

Basics of Jelly Making

JELLIED PRODUCTS

- **Jams** are thick, sweet spreads, which will hold their shape, but are less firm than jelly. They are made from crushed or chopped fruits and sugar.
- **Conserves** are jams made from a mixture of fruits, especially when they include citrus fruits, nuts, raisins or coconut.
- **Preserves** are made of small, whole fruits or uniform-size pieces of fruits in a clear, thick, slightly jellied syrup.
- **Marmalades** often contain citrus fruits and are soft fruit jellies containing small pieces of fruit or peel, evenly suspended in the transparent jelly.

COMMON INGREDIENTS

For proper texture, jellied fruit products require the correct combination of fruit, pectin, acid and sugar.

Fruit: Fruit gives each spread its unique flavor and color. It also supplies the water to dissolve the rest of the necessary ingredients and furnishes some or all of the pectin and acid. Good-quality, flavorful fruits make the best jellied products.

Pectin: Pectin is a substance in fruits that forms a gel if it is in the right combination with acid and sugar. All fruits contain some pectin. Apples, crab apples, gooseberries, and some plums and grapes usually contain enough natural pectin to form a gel. Other fruits, such as strawberries, cherries and blueberries, contain little pectin and must be combined with other fruits high in pectin or with commercial pectin products to obtain gels. Because fully ripened fruit has less pectin, one-fourth of the fruit used in making jellies without added pectin should be under-ripe.

Acid: The proper level of acid is critical to gel formation. If there is too little acid, the gel will never set; if there is too much acid, the gel will lose liquid (weep). For fruits low in acid, add lemon juice or other acid ingredients as directed. Commercial pectin products contain acids that help to ensure gelling.

Sugar: Sugar serves as a preserving agent, contributes flavor and aids in gelling. Cane and beet sugars are the usual sources of sugar for jelly or jam. Corn syrup and honey may be used to replace part of the sugar in recipes, but too much will mask the fruit flavor and alter the gel structure. Use tested recipes for replacing sugar with honey and corn syrup. Do not try to reduce the amount of sugar in traditional recipes. Too little sugar prevents gelling and may allow yeast and mold growth.

EQUIPMENT AND CONTAINERS

A large saucepan is essential as jellies and jams have a tendency to boil over. An 8-or 10-quart saucepot is recommended. A heavy metal is best because it allows even heat distribution.

A jelly bag of suitable cloth is needed when extracting juice for jelly. Firm unbleached muslin or cotton flannel with the napped side turned in can be used. Four thicknesses of closely woven cheese-cloth may be used. Jelly bags or cloths should be damp when extracting juice.

A jelly, candy, or deep fat thermometer can be used to determine doneness in jellied products without added pectin.

A boiling water bath canner is necessary for processing all fruit spreads. A deep cooking pot with a rack may be used for a canner if it's deep

enough for one or two inches of boiling water above the tops of jars. Be sure the pot has a close-fitting lid.

BASIC STEPS FOR MAKING JELLY WITHOUT ADDED PECTIN

1. Check recipe and assemble equipment.
2. Sterilize canning jars for 10 minutes and keep hot.
3. Treat new canning lids according to instructions on the box.
4. Measure juice and sugar. When a recipe is not available, try using $\frac{3}{4}$ cups sugar for each 1 cup of juice. Put juice into a large saucepan and bring to a boil.
5. Add sugar to juice.
6. Test for doneness.
7. Remove jelly from heat; quickly skim to remove foam.
8. Pour quickly into hot jars, leaving $\frac{1}{4}$ -inch head space. Wipe jar rims, adjust lids and process in a boiling water bath for 5 minutes.

JELLIES MADE WITH ADDED PECTIN

Jellies made from powdered or liquid pectin are prepared differently from those made without added pectin. Be sure to follow manufacturer's directions carefully. When commercial pectin is used, it is not necessary to test for pectin, acid or doneness.

EXTRACTING THE JUICE

Use only firm fruits naturally high in pectin. Select a mixture of about three-quarters ripe and one-quarter under-ripe fruit. Do not use commercially canned or frozen fruit juices. Their pectin content is too low. Wash all fruits thoroughly before cooking. Crush soft fruits or berries; cut firmer fruits into small pieces. Using the peels and cores adds pectin to the juice during cooking. Add water to fruits that require it. Put fruit and water in a large saucepan and bring to a boil. Then simmer according to the times in Table 2 or until fruit is soft. Stir to prevent scorching. One pound of fruit should yield at least 1 cup of clear juice.

When fruit is tender, strain through a colander, then strain through a double layer of cheesecloth or a jelly bag. Allow juice to drip through, using a stand or colander to hold the bag. Pressing or squeezing the bag or cloth will cause cloudy jelly. Table 2 provides instructions and proportions for extracting juice from jelly fruits.

To make jelly, use no more than 6 to 8 cups of extracted fruit juice at a time; measure fruit juice, sugar and lemon juice; and heat to boiling. Stir until the sugar is dissolved. Boil over high heat to the jelling point.

DONENESS TEST

To test jelly for doneness, use one of the following methods:

Temperature test: Use a jelly or candy thermometer and boil until mixture reaches the correct temperatures at the appropriate altitudes according to Table 3.

Sheet or spoon test: Dip a cool metal spoon into the boiling jelly mixture. Raise the spoon about 12 inches above the pan (out of steam). Turn the spoon so the liquid runs off the side. The jelly is done when the syrup forms two drops that flow together and sheet or hang off the edge of the spoon.

Remove from heat and quickly skim off foam. Fill sterile jars with jelly. Use a measuring cup or ladle to pour the jelly through a wide-mouthed funnel, leaving $\frac{1}{4}$ -inch headspace. Wipe jar rims. Adjust lids and process according to Table 1.

GENERAL PROCEDURES FOR MAKING JAMS, PRESERVES, MARMALADES, ETC.

1. Use canning jars and pretreated lids.
2. Check jars and lids. Discard any cracked or chipped jars and any lids with blemished sealing surfaces. Wash in hot, soapy water; rinse. Boil jars for 10 minutes to sterilize. Keep jars hot.
3. Wash and rinse all fruits thoroughly before cooking. Do not 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.
4. Combine ingredients and cook in small batches in a large, heavy saucepot (8- to 10- quart capacity).
5. Stir fruit mixture over low heat until sugar dissolves. Then boil rapidly for a clear-finished product. As the fruit mixture begins to thicken, stir frequently to prevent sticking and scorching.
6. To test for doneness, boil until the temperature is 220 °F or 8 °F above the boiling point of

water. For a softer product, shorten the cooking time; for a firmer product, lengthen it. The refrigerator/freezer test can be used: Pour a small amount of boiling product mixture on a plate and put it into the freezing compartment of a refrigerator for a few minutes. If the mixture gels, it should be done. During the test, however, the rest of the mixture should be removed from the heat.

7. Before filling jars, skim off foam that forms from the boiling process. The addition of ¼ teaspoon butter or margarine during cooking helps cut down on the foam formed.
8. To fill the jars, pour hot fruit mixture into hot sterilized jars, leaving ¼-inch headspace.
9. Process jams, preserves and conserves in a boiling water bath for the length of time specified in the recipe. If no processing instructions are given, process for 5 minutes. At altitudes over 1000 feet, add 1 minute to the processing time for each additional 1000 feet of altitude.
10. If unsterile jars are used, the filled jars should be processed 10 minutes. Use of sterile jars is preferred, especially when fruits are low in pectin, since the added 5-minutes process time may cause weak gels.
11. Cool and remove screw bands after about 12 hours. Store in a dark, dry, cool place. The shorter the storage time, the better the product.
12. If liquid or powdered pectin is used, follow manufacturer's directions. The method of combining ingredients varies with the form of pectin used. Additional, acid and doneness tests are not necessary with added pectin.

PREVENTING SPOILAGE OF JELLIES

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.

REMAKING RUNNY JELLY AND JAM

Measure jelly to be re-cooked. Work with no more than 4 to 6 cups at a time. Use directions based on the form of pectin in the jellied product.

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 foam off jelly 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. Wipe jar rims. 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 previously to determine jelly doneness. Remove from heat, quickly skim off foam, and fill sterile jars, leaving ¼-inch headspace. Wipe jar rims. Adjust new lids and process as recommended in Table 1.

FREQUENTLY ASKED QUESTIONS

1. **Why Should Cooked Jelly Be Made in Small Batches?** If a larger quantity of juice is used, it will be necessary to boil it longer thus causing loss of flavor, darkening of jelly, and toughening of jelly.
2. **Should Jelly Be Boiled Slowly or Rapidly?** It should be boiled rapidly since long, slow boiling destroys the pectin in the fruit juice.
3. **Why Did My Jellied Fruit Product Ferment, and What Do I Do?** Jellied fruit products may ferment because of yeast growth. This can occur if the product is improperly processed and sealed, or if the sugar content is too low. Fermented fruit products have a disagreeable taste. Discard them.

**TABLE 1. RECOMMENDED PROCESS TIMES FOR JELLIES AND JAMS
IN A BOILING-WATER CANNER**

Product	Pack Style	Jar Size	PROCESS TIMES (MIN) AT ALTITUDES OF:			
			0-1000 ft.	1001-3000 ft.	3001-6000 ft.	Above 6000 ft.
Jelly Without Pectin, Jam Without Pectin, and Remade Soft Jellies	Hot	Half-Pints or Pints	5	10	10	15

TABLE 2. TO EXTRACT JUICE

Fruit	Cups of Water to be Added/Lb. of Fruit	Minutes to Simmer Fruit before Extracting Juice	Ingredients Added to Each Cup of Strained Juice		Yield from 4 Cups of Juice (Half-Pints)
			Sugar (Cups)	Lemon Juice (Tsp.)	
Apples	1	20-25	¾	1½ (opt)	4-5
Blackberries	None or ¼	5-10	¾ - 1	None	7-8
Crab Apples	1	20-25	1	None	4-5
Grapes	None or ¼	5-10	¾-1	None	8-9
Plums	½	15-20	¾	None	8-9

TABLE 3. TEMPERATURE TEST (DEGREES F)

Sea Level	1000 ft.	2000 ft.	3000 ft.	4000 ft.	5000 ft.	6000 ft.	7000 ft.	8000 ft.
220	218	216	214	212	211	209	207	205

TABLE 4. INGREDIENT QUANTITIES NEEDED WHEN MAKING JAM WITHOUT PECTIN

FRUIT	CUPS CRUSHED FRUIT	CUPS SUGAR	TBSP. LEMON JUICE	YIELD (HALF-PINTS)
Apricots	4 to 4½	4	2	5 to 6
Berries*	4	4	0	3 to 4
Peaches	5½ to 6	4 to 5	2	6 to 7

*Indicates blackberries, boysenberries, dewberries gooseberries, loganberries, raspberries and strawberries

For more information on home canning, contact your local Extension Service agent.

SOURCES:

1. Reynolds, Susan and Paulette Williams. *So Easy to Preserve*, Bulletin 989. Revised 1993 by Judy Harrison. Cooperative Extension Service, University of Georgia, College of Agricultural and Environmental Sciences, Athens.
2. USDA (Reviewed 1994). *Complete Guide to Home Canning*, Agriculture Information Bulletin No. 539.

This information has been reviewed and adapted for use in South Carolina by E.H. Hoyle, Extension Food Safety Specialist, Clemson University.

This information is supplied with the understanding that no discrimination is intended and no endorsement by the Clemson University Cooperative Extension Service is implied. All recommendations are for South Carolina conditions and may not apply to other areas. (New 6/99).