

Food Preservation

Low or No Sugar in Jams, Jellies and Preserves

*William C. Morris, Associate Professor
Food Science and Technology*

Home canners now have a choice. If you want to make jams, jellies or preserves without adding sugar, you now have the means to do so successfully.

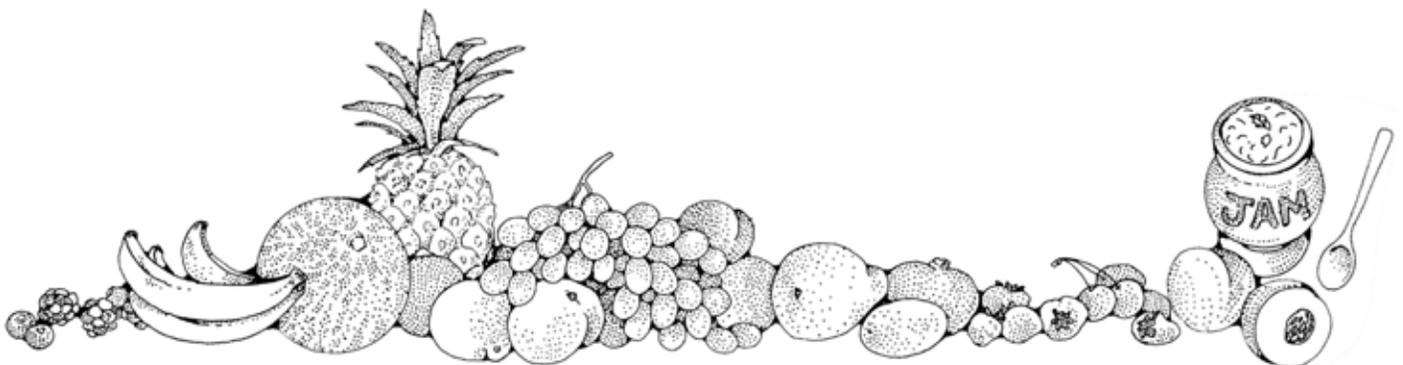
The preparation of reduced sugar or “sugar-free” jams and jellies is now possible using alternative ingredients and methods. One ingredient that must be changed is the pectin. Two types of commercial pectins are now available to the home canner: the regular pectin that requires acid and sugar to set in a gel, and the “no sugar pectins” or the “lite” pectin that does not require sugar or acid but does require calcium. Some gelling agents are also available that contain, in addition to pectin, starch and/or gums that aid in forming a gel. Sugar may not be required when certain starches or gums are used to thicken or gel the final product.

Role of Sugar

In addition to sweetening and helping with gel formation in regular jams, jellies and preserves, sugar plays a very important role in preventing spoilage. The large amount of sugar present reduces the “available” moisture for microbial growth. Microbial growth will be inhibited when the sugar

concentration is high enough to cause the jelly mixture to boil at eight degrees above the normal boiling point of water (i.e., if water boils at 212 F, the sugar level is high enough to prevent microbial growth if the batch of jelly boils at 220 F). Remember the main spoilers of jams, jellies and preserves are molds. Molds can send “root”-appearing growths down into the jelly, which can produce toxins. Therefore, moldy jelly should be discarded.

Simply lowering the sugar content of your old recipes will usually not produce an acceptable reduced-sugar jellied product. The amount of sugar required for proper gelling is dependent on the concentration of pectin in the natural fruit or in the commercial pectin added to your recipes. Low-sugar jams and jellies are best prepared with commercial pectin preparations and using the recipes developed specifically for that purpose. Because these contain less sugar than regular jams and jellies, they are more susceptible to mold growth. Reduced-sugar jams and jellies may require longer processing in the water bath canner to kill these micro-organisms that might cause spoilage.



Reduced-Sugar Jams, Jellies and Preserves

Sugarfree jams, jellies and preserves are now possible using the calcium-set (“lite”) pectin products. Three non-sugar sweeteners on the market today are:

- Aspartame (Equal®)
- Saccharin (Sweet n’ Low®)
- Acesulfame-K (Sweet One®)

These non-sugar sweeteners have different stability characteristics when heated. Aspartame (Equal) loses some of its sweetening characteristics during cooking, but research has shown it can be added before processing in a boiling water bath, without seriously affecting the taste of the jam or jelly. Acesulfame-K and saccharin are heat-stable and can be heat-processed. A more distinct bitter taste can be found upon heating saccharin. A recommended sequence for all non-sugar sweeteners is to bring the pectin/juice or pectin/fruit to boiling, remove from heat, add the sweetener, stir well and jar as quickly as possible. With the absence of sugar, these products will spoil more easily, so they should be refrigerated if they are not heat-processed. These “lite” or no-sugar pectins usually have mold inhibitors added in the form of potassium sorbate, potassium benzoate or sodium benzoate.

Since jellied products without sugar or with reduced sugar cannot be made simply by leaving out or reducing the sugar level, which methods can be used?

- 1. Special Modified Pectins**—These pectins will say “light,” “less sugar” or “no sugar” on the label. Follow the directions on the package. Some of these modified pectin jams and jellies are made with less sugar, while others are made with non-sugar sweeteners and no added sugar.
- 2. Long Boil Methods**—Boiling fruit products for an extended period of time makes the product thicker and appearing more like jam, preserves or fruit butter. This is concentrating the naturally occurring sugar and pectin found in the fruit. Non-sugar sweetener may be added.
- 3. Use of Gelatin**—Gelatin may be used in some recipes as the thickener for jams and jellies. It does not produce a gel. Non-sugar sweetener may be added.

- 4. Regular Pectin with Special Recipes**—No added sugar is needed in these specially formulated recipes, but the package of pectin does contain some sugar. Non-sugar sweetener is often added.

The directions for using modified pectin or using a no-sugar recipe should be followed exactly. Because these products do not have sugar in them to act as a preservative, be sure to process and store them as directed. Some will need longer processing in a boiling water bath and some will need to be refrigerated or frozen. Recipes will specify processing in a boiling water bath or storing in refrigerator/freezer.

Important note: Follow the manufacturer’s directions when using fruit pectin jam and jelly recipes.

Commercial Gelling Agents Available

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product.

The following are some of the gelling agents and lite gelling agents available at grocery stores. **Always remember to read the recipes carefully and follow the directions.** Most labels have the company’s telephone number listed if you have inquiries.

The products listed serve only as examples of the different retail products. The list does not include all products available.

Certo®

Pectin is derived from citrus fruit. Exact acidity is needed for pectin to stay soluble as a liquid and to gel in the jelly. Exact measurements are necessary. Water is used to control pectin concentration. Certo may be easier to disperse in your product. It is the only liquid-type pectin available. **Substitute sweeteners cannot be used.**

Sure-Jell®

Pectin is derived from citrus fruit. Exact measurements are necessary. Sugar and acid are used to control pectin concentration. **Substitute sweeteners cannot be used.**

Sure-Jell Light®

Pectin is derived from regular or citrus fruit. Jelly can be made with one third less sugar. It is a combination of regular or high methoxyl (HM) pectin and low methoxyl (LM) pectin. Regular pectin needs different proportions of sugar and acid to gel properly than (LM) pectin. More fruit is used for the amount of sugar, so the flavor is less sweet and more fruity. Substitute sweeteners cannot be used.

Can-Jel®

Pectin is derived from citrus fruit. Exact measurements are necessary. Sugar and acid are necessary for gel to form. Substitute sweeteners cannot be used.

Slim Set®

Contains calcium-set, low methoxyl pectin that does not require sugar to gel. Contains malto-dextrin as a diluent. It will spread the pectin and allow it to dissolve without lumping. Alternate sweeteners may be used.

Ball 100% Natural Reduced Calorie Fruit Pectin®

Contains fruit pectin in combination with dextrose as a disperser, locust bean gum and xanthan gum as thickeners. Jelly can be made with one third less sugar. Alternate sweeteners may be used.

Mrs. Wage's Light Home-Jell®

Contains dextrose as a diluent to spread the pectin so it will dissolve without lumping. Contains calcium-set, low methoxyl pectin which does not require sugar to gel. **Alternate sweeteners may be used.** Kerr Jel 'n Jam contains natural fruit pectin in combination with the sugar. It is used with recipes developed by Kerr for jams and jellies. Substitute sweeteners cannot be used.

Kerr Pure Fruit Pectin (lite)®

Contains calcium-set, low methoxyl pectin which requires no sugar for gel formation. Contains dextrose as a diluent to spread the pectin

so it will dissolve without lumping. **Alternate sweeteners may be used.**

Commercial Artificial Sweeteners

“Equal”- aspartame, should not be heated extensively; however, some recipes allow for boiling water bath processing.

“Sweet 'n Low”- saccharin, gives a more distinct bitter taste upon heating.

“Sweet One”- acesulfame-k, is heat stable.

Equivalents:

12 packets of Equal = 1/2 cup sugar

12 packets of Sweet 'n Low = 1 cup sugar

12 packets of Sweet One = 1 cup sugar

Liquid measurements

1 cup = 16 tbsp

1/2 cup = 8 tbsp

Segments adopted from:

Reynolds, S. J., 1988. *Jellied Products Without Added Sugar*, The University of Georgia, Georgia Extension Service, Athens, Georgia.

Brewer, S., 1990. *Reduced and Sugar - Free Jams, Jellies and Preserves*. University of Illinois, Co-operative Extension Service, 122 Mumford Hall, 1301 W. Gregory Dr., Urbana, Illinois 61801.

Jellied Products Without Added Sugar

Low Sugar Apple Butter

Yield: 1 to 2 pints or 3 to 4 half-pints.

5 pounds apples, peeled, cored and cut in eighths

1 cup apple cider or juice

2 tablespoons bottled lemon juice

1/2 teaspoon ground cinnamon

1/4 teaspoon ground cloves

1/4 teaspoon ground nutmeg

Granulated artificial sweetener; equivalent to 3/4 cup sugar, i.e., 18 packets Equal® or 9 packets of Sweet 'n Low® or Sweet One®

Combine apples, cider and lemon juice in a 6- to 8-quart saucepan. Bring to a boil. Cook about 30 minutes or until apples are very soft, stirring occasionally. Puree apple mixture in food processor or blender or press through a sieve. Combine apple mixture and spices in a 6- to 8-quart saucepan. Simmer over low heat approximately 35 minutes or until very thick, stirring constantly. Measure pulp. For every 1 cup pulp you will need 6 packets of Equal® or 3 packets of Sweet 'n Low® or Sweet One®. Return pulp to saucepan and bring to a boil. Add artificial sweetener. Immediately fill hot pint or half-pint jars with apple butter, leaving 1/2-inch headspace. Wipe jar tops and threads clean. Place hot lids on jars and screw bands on firmly. Process in boiling water canner for 15 minutes.

Low Sugar Pear-Apple Jam

(about 5 pints)

4 1/2 pounds pears

1-2 Granny Smith apples

1/3 cup bottled lemon juice

1 3/4 ounce packet Fruit Pectin (Lite)®

1/2 teaspoon ground cinnamon

6 tablespoons liquid artificial sweetener or its equivalent

Peel and core pears. Chop pears in a food processor or blender. Add half of the lemon juice and process until smooth. Measure 4 cups of pulp. Repeat process for apples and measure 1 cup of pulp. In a 6-to 8-quart saucepan, combine pear and apple pulp, cinnamon and pectin. Let stand for 10 minutes. Stir mixture over high heat for 5 minutes. Immediately fill half-pint jars with mixture, leaving 1/4-inch headspace. Wipe jar tops and threads clean. Place hot lids on jars and adjust screw bands for processing. Process in boiling water canner for 10 minutes.

Sparkling Strawberry Jam (made with gelatin)

(1 pint)

2 envelopes unflavored gelatin

12-ounce can strawberry diet carbonated beverage

2 cups strawberries

1 tablespoon granulated artificial sweetener

Sprinkle gelatin over beverage in saucepan. Add berries; simmer 10 minutes. Add sweetener. Beat with mixer until smooth. Pour into containers. Cover. Store in refrigerator.

Grape Jelly with Gelatin

(1 1/2 Pints)

- 2 packages or 2 tablespoons unflavored gelatin
- 1 bottle (1 pt 8 oz) unsweetened grape juice
- 2 tablespoons bottled lemon juice
- 2 tablespoons liquid sweetener

In a saucepan, soften gelatin in grape juice and lemon juice. Bring to a rolling boil, dissolving gelatin; boil 1 minute. Remove from heat. Stir in liquid sweetener. Pour into containers. Cover. Store in refrigerator.

Sangria Jam

(three 8-ounce jars)

- 2 1/2 cups red wine
- 2 1/2 cups unsweetened grape juice
- 1/2 cup water
- 1/4 cup granulated sugar
- 1 tablespoon bottled lemon juice
- 1 tablespoon + 1 teaspoon Sweet One® granulated sugar substitute
- 1/2 teaspoon grated lemon rind
- 1 pound red apples (such as McIntosh), peeled, cored and thinly sliced
- 1 envelope unflavored gelatin

In large saucepan, combine wine, grape juice, water, sugar, lemon juice, Sweet One® and lemon rind. Over high heat, bring to a boil. Add apples; reduce heat to medium and cook 30 minutes or until apples are very tender. With slotted spoon, remove apples to blender or food processor container and puree. Return to saucepan and continue cooking 30 minutes.

Meanwhile, in small saucepan, sprinkle gelatin over water to soften. Over low heat, cook until gelatin dissolves. Stir into fruit mixture. Funnel mixture into hot sterilized jars, allowing 1/4 inch headspace. Wipe rims with clean cloth dipped in hot water. Close according to jar manufacturer's instructions and processing boiling-water bath 10 minutes.



Peach-Pineapple Spread

(about 5 to 6 half-pints)

- 4 cups drained peach pulp (procedure as below)
- 2 cups drained unsweetened crushed pineapple
- 1/4 cup bottled lemon juice
- 2 cups sugar (optional), or equivalent amount of sugar substitute

This recipe may be made with any combination of peaches, nectarines, apricots and plums. This recipe may be made without sugar or with up to 2 cups, according to taste or preference. Non-nutritive sweeteners may be added. If aspartame is used, the sweetening power of aspartame may be lost within 3 to 4 weeks.

Procedure: Thoroughly wash 4 to 6 pounds of firm, ripe peaches. Drain well. Peel and remove pits. Grind fruit flesh with a medium or coarse blade, or crush with a fork (do not use a blender). Place ground or crushed fruit in a 2-quart saucepan. Heat slowly to release juice, stirring constantly, until fruit is tender. Place cooked fruit in a jelly bag or strainer lined with four layers of cheesecloth. Allow juice to drip about 15 minutes. Save the juice for jelly or other uses. Measure 4 cups of drained fruit pulp for making spread. Combine the 4 cups of sugar, if desired, and mix well. Heat and boil gently for 10 to 15 minutes, stirring enough to prevent sticking. Fill jars quickly, leaving 1/4-inch headspace. Adjust lids and process for water-bath processing for 15 minutes in half-pints or 20 minutes in pints.

Refrigerated Apple Spread (made with gelatin)

(about 4 half-pints)

- 2 tbsp unflavored gelatin powder
- 1 qt bottle unsweetened apple juice
- 1 tbsp bottled lemon juice
- 2 tbsp liquid low-calorie sweetener
- Food coloring, if desired

Procedure: In a saucepan, soften the gelatin in the apple and lemon juices. To dissolve gelatin, bring to a full rolling boil and boil 2 minutes. Remove from heat. Stir in sweetener and food coloring, if desired. Fill jars, leaving 1/4 inch headspace. Adjust lids. Do not process or freeze. Caution: Store in refrigerator and use within 4 weeks.

Optional: For spiced apple jelly, add 2 sticks of cinnamon and 4 whole cloves to mixture before boiling. Remove both spices before adding the sweetener and food coloring.

Low-Sugar Peach Butter

Yield: 1 to 2 pints or 3 to 4 half-pints.

12 cups (approximately 5 pounds whole) peeled, pitted and chopped ripe peaches

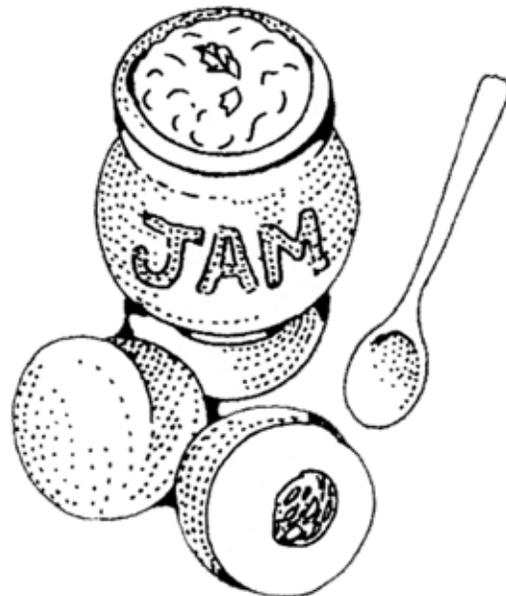
3 tablespoons bottled lemon juice

1/2 teaspoon ground cinnamon

1/4 teaspoon ground nutmeg

30-48 packets Equal® artificial sweetener or 15-24 packets of Sweet 'n Low® or Sweet One®

Place peaches in an 8-quart saucepan. Cook over medium-high heat about 30 to 40 minutes or until peaches are soft and transparent, stirring frequently. Puree peaches in a food processor or blender or press through a sieve. Pour lemon juice into an 8-quart saucepan. Bring to a boil. Stir in peach puree and spices. Bring to a boil and simmer over low heat about 35 to 60 minutes or until very thick, stirring frequently. Measure pulp. For every 1 cup pulp, you will need 12 packets of Equal® or 6 packets of Sweet 'n Low® or Sweet One®. Return pulp to saucepan and bring to a boil. Stir in artificial sweetener. Immediately fill hot pint or half-pint jars with peach butter, leaving 1/2-inch headspace. Wipe jar tops and threads clean. Place hot lids on jars and screw bands on firmly. Process in boiling water canner for 15 minutes.



a U.T. Extension Reminder...

To Use a Pressure Canner or Boiling-Water Bath (It All Depends on the Foods' Acid Level)

Whether food should be processed in a pressure canner or boiling-water bath canner to control botulinum bacteria depends on the acidity in the food. Acidity may be natural, as in most fruits, or added, as in pickled food. Low-acid canned foods contain too little acidity to prevent the growth of these bacteria. Acid foods contain enough acidity to block their growth, or destroy them more rapidly when heated. The term "pH" is measure of acidity; the lower its value, the more acid the food. The acidity level in foods can be increased by adding lemon juice, citric acid or vinegar.

Low-acid foods have pH values higher than 4.6. They include red meats, seafood, poultry, milk and all fresh vegetables except for most tomatoes. Acid foods have a pH of 4.6 or lower. They include fruits, pickles, sauerkraut, jams, jellies, marmalades and fruit butters.

Although tomatoes usually are considered an acid food, some are now known to have pH values slightly above 4.6. Figs also have pH values slightly above 4.6. Therefore, if they are to be canned as acid foods, these products must be acidified to a pH of 4.6 or lower with lemon juice or citric acid. Properly acidified tomatoes and figs are acid foods and can be safely processed in a boiling-water canner.

Therefore, if in doubt, always pressure-can vegetables and meats, and water-bathe fruits and pickles, or check with your local Extension agent.

Visit the Agricultural Extension Service Web site at:
<http://www.utextension.utk.edu/>

SP325F(Rev.)-1.5M-5/04 E12-1815-00-002-04

The Agricultural Extension Service offers its programs to all eligible persons regardless of race, religion, color, national origin, sex, age, disability or veteran status and is an Equal Opportunity Employer.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS.

The University of Tennessee Institute of Agriculture, U.S. Department of Agriculture, and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914.

Agricultural Extension Service Charles L. Norman, Dean