and may not be as crisp.

Lite salt is a mixture of potassium chloride and sodium chloride that has been used successfully for making sweet and fresh-packed dill pickles. Lite salt does contain an anticaking agent that might make brine cloudy. Potassium chloride produces pickles that are crisp and crunchy but have a bitter or astringent taste. Some consumers find this potassium-related flavor more acceptable in sweet pickles than in dill pickles.



Figure 16. Salt can be omitted from a quick- or fresh-pack pickle recipe. Dried spices can be added to compensate for missing salt. Photo credits: CSU image library.

Salt in Fermentation

The salt used in making fermented sauerkraut and brined pickles is critical to the safety and texture of the finished product (Figure 17). Salt encourages the growth of desirable bacteria while inhibiting the growth of pathogens and spoilage organisms. Do not attempt to make sauerkraut or fermented pickles by reducing the salt called for in the recipe (Figure 18).

An option for reducing the amount of sodium in sauerkraut is to rinse it after opening the jar. DO NOT rinse before canning. Rinsing before canning will remove the acid that is necessary to keep the sauerkraut safe when sealed in the canning jar.



Figure 17. Salt in fermented dill pickles and sauerkraut is critical for safety in the canned product and cannot be reduced or removed. Photo credit: Bigstock: 288470665.

Summary

The information provided in this publication describes some of the strategies you can use to reduce the sugar or sodium content of foods being preserved at home. In addition to providing updated canning information, the [USDA Complete Guide to Home Canning](#) (2015) offers recipes for low sodium and no-sugar-added pickled products.

For additional information on food safety or home food preservation, contact your local Extension office.



Figure 18. Salt used to prepare sauerkraut is necessary for safety. Never reduce the amount called for in the directions when fermenting sauerkraut at home. Photo credit: Shutterstock: 477860095.

Further Reading

Master Food Preserver Program. 2013. [Food Safety & Preservation: Preserving for Special Diets](#). Oregon State University Extension Service SP 50-646. Oregon State University.

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USDA (United States Department of Agriculture). 2015. [USDA Complete Guide to Home Canning](#), 2015 revision. Agriculture Information Bulletin No. 539.

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