UCCE Master Food Preservers of El Dorado County
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Preserve Today, Relish Tomorrow

Jams and Jellies

Food Safety

Mold is the biggest enemy of jams and jellies. Jams can become moldy if not processed properly, if the jar is not thoroughly cleaned after processing and cooling, if the lid does not seal or the seal is broken due to improper storage, or if the sugar-to-fruit ratio is incorrect. **Always use recipes from reputable sources** to ensure your sugar-to-fruit proportions are correct for safe home canning.

Even though sugar helps preserve jellies and jams, molds can grow on the surface of these products. Research now indicates that the mold which people usually scrape off the surface of jellies may not be as harmless as it seems. Mycotoxins have been found in some jars of jelly having surface mold growth. Mycotoxins are known to cause cancer in animals; their effects on humans are still being researched.

Because of possible mold contamination, paraffin or wax seals are no longer recommended for any sweet spread, including jellies. To prevent growth of molds and loss of good flavor or color, ladle hot products into canning jars, leaving ¼" headspace. Wipe jar rims clean. Place lids and rings on jars, tightening rings finger-tight. Process in a boiling water or steam canner canner for the time indicated in recipe. Increase the processing time at higher elevations by using the Altitude Chart below if specific times for elevations are not listed in a recipe.

Other concerns are *E. Coli* and *Clostridium Botulinum*. *E. Coli* is prevalent in our soils and is a native in the human body. All produce should be thoroughly cleaned before processing.

Personal cleanliness is a must. Wash hands thoroughly and frequently. *E. Coli* resides in the human nose and intestines. Wash your hands if you rub your nose, wipe your face, or skin.

Adjusting for Altitude

All recipes are developed using sea level as the criteria for processing times.

At sea level, water boils at 212°F. At higher altitudes water boils at a lower temperature. Adjustments have to be made to ensure safe canning. When canning at any altitudes higher than 1000 feet, refer to the Altitude Chart for adjusting the processing time.

Altitude Chart for jams and jellies	
Altitude in feet	**Increase processing time by**
1000-6000	5 minutes
Above 6000	10 minutes

It is typical for many fruit jams and jellies to be processed in boiling water for 5 minutes if **pre-sterilized** jars are used. If hot, clean jars are used instead, then the minimum process time is 10 minutes. (If you are at an altitude of 1000 feet or more, add 1 minute of processing time for each 1000 feet of altitude.) Some sweet spreads, especially low sugar spreads, may require more than 5 or 10 minutes process time, so follow directions with those particular recipes as provided.

Methods

There are several methods for making jams and jellies:

- **Quick jams and jellies**: Pectin, dry or liquid, is used to achieve a gelled consistency.
- **Cook down method**: Also known as Long Cook Method. Instead of using pectin, a product is cooked down to the gel point. (See gelling stage test pg. 3)
- **Freezer jams and jellies**: Do not require a boiling water bath process. Special freezer jam pectin is used.

Jams

Jam is made by cooking crushed fruit and sugar to a spreadable consistency. All berries and soft fruit, such as peaches, apricots, and figs, make excellent jam. The fruit usually is crushed or finely chopped. Pectin and acid are sometimes added, depending upon the consistency desired. Most jam will continue to thicken after cooking. Adding ¼ tsp. of butter or margarine to the boiling product will help reduce foaming.

Jellies

Prepare the fruit for jelly: Wash fruit carefully; discard any that is spoiled or discolored. Remove the stem and blossom parts. Do not core or peel apples or similar fruits. Cut hard fruits into small pieces or grind in a food chopper.

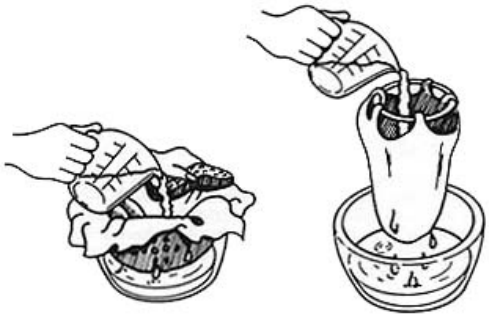
Fruit may be dipped into an antioxidant agent to prevent discoloration of the juice. The most commonly used antioxidant agents are ascorbic acid, citric acid, or lemon juice. Fruit should be drained.

Extracting the juice for jellies

Place the fruit in a large kettle. Add a little water or fruit juice to prevent scorching.

Add water or juice to firm fruits such as apples and plums. Add 1 cup for each pound of apples; ¼ cup of water for each pound of plums.

Soft fruit usually needs no added water. If fruit lacks juice or is overripe, add ¼ cup of water for each pound of fruit.



Using a Jelly Bag

Bring fruit to a boil, and boil rapidly until tender, 10 to 20 minutes. Too much boiling will reduce gelling strength of the juice and affect the flavor.

Pour the fruit mixture into a jelly bag and let drain. A jelly bag may be made by using four thickness of dampened cheesecloth spread over a colander or made from unbleached muslin: bring the corners of the cloth together, tie with twine and suspend over a container to catch the juice. For greater yield, twist the bag and press out the juice. For very clear jelly, allow the juice to drip without squeezing or pressing.

For good jelly, the fruit juices should not be diluted.

Make jelly in small batches. The same kind of fruit may vary in pectin, acids, and sugar content from one lot to the next, depending on growing conditions, maturity, and variety, so it may be necessary to change the water or juice/fruit proportions after making the first batch.

Pectin

Not all pectin is created equal. Do not interchange powdered and liquid pectin. Cooking times vary; review directions before beginning. For the boiling times of the jam or jelly, follow the time listed in the pectin package or the finished product will not turn out correctly.

Do not change the quantities of ingredients in any recipe that calls for pectin. Follow the recipe exactly. The combination of pectin, acid, and sugar forms a chemical reaction, which causes the mixture to gel. Do **not** "double," or cut any pectin recipe in half unless the manufacturer's directions say to do so.

Types Of Pectin

Regular Powdered Pectin is a high-methoxyl pectin generally made from apple peels or the white pith of citrus fruits. This type of pectin works with sugar and acid to form a gel. All brands of powdered pectin can be used interchangeably. Follow the manufacturer's instructions. Cooking times may vary.

Liquid pectin is a high-methoxyl pectin and cannot be substituted for powdered pectin. Recipes specifying liquid pectin also specify the amount to be used (1 pouch or 2 pouches). Liquid pectin is always added after the sugar and at the end of the cooking time. Powdered pectin is added into the raw fruit before the sugar is added. Always read and follow manufacturer's directions. *Asthmatics should be aware that liquid pectin may contain sulfites.*

Ball Flex-Pectin is a product that has been out for several years now. Ball produces both classic, no/low sugar, and freezer powdered pectin in flex-pectin packages. The pectin is the same as in the boxes but comes in containers allowing you to measure out the quantity of pectin needed for your recipes and storing the remainder in a cool dark place. The classic flex-pectin will make up to 16 half-pints while the freezer flex-pectin will make up to 24 half-pints.

The flex-pectin shows that 6 tablespoons of the pectin equals 1 box. Packages have recipes under the label that you can follow for a safe product.

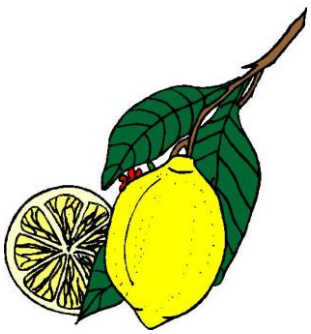
Low/No Sugar pectins are low-methoxyl pectins which allows jams to be made with no or low sugar. It uses calcium to form a gel, which is included in the pectin. Always follow the manufacturer's directions to ensure a firm gel.

Pomona brand pectin is a low-methoxyl pectin. It needs calcium to form a gel. The calcium packet is included in the box. This pectin has the flexibility to make small batches, regular sugar or no/low sugar jams. Pomona has its own recipes as this pectin is used differently than all other pectins. Each box of Pomona pectin can make several batches of jam. Always follow the manufacturer's directions.

Acidifiers

Citric Acid can be substituted – it will adjust the acidity (lower the pH) of the fruit, which is what you want to do.

- 1/4 teaspoon powdered **Citric Acid** is equivalent to 1 Tablespoon lemon juice.
- 1 teaspoon powdered **Citric Acid** is equivalent to ¼ cup lemon juice (4 Tablespoons).



Sweeteners

Table Sugar (sucrose) is the typical white granulated product we use to sweeten foods. It will give you the best, overall results. In addition to its sweetening effect, sugar serves as a preserving agent and aids in the gelling of jams and jellies.

Brown sugar is refined white sugar with molasses mixed in, and although the flavor differs somewhat, it has about the same sweetness value as white sugar when considered on a volume basis. Brown sugar will change the flavor of your product.

Corn syrup is manufactured from corn starch by heating under acidic conditions. After a concentration step, the final product is a viscous mixture consisting mostly of glucose and polysaccharide chains of varying lengths. There are various corn syrups available on the market; the sugar content may vary depending on how long the process is allowed to proceed. Therefore, it is difficult to convert a volume of sugar into an equivalent amount of corn syrup at the same sweetness level. We recommend using a pretested food preservation recipe that specifically indicates how much liquid corn syrup to use.

High-fructose corn syrup *(HFCS)* is corn syrup that has been modified enzymatically to convert glucose molecules into fructose. The sweetening ability of the HFCS can be manipulated by adjusting the amount of fructose to between 42 and 90 percent of the product. HFCS is used most often as an ingredient in commercially manufactured foods and typically not found on grocery store shelves. If you were to find and use HFCS, consider using a lower volume than in recipes calling for corn syrup.

Honey is a natural product in which the primary sugar is fructose. It is safe to use as sweetener for canning or freezing. However, the flavor of the honey-sweetened foods may be noticeably different than expected. You may wish to make small quantities first to determine if you like them. Honey may be substituted in a full sugar recipe: use 50% honey and 50% granulated sugar.

Splenda® is a commercially formulated mixture of sucralose, starch, and dextrose sugar. Although sucralose is a chemically modified form of sucrose with no nutritive value (0 calories), the bulking agents added do contribute some energy value and the product contains about 12 percent of the calories of an equal volume of table sugar. Unlike other nonnutritive sugar substitutes, Splenda® is heat stable, so it can be used in canned foods. Some people do notice an aftertaste that may increase with storage time. Although Splenda® will provide sweetness, it will not provide the firmness to canned fruits that sugar does. Products canned with Splenda® will therefore be similar in texture to those canned in water. The Splenda® website has recipes for preparing shelf-stable jams and jellies.

Stevia is stable to heat and could be used for canning fruit and other products in which sugar is not critical to food safety or texture. Rebaudioside A, the active ingredient in stevia, is 300 times sweeter than sugar. It has been listed as "generally recognized as safe" by the Food and Drug Administration (FDA) and therefore is exempt from food additive regulations. Truvía® is a stevia-based sugar substitute currently available on the market. According to their website, the product can be used for baking. We have no reliable information on its potential use in canning and/or freezing. Green stevia leaves or leaf powders are available, but their sweetening effects might not be consistent.

Source: excerpt from Penn State University, "Ingredients Used in Home Food Preservation", https://extension.psu.edu/lets-preserve-ingredients-used-in-home-food-preservation

Gel Stage Tests

Temperature test: Cook the soft spread until it reaches a temperature of 220°F which is 8°F above the boiling point of water at sea level. Adjust this temperature for altitude by decreasing it by two degrees for each 1,000 feet above sea level. Measure the temperature of soft spreads with a candy or jelly thermometer. Always insert the thermometer vertically into the soft spread and ensure that it does not contact the surface of the pot.

Sheet test: Dip a cold metal spoon into the boiling soft spread. Lift the spoon and hold it horizontally with edge down so that the syrup runs off the edge. As the mixture thickens, the drops will become heavier and will drop off the spoon separately about two at a time. When the two drops join together and "sheet" off the spoon, the gel stage has been reached.

Spoon or Sheet Test

Freezer test: Chill two or three small saucers in the freezer. Place a teaspoonful of soft spread on the chilled saucer and place in the freezer for 1 minute. Remove the saucer from the freezer and push the edge of the spread with your finger. A mixture that has reached the gel stage will be set, and the surface will wrinkle when the edge is pushed. Note: To prevent overcooking or scorching, remove the soft spread from the heat before performing this test.

If the test you performed shows that the gel stage has not been reached, return the mixture to the heat to cook for a few minutes longer, then retest the soft spread.

Remaking Soft Jellies

- If your product fails to gel, use the methods below.
- Measure jam or jelly to be re-cooked. Work with no more than 4 cups at a time.

To Remake With Powdered Pectin
For each quart of jelly, mix ¼ cup sugar, ½ cup water, 2 tablespoons bottled lemon juice, and 4 teaspoons powdered pectin. Bring to a boil while stirring. Add jelly and bring to a rolling boil over high heat, stirring constantly. Boil hard ½ minute. Remove from heat, quickly skim off foam, and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process as recommended in Table 1.

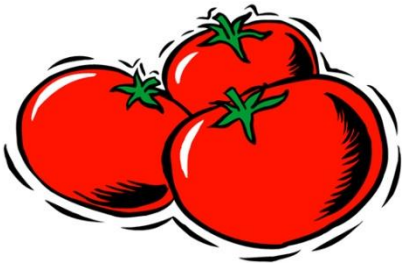
To Remake With Liquid Pectin
For each quart of jelly, measure ¾ cup sugar, 2 tablespoons bottled lemon juice, and 2 tablespoons liquid pectin. Bring jelly only to boil over high heat, while stirring. Remove from heat and quickly add the sugar, lemon juice, and pectin. Bring to a full rolling boil, stirring constantly. Boil hard for 1 minute. Quickly skim off foam and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process as recommended in Table 1.

To Remake Without Added Pectin
For each quart of jelly, add 2 tablespoons bottled lemon juice. Heat to boiling and boil for 3 to 4 minutes. Use one of the tests described in above in "Gel Stage Tests". Remove from heat, quickly skim off foam, and fill sterile jars, leaving ¼-inch headspace. Adjust new lids and process as recommended in the recipe. Adjust for altitude, if necessary.

Spiced Tomato Jam

Yield: About 5 half-pint jars

- 3 cups prepared tomatoes (about 2 ¼ pounds)
- 1½ tsp. grated lemon rind
- ½ tsp. ground allspice
- ½ tsp. ground cinnamon
- ¼ tsp. ground cloves
- 4½ cups sugar
- 1 box powdered pectin
- ¼ cup lemon juice



Wash firm-ripe tomatoes. Scald, peel, and chop tomatoes. Cover and simmer 10 minutes, stirring constantly. Measure 3 cups tomatoes into a saucepot. Add lemon rind, allspice, cinnamon and cloves.

Place prepared fruit into a saucepot. Add lemon juice. Measure sugar and set aside. Stir powdered pectin into prepared fruit. Bring to a boil over high heat, stirring constantly. At once, stir in sugar. Stir and bring to a full rolling boil that cannot be stirred down. Then boil hard for 1 minute, stirring constantly. Remove from heat. Skim off foam.

Ladle hot jam into hot jars, leaving ¼ inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding more hot jam. Wipe rims; place lids and rings on jars. Tighten rings only finger tight.

Process in either a boiling water or atmospheric steam canner for 10 minutes between 0-1,000 feet, 15 minutes between 1,001-6,000 feet, and 20 minutes above 6,000 feet.

Source: So Easy To Preserve, Cooperative Extension/The University or Georgia, 2014

Spiced Orange Jelly

Yield: About 4 half-pint jars

- 2 cups orange juice (about 5 medium oranges)
- 1/3 cup lemon juice (about 2 medium lemons)
- 2/3 cup water
- 1 package powdered pectin
- 2 tablespoons orange peel, finely chopped
- 1 teaspoon whole allspice
- ½ teaspoon whole cloves
- 4 sticks cinnamon, 2 inches long
- 3½ cups sugar

Pour juice, and water in a large, non-reactive saucepan. Stir in pectin.
Place orange peel, allspice, cloves, and cinnamon sticks loosely in a clean white cloth; tie with a string and add to juice mixture.
Place on high heat and, stirring constantly, bring quickly to a full rolling boil that cannot be stirred down.
Add sugar, continue stirring, and heat again to a full rolling boil. Boil hard for 1 minute.
Remove from heat. Remove spice bag and skim off foam quickly.

Ladle hot jelly into hot jars, leaving ¼ inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding more hot jelly. Wipe rims; place lids and rings on jars. Tighten rings only finger tight.

Process in either a boiling water or atmospheric steam canner for 10 minutes between 0-1,000 feet, 15 minutes between 1,001-6,000 feet, and 20 minutes above 6,000 feet.

Source: National Center for Home Preservation, 2018 (NCHFP) https://nchfp.uga.edu/how/can_07/orange_jelly_spiced.html

Triple Berry Low Sugar Jam

Yield: 8 half-pint jars

- 6 cups prepared fruit (3 pints of strawberries, 1 ½ pts raspberries or blackberries, 1 pt blueberries*
- 2-4 cups of Sugar
- 1 box Sure-Jell for Less or No Sugar Needed Recipes Fruit Pectin
- ½ tsp butter or margarine

Crush berries thoroughly, 1 layer at a time, or pulse in a food processor until all fruit is in very small pieces.
Measure exactly 6 cups of the mixture and put into a 6-8 qt sauce pan.

Mix ¼ cup of the sugar with 1 package of Sure-Jell for Less or No Sugar pectin in a small bowl. Add to fruit in the saucepan and mix well. Add butter to reduce foaming. Bring mixture to a full rolling boil (a boil that doesn't stop bubbling when stirred) on high heat, stirring constantly. Stir in remaining sugar. Return to full rolling boil and boil exactly 1 minute, stirring constantly. Remove from heat, skim off any remaining foam with a metal spoon.

Ladle hot jam into hot jars, leaving ¼-inch headspace. Remove air bubbles and adjust headspace, if necessary, by adding hot jam. Wipe jar rim and center lid on jar. Screw band down until resistance is met, then increase to fingertip tight.

Process in boiling water or steam canner for 10 minutes at 0-1,000 ft., 15 minutes at 1001-6,000 ft., and 20 minutes above 6,000 ft.

*You can use commercial Triple Berry Frozen fruit, or you can substitute blueberries for either the blackberries or raspberries.

Source: Sure Jell Premium Fruit Pectin for less or no sugar needed recipes insert

Apple Cider Cinnamon Jelly

Yield: 4 half-pint jars

- 2 ½ cups fresh-pressed apple cider
- 1 stick cinnamon, 4 inches long, broken into 4 pieces
- 3 ½ cups granulated sugar
- 1 pouch liquid pectin

Combine the cider and cinnamon pieces in a large stainless steel or enamel saucepan. Cover and bring to a boil over high heat, reduce heat and boil gently for 5 minutes. Strain cider through several layers of cheesecloth, reserving cinnamon pieces to add to jars. Rinse saucepan.

Measure 2 cups of cider and return to saucepan; add sugar. Bring to a full boil over high heat, stirring constantly. Stir in pectin, return to a full boil and boil hard for one minute, stirring constantly. Remove from heat. Fill hot jars, leaving ¼ inch headspace. Remove air bubbles. Add one piece of cinnamon stick to each jar.

Wipe the rims clean. Place lids and rings on jars, tightening rings finger tight.
Process in boiling water or steam canner for 10 minutes at 0-1,000 ft., 15 minutes at 1001-6,000 ft., and 20 minutes above 6,000 ft.

Source: Certo liquid pectin, http://www.kraftrecipes.com/recipes/certo-apple-jelly-recipe-51936.aspx

Making Jam Without Pectin (cookdown)

Yield: See Table 1

Making Jam without Pectin (AKA cookdown jam)

Wash and rinse all fruits thoroughly before cooking. Do no soak. For best flavor, use fully ripe fruit. Remove stems, skins and pits from fruit; cut into pieces and crush. For berries, remove stems and blossoms and crush. Seedy berries may be put through a sieve or food mill. Measure crushed fruit into a large saucepan using the ingredient quantities specified in **Table 1**.

Add sugar and bring to a boil while stirring rapidly and constantly. Continue to boil until mixture thickens. Use one of the following tests to determine when jams and jellies are ready to fill. Remember to allow for thickening during cooling.

Temperature Test: Use a jelly or candy thermometer and boil until mixture reaches the temperature for your altitude (**Table 3**).

Refrigerator test: Remove the jam mixture from the heat. Pour a small amount of boiling jam on a cold plate and put it in the freezing compartment of a refrigerator for a few minutes. If the mixture gels, it is ready to fill.

Wipe the rims clean. Place lids and rings on jars, tightening rings finger tight. Process in boiling water or steam canner for 10 minutes at 0-1,000 ft., 15 minutes at 1001-6,000 ft., and 20 minutes at 6,011 ft. and above.

Table 1:

Fruit	Cups Crushed Fruit	Cups Sugar	Tbs. Lemon Juice	Yield (Half-pints)
Apricots	4 to 4-1/2	4	2	5 to 6
Berries*	4	4	0	3 to 4
Peaches	5-1/2 to 6	4 to 5	2	6 to 7

* Includes blackberries, boysenberries, dewberries, gooseberries, loganberries, raspberries, and strawberries.

Table 2. Recommended process time for **Jams without Added Pectin** in a boiling-water canner.

		Process Time at Altitudes of		
Style of Pack	**Jar Size**	**0 - 1,000 ft**	**1,001 - 6,000 ft**	**Above 6,000 ft**
Hot	Half-pints or pints	**10 min**	15	20

Table 3. Temperature Test - Use a jelly or candy thermometer and boil until mixture reaches the following temperatures at altitudes of:

Sea Level	1,000 ft	2,000 ft	3,000 ft	4,000 ft	5,000 ft	6,000 ft	7,000 ft	8,000 ft
220°F	218°F	216°F	214°F	212°F	211°F	209°F	207°F	205°F

Recommended Home Preserving Resources:

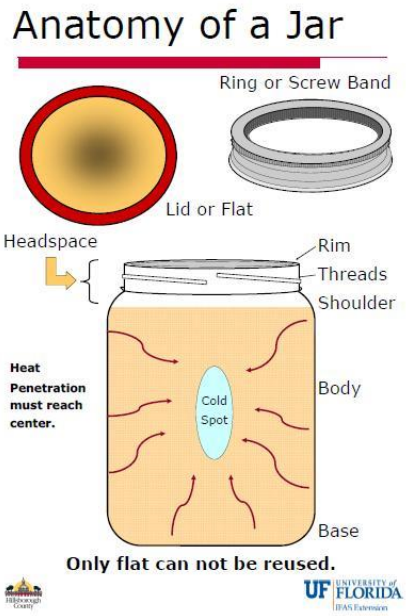
National Center for Home Food Preservation: http://nchfp.uga.edu/

Complete Guide to Home Canning. 2015. http://nchfp.uga.edu//publications/publications_usda.html
Also available in paper copy from Purdue Extension (online store is located at https://mdc.itap.purdue.edu/item.asp?item_number=AIG-539)

So Easy to Preserve, Sixth Edition. 2014. Bulletin 989. Cooperative Extension/The University of Georgia/Athens

Ball Blue Book Guide to Preserving. 2014. Jarden Corporation.

Ball Complete Book of Home Preserving, 2006/2012. Jarden Corporation.



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