

NOTE: This publication is intended for use by individuals with a basic understanding of home canning procedures. For more detailed information, consult the *USDA Complete Guide to Home Canning* (2009), which is available through your local county Extension office (<http://aces.nmsu.edu/county>) or online at http://nchfp.uga.edu/publications/publications_usda.html.

INTRODUCTION

Jams, jellies, and other sweet spreads are some of the easiest products for home canners to prepare. **Jams** are mixtures of about 45% fruit and 55% sugar that are cooked to a thick consistency, making the fruit pieces soft and nearly formless. **Jellies** are prepared from fruit juice only, with no fruit pulp present in the product. **Preserves** are similar to jams, but generally contain large chunks or whole pieces of fruit. **Marmalades** typically contain fruit rind, most often from citrus fruits such as lemons and oranges. **Butters** are smooth, thick mixtures of one or more fruits and often contain spices.

FOUR ESSENTIAL INGREDIENTS

Fruit

Fruit gives jams and jellies their characteristic flavor and provides at least part of the pectin and acid required for successful gels. Flavorful fruits are best for jellies because the fruit flavor is diluted by large amounts of sugar.



© Olena Rudo | Dreamstime.com

Sweeteners

Sugar helps gel formation, serves as a preservative, contributes to the flavor of the jam/jelly, and has a firming effect on fruit. Beet sugar and cane sugar can be used with equal success.

Corn syrup and honey can 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 yeasts and molds to grow. Low- and no-sugar pectin can be used if you want to cut back on sugar; follow recipes specific for low-sugar pectin. These specially formulated pectins give options for sugar content or sugar substitutes, which allows you to store these products at room temperature.

Special note on sucralose (sold under the brand name Splenda): Sucralose cannot be substituted for the

¹Respectively, Extension Food Technology Specialist, Department of Extension Family and Consumer Sciences; and County Program Director/Extension Home Economist, Bernalillo County Extension Office, New Mexico State University.

Product	Pack	Jar size	Processing time (in minutes) at elevation of	
			1,000–6,000 ft	6,000–10,000 ft
All jams and jellies with or without added pectin	Hot	Half pints and pints	10	15
Peach-pineapple spread	Hot	Half pints	20	25
	Hot	Pints	30	35

required sugar in recipes calling for “regular” liquid or powdered pectins. Additionally, sucralose cannot be used in long-boil or no-pectin-added jams/jellies that are canned and stored at room temperature. Thickened fruit spreads with just fruit and sucralose can be made, however, but may not have enough water control for proper room-temperature preservation. It is recommended that products made with sucralose be frozen or refrigerated for storage.

Pectin

Most jellies require added pectin, although some fruits, such as apples, grapes, and some berries, contain enough natural pectin to make high-quality products. All under-ripe fruits have more pectin than ripe fruits. Usually, a ratio of 1/4 slightly under-ripe fruit to 3/4 fully ripe fruit is recommended for making jams/jellies. Many people prefer the added-pectin method for making jams and jellies because fully ripe fruit can be used with a shorter cooking time.

Commercial fruit pectins made from apples or citrus fruits are available in both liquid and powder forms. The two forms are not interchangeable. Commercial pectins may be used with any fruit. Powdered pectins are formulated for various applications such as regular, low-sugar, and freezer jam or instant pectin.

Pectin should be stored in a cool, dry place to keep its gel strength. Liquid pectin should be refrigerated after opening. Use commercial pectins by the date stamped on the label.

Acid

Acid provides a tangy flavor, retains natural fruit color, and helps gel formation. Acid content varies among fruits and is higher in under-ripe fruits. Lemon juice and citric acid are commonly added to low-acid fruits. Some commercial fruit pectins contain acid.

CANNING EQUIPMENT LIST

- Cutting board
- Knife
- Peeler/corer
- Mixing spoons
- Tongs
- Measuring cup and spoon sets
- Canning jars
- Canning lids and screw bands
- Re-sealable plastic bags for leftovers
- Pot holders x 2
- Paper towels
- Cloth towels x 2
- Dish soap and scrubber
- Cooking pots in 1-quart and 5-quart sizes
- Large strainer
- Mixing bowl set in 2-, 3-, and 5-quart sizes
- Canning set
 - Jar lifter
 - Magnetized lid lifter
 - Funnel
 - Plastic spatula (to release air bubbles in jars)
- Pressure canner or boiling water canner with rack for proper elevation

GENERAL CANNING PROCEDURES

Use regular or wide-mouth Mason jars with self-sealing lids held in place by screw-on metal bands. The bands hold the lids in place during the processing and cooling periods, and can be removed and reused after cooling. Mason jars are made from tempered glass to resist high temperatures. Jars are available in 1/2 pint, pint, 1 1/2 pint, and quart sizes. Larger jars are not recommended for home canning. Do not reuse glass jars or bottles from commercially processed products such as mayonnaise because these jars will not withstand the water bath or pressure canner heating process.

Inspect jars carefully for cracks or chips and discard faulty ones. Wash jars in hot, soapy water and rinse thoroughly or clean using a dishwasher. To sterilize jars, keep jars hot in the dishwasher, a sink of hot water, or in a warm 180°F oven until they are filled. Check metal screw bands for signs of rust or dents. Discard corroded or dented bands. Use only new lids and follow the manufacturer’s directions for preparing lids for canning. Do not use lids that are missing any gasket compound, dented, deformed, or older than five years from date of manufacture.

Prepare ingredients as described. All mixtures should be boiling when ladled into clean half-pint or pint canning jars (hot pack). Leave 1/4 inch of headspace.

Fill jars one at a time. Clean the top of each jar with a clean, damp cloth or paper towel. Cover with a new

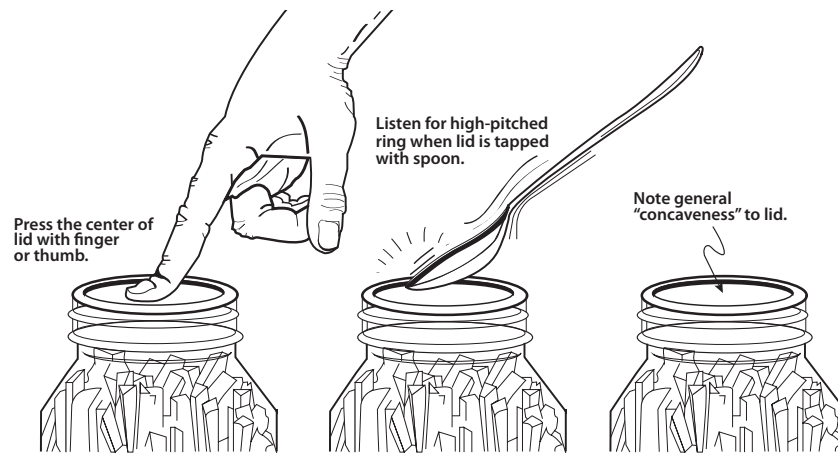


Figure 1. Procedure for testing jar seals after processing (illustrations adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).

two-piece canning lid. Tighten screw band. Place each jar in the canner immediately after filling.

“Follow these steps for successful boiling-water canning:

1. Before you start preparing your food, fill the canner halfway with clean water. This is approximately the level needed for a canner load of pint jars. For other sizes and numbers of jars, the amount of water in the canner will need to be adjusted so it will be 1 to 2 inches over the top of the filled jars.
2. Preheat water to 140°F for raw-packed foods and to 180°F for hot-packed foods. Food preparation can begin while this water is preheating.
3. Load filled jars, fitted with lids, into the canner rack and use the handles to lower the rack into the water; or fill the canner with the rack in the bottom, one jar at a time, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid.
4. Add more boiling water, if needed, so the water level is at least 1 inch above jar tops. For process times over 30 minutes, the water level should be at least 2 inches above the tops of the jars.
5. Turn heat to its highest position, cover the canner with its lid, and heat until the water in the canner boils vigorously.
6. Set a timer for the total minutes required for processing the food.
7. Keep the canner covered and maintain a boil throughout the process schedule. The heat setting may be lowered a little as long as a complete boil is maintained for the entire process time. If the water stops boiling at any time during the process, bring the water back to a vigorous boil and begin the timing of the process over, from the beginning.
8. Add more boiling water, if needed, to keep the water level above the jars.
9. When jars have been boiled for the recommended time [Table 1], turn off the heat and remove the canner lid. Wait 5 minutes before removing jars.
10. Using a jar lifter, remove the jars and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.” (USDA, 2009; p. I-18)

“Testing jar seals

After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:

Option 1. Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed.

Option 2. Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.

Option 3. Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed.” (p. I-25, USDA [2009])

See Figure 1 illustrating these steps for testing jar seals.

Reprocessing Unsealed Jars

Remove lids from unsealed jars and discard. Check the sealing surface of the jar for tiny nicks or cracks. If a jar has defects, discard it and replace it with another jar. If not, add a new lid and process for the same amount of time within 24 hours. Unsealed jars can be kept in the refrigerator and the food can be used within 3 to 4 days, or remove about an inch of the contents and freeze.

Storing Canned Food

Clean the outside of sealed, cooled jars with a damp towel dipped in a vinegar and water solution. Replace screw bands once they are completely dry, otherwise the bands will rust onto the lid and damage the lid and seal. Label with date and contents, including ingredients, and store in a cool (50–70°F), dark, dry place away from sun, light, or dampness.

Accidental Freezing

Freezing may cause food in jars to spoil if the seal is broken. Freezing and thawing can cause food to soften and lose eating quality. Protect jars from freezing by wrapping them with layers of newspaper.

If Canned Food Spoils

Examine jars carefully before consuming. Check lids for a vacuum seal. NEVER taste food from an unsealed jar. Signs of food spoilage are streaks and dried food at the top of the jar, swollen lids, broken jar seals, rising air bubbles, and any unnatural color. Other indicators include bad or unnatural odor; spurting liquid; white, blue, green, or black mold; or foaming.

Dispose of any food you suspect of being spoiled. For safety, spoiled canned food and containers may need to be detoxified before disposal. Contact your county Extension office (<http://aces.nmsu.edu/county/>) for detoxification instructions.

Elevation Adjustments

All communities in New Mexico are above sea level, varying from 3,000 to 10,000 feet in elevation, with differences even within a county.

Use Table 2 to determine the elevation of your community, and then select safe processing times for boiling your sweet spreads (Table 1). The boiling temperature of liquids is lower at higher elevations, and therefore food must be processed longer or at a higher pressure at high elevations.

MAKING JAM WITHOUT ADDED PECTIN

For best flavor, use fully ripened fruit. Wash and rinse all fruits thoroughly before cooking. Do not soak. Remove stems, skins, pits, and blossoms. Cut fruit into pieces and crush. Seedy berries can be put through a sieve or food mill to remove seeds. Measure crushed

Table 2. Elevation of Cities and Towns in New Mexico

City/Town	Elevation (Feet)	City/Town	Elevation (Feet)
Alamogordo	4,350	Logan	3,830
Albuquerque	5,000	Lordsburg	4,250
Artesia	3,350	Los Alamos	7,400
Aztec	5,650	Los Ranchos de Albuquerque	4,950
Bayard	5,800		
Belen	4,800	Lovington	3,900
Bernalillo	5,050	Magdalena	6,556
Bosque Farms	4,864	Melrose	4,599
Carlsbad	3,100	Mora	7,200
Carrizozo	5,450	Mosquero	5,550
Chama	7,900	Mountainair	6,500
Cimarron	6,450	Portales	4,010
Clayton	5,050	Raton	6,650
Cloudcroft	8,650	Reserve	5,749
Clovis	4,300	Rio Rancho	5,290
Columbus	4,020	Roswell	3,600
Corona	6,664	Roy	5,900
Corrales	5,005	Ruidoso	7,000
Cuba	7,000	San Jon	4,200
Deming	4,300	Santa Fe	7,000
Dexter	3,500	Santa Rita	6,300
Eagle Nest	8,250	Santa Rosa	4,600
Elida	4,345	Silver City	5,900
Española	6,100	Socorro	4,600
Farmington	5,400	Springer	5,800
Fort Sumner	4,050	Taos	7,000
Gallup	6,500	Texico	4,150
Grants	6,450	Tierra Amarilla	7,460
Hobbs	3,650	Truth or Consequences	4,250
Hurley	5,700	Tucumcari	4,100
Jemez Springs	6,200	Tularosa	4,500
Las Cruces	3,900	Vaughn	5,950
Las Vegas	6,450	Wagon Mound	6,200

Table 3. Measurements for Preparing Jam Without Added Pectin

	Cups of crushed fruit	Cups of sugar	Tbsp 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, gooseberries, raspberries, and strawberries.

Table 4. Measurements for Preparing Jelly Without Added Pectin

	To extract juice		Add to each cup of strained juice		Jelly yield (in half pints) from 4 cups of juice
	Cups of water to add per pound of fruit	Minutes to simmer before extracting juice	Sugar (cups)	Lemon juice (optional)	
Apples	1	20 to 25	3/4	1 1/2 tsp	4 to 5
Blackberries	0 to 1/4	5 to 10	3/4 to 1	—	7 to 8
Crab apples	1	20 to 25	1	—	4 to 5
Grapes	0 to 1/4	5 to 10	3/4 to 1	—	8 to 9
Plums	1/2	15 to 20	3/4	—	8 to 9

fruit into a large saucepan (see Table 3 for measurements). Add sugar and bring to a boil while stirring rapidly. Continue to boil until mixture thickens. Allow for thickening during cooling.

Test for doneness using one of the methods listed in the **Tests for Doneness** section. When jam is done, remove from heat and quickly skim off foam. Using a wide-mouth funnel, ladle the jam into hot, clean jars, leaving 1/4-inch headspace. Adjust lids and process jars as described in Table 1.

Tests for Doneness

The trick to making jam and jelly without added pectin is knowing when it is thick enough. Use one of these three methods to determine jam/jelly's doneness.

Temperature test. Before cooking the jam/jelly, measure the temperature of boiling water with a jelly, candy, or other cooking thermometer. Cook the jam/jelly mixture to a temperature 8°F higher than the boiling point of water. At that point, the concentration of sugar should form a satisfactory gel. For example, if water boils at 203°F at 5,000 ft elevation, cook jam/jelly to 211°F. This is the most dependable test.

Spoon or sheet test. Use a metal spoon to remove some of the liquid portion of the jam/jelly from the pot. Turn the spoon sideways so the jam/jelly flows off the spoon. As it reaches the proper thickness, individual drops will run together into a “sheet” that breaks cleanly off the edge of the spoon. Although widely used, this test is not entirely dependable.

Freezer test. Remove the jam/jelly mixture from the heat during this test. Pour a small amount of boiling jam/jelly on a cold plate and place it in the freezer for a few minutes. If the mixture gels, it should be done and ready to jar.

MAKING JELLY WITHOUT ADDED PECTIN

Use only firm fruits naturally high in pectin, such as apples, grapes, and some berries. Use a mixture of 3/4 ripe

and 1/4 under-ripe fruit. One pound of fruit should yield at least 1 cup of clear juice. Do not use commercially canned or frozen fruit juices since their pectin content is too low.

Wash all fruits thoroughly before cooking. Cut firm, larger fruits into small pieces. Include peels and cores because they add pectin to the juice. Crush soft fruits or berries. Put fruit and water (see Table 4 for amount of water) in a large saucepan and bring to a boil. Simmer, stirring occasion-

ally, for the amount of time listed in Table 4 or until the fruit is soft.

When fruit is tender, press **lightly** through a colander—too much pulp makes a cloudy jelly. Let the juice drip through a double layer of cheesecloth or a jelly bag.

Using no more than 6 to 8 cups of juice at a time, measure and combine the proper quantities of juice, sugar, and lemon juice (see Table 4). Heat to boiling. Stir until the sugar is dissolved. Boil over high heat, stirring frequently, until the mixture reaches its gelling point (see **Tests for Doneness** section).

When jelly is done, remove from heat and allow to stand about 1 minute. Bubbles will rise to top. Use a large metal spoon to skim foam off the jelly. Fill hot, clean jars one at a time. Add a lid and screw band and place each completed jar in a boiling-water canner before proceeding to the next jar.

MAKING JAM AND JELLY WITH ADDED PECTIN

Jam or jelly made with added pectin requires less cooking, provides a larger yield, and has more natural fruit flavor. Using added pectin also reduces the need to test for doneness. However, at elevations above 3,000 ft, jams or jellies with added pectin may need to be boiled a minimum of 2 minutes to reach gelling point.

Fresh fruits and fresh, canned, or frozen juices may be used with commercial powdered or liquid pectins. Follow complete directions provided with commercial pectins. The following recipes are usually available with packaged pectins.

Jams—Apricot, blackberry, blueberry, boysenberry, cherry, currant, dewberry, fig, gooseberry, grape, loganberry, orange marmalade, peach, pear, plum, red raspberry, rhubarb, spiced tomato, strawberry, and youngberry.

Jellies—Apple, blackberry, black or red raspberry, boysenberry, crab apple, currant, dewberry, elderberry, grape, loganberry, mayhaw, mint, peach, plum, rhubarb, and strawberry.



© Zigzagmtart | Dreamstime.com

Freezer Jam

Yield: 5 half pints

Note: Freezer jam is made with freezer jam pectin, also called instant pectin.

4 cups well crushed fruit (fresh or frozen)

1 1/2 cups sugar or 1/2 cup sucralose
1 packet or 5 tablespoons freezer jam or instant pectin

Combine sugar or sucralose with pectin and blend well. Stir in crushed fruit, stir for 3 minutes. Ladle into freezer containers or canning jars and let set for 30 minutes to thicken. Refrigerate up to three weeks, or freeze up to a year.

MAKING REDUCED-SUGAR FRUIT SPREADS

Using the following recipes, you can make a variety of tasty fruit spreads that are lower in sugar and calories than regular jams and jellies.

Peach–Pineapple Spread

Yield: 5 to 6 half pints

4 cups drained peach pulp
2 cups drained, unsweetened, crushed pineapple
1/4 cup bottled lemon juice
2 cups sugar (optional)

Thoroughly wash 4 to 6 pounds of firm, ripe peaches. Drain well. Peel and remove pits. Grind fruit flesh with a medium or serrated knife blade, crush with a fork, or pulse grind for 2 to 3 seconds in a food processor. Do not use a blender. Place prepared fruit in a 2-quart saucepan. Heat slowly to release juice. Stir 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. Combine 4 cups of peach pulp, pineapple, and lemon juice in a 4-quart saucepan. Add up to 2 cups of sugar, if desired, and mix well. Heat and boil gently for 10 to 15 minutes. Stir to prevent sticking. Fill hot, sterile jars quickly, leaving 1/4-inch headspace. Adjust lids and process jars (see Table 1).

This recipe can also be made with any combination of peaches, nectarines, apricots, or plums.

Non-nutritive sweeteners may be substituted for sugar. However, the spread must either be frozen or refrigerated and used within two to three weeks.

REMAKING SOFT JELLIES

If your jelly comes out too soft or watery, it can be re-made. Measure jelly to be recooked. Work with no more than 4 cups at a time.

To remake products without added pectin: For each cup of jelly, add 1 1/2 teaspoons bottled lemon juice. Heat to boiling and boil until gelling point is reached (see **Tests for Doneness** section). Remove from heat, quickly skim off foam, and fill hot, clean jars, leaving 1/4-inch headspace. Adjust new lids and process (see Table 5 for processing times).

To remake products with powdered pectin: For each cup of jelly, mix 1 tablespoon sugar, 2 tablespoons water, 1 1/2 teaspoons bottled lemon juice, and 1 teaspoon powdered pectin. Bring to a boil while stirring. Add jelly and bring to a rolling boil over high heat, stirring constantly. Boil hard for 30 seconds. Remove from heat, quickly skim off foam, and fill hot, clean jars, leaving 1/4-inch headspace. Adjust new lids and process (see Table 5 for processing times).

To remake products with liquid pectin: For each cup of jelly, measure 3 tablespoons sugar, 1 1/2 teaspoons bottled lemon juice, and 1 1/2 teaspoons liquid pectin. Bring only the jelly to a boil while stirring. Remove from heat and quickly add the sugar, lemon juice, and pectin. Return to a full, rolling boil while stirring constantly. Boil hard for 1 minute. Remove from heat, quickly skim off foam, and fill hot, clean jars, leaving 1/4-inch headspace. Adjust new lids and process (see Table 5 for processing times).

Table 5. Recommended Processing Times for Remade Soft Jellies in a Boiling-water Canner

Pack	Jar size	Processing time (in minutes) at elevation of	
		1,000–6,000 ft	6,000–10,000 ft
Hot	Half pints	10	15

Originally developed by Penn State Cooperative Extension with special project funds from Extension Service, U.S. Department of Agriculture. Adapted for use in New Mexico by Priscilla Grijalva, Extension Food and Nutrition Specialist. Subsequently revised by Alice Jane Hendley and Martha Archuleta, Extension Food and Nutrition Specialists.



Nancy Flores is the Extension Food Technology Specialist in the Department of Extension Family and Consumer Sciences at NMSU. She earned her B.S. at NMSU, M.S. at the University of Missouri, and Ph.D. at Kansas State. Her Extension activities focus on food safety, food processing, and food technology.



Cindy Schlenker Davies is the County Program Director and Extension Home Economist at NMSU's Bernalillo County Extension Office. She earned her B.S. at Eastern New Mexico University and her M.A. at NMSU. Her Extension and public outreach work focuses on food processing and preservation and food safety.

Contents of publications may be freely reproduced for educational purposes. All other rights reserved. For permission to use publications for other purposes, contact pubs@nmsu.edu or the authors listed on the publication.

New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating.