



FOOD PRESERVATION

Tempt your tastebuds with natural sweets

Jam and Jelly Basics

Nutritional Sciences
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Jelly, jam, preserves, conserves, marmalades and fruit butters are similar products. All are made from fruit, preserved by sugar and thickened or gelled to some extent.

Ingredients

To gel properly, sweet spreads must contain the right combination of fruit, pectin, acid and sugar. The fruit gives each spread its unique flavor and color. Fruit also supplies the water needed to dissolve the other ingredients and some or all of the pectin and acid. Good quality, flavorful fruits make the best sweet spreads.

If combined with the right amount of acid and sugar, pectins cause a gel to form. All fruits contain some pectin. Apples, crabapples, gooseberries and some plums and grapes contain enough natural pectin to form a gel. Other fruits, like strawberries, cherries and blueberries, contain little natural pectin. They must be mixed with other fruits high in pectin or with commercial pectin products for a gel to form. Fully ripened fruit contains less pectin, so combine it with one-fourth underripe fruit when making sweet spreads without added pectin.

Caution: Commercially frozen and canned juices are low in natural pectins and make soft-textured sweet spreads. Use only in recipes



calling for added pectin.

The right amount of acid is critical to gel formation. With too little acid, the gel will never set. Too much acid will cause the gel to lose liquid (weep). If fruits are low in acid, add lemon juice or other acid ingredients as directed. Commercial pectin products contain enough acid to ensure gelling.

Sugar helps preserve sweet spreads, contributes flavor and aids in gelling. Granulated white sugar is most often used to make jelly or jam. You can replace part of the sugar with corn syrup or honey, but too much masks the fruit flavor and changes the gel structure. Use tested recipes for replacing sugar with honey and corn syrup. Don't reduce the amount of sugar in traditional recipes, because a gel won't form, and yeasts and molds may grow in the sweet spreads.

Artificial sweeteners cannot be substituted for sugar in regular recipes

Jelly is a mixture of fruit juice and sugar that is clear and firm enough to hold its shape.

Other sweet spreads, like jam, are made from crushed or chopped fruit. Jam holds its shape, but is less firm than jelly. When jams are made from a mixture of fruits they are usually called conserves, especially when they contain citrus fruits, nuts, raisins or coconut.

Preserves are made of small, whole fruits or pieces of fruits in a clear, thick, slightly gelled syrup.

Marmalades are soft, transparent fruit jellies that contain small pieces of fruit or citrus peel.

Fruit butters are made from fruit pulp cooked with sugar until thickened.

because the sugar is needed for gel formation. Look for tested recipes on making jellied products without added sugar.

Don't seal it with a kiss — use the right lids and procedures to prevent spoilage

Even though sugar helps preserve sweet spreads, molds can still grow on

the surface of these products unless they are heat-processed. It is not a safe practice to scrape the mold off the surface of sweet spreads and use what's left in the jar. Poisons called mycotoxins — known to cause cancer in animals — have been found in some jars of jelly with surface mold growth. The effects of mycotoxins on humans are still being researched, so you should discard any sweet spread containing mold.

Paraffin or wax seals don't prevent mold growth and are no longer recommended for sealing any sweet spread, including jelly.

To prevent mold growth and to keep good flavor and color, pour hot sweet spreads into sterilized jars; leave ¼-inch headspace. Seal with two-piece lids, and process as directed in Table 1 (Page 5). Be sure to use the processing time recommended for your altitude.

Sweet spreads are best if eaten within one year.

Methods for making jams and jellies

You can make jams and jellies with or without added pectin. Only use the standard method of making sweet spreads — without added pectin — with fruits naturally high in pectin. It is much faster to make sweet spreads with added powdered or liquid pectin. For the best results, follow specific directions on packages of commercial pectins.

Making jelly without added pectin

Use only firm fruits naturally high in pectin. Mix about three-fourths ripe and one-fourth underripe fruit. One pound of fruit will make at least 1 cup of clear juice. Adding peels and cores while the fruit is cooking will add pectin



Jam and jelly gems

- Overcooking jam and jelly can break down pectin and prevent proper gelling.
- Always make only one batch at a time. Making more than one batch at a time (doubling or tripling the recipe) often results in soft gels.
- Stir constantly while cooking to prevent burning.
- Remember that recipes are developed for specific jar sizes. Using larger jars may cause excessively soft sweet spreads.

to the juice and make your jelly firmer. Do not use commercially canned or frozen fruit juices, because their pectin content is too low.

Wash all fruits thoroughly before cooking. Cut firm, larger fruits into small pieces. Crush soft fruits or berries. Add water to fruits as directed in Table 2 (Page 5). Put fruit and water in a large saucepan and bring to a boil. Simmer, stirring occasionally, for the amount of time listed or until the fruit is soft.

Press soft fruit lightly through a colander. Then, let juice drip through a double layer of cheesecloth or a jelly bag. Pressing or squeezing the cooked fruit will cause cloudy jelly.

Use no more than six cups to eight cups of fruit juice at a time and combine the right amounts of juice, sugar and lemon juice, as directed in Table 2 (Page 5). Heat to boiling. Stir until the sugar is dissolved. Boil over high heat, stirring frequently, until the gelling point is reached. Test for the

gelling point with one of the following methods:

Temperature test

Use a jelly or candy thermometer, and boil until mixture reaches the following temperature at your altitude.

| If your altitude is: | Boil until mixture reaches: |
|-----------------------------|------------------------------------|
| Sea level | 220 degrees F |
| 1,000 feet | 218 degrees F |
| 2,000 feet | 216 degrees F |

Sheet or spoon test

Dip a cool metal spoon into the boiling jelly mixture. Raise the spoon out of the steam, about 12 inches above the pan. 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. See Figure 1 (Page 6).

When the gelling point is reached, remove jelly from the heat and quickly skim off foam. Use a wide-mouth funnel, and pour the jelly into sterilized

jars. Leave ¼-inch headspace. Adjust lids and process as directed in Table 1 (Page 5).

Making jam without added pectin

For best flavor, use fully ripe fruit. Wash and rinse all fruit thoroughly before cooking. Don't soak. Remove stems, skins and pits from fruit; cut fruit into pieces and crush. Remove stems and blossoms and crush berries. Put seedy berries (such as raspberries and blackberries) through a sieve or food mill. Do not puree fruit — this will change the acid level and cause a weak gel.

Use the ingredient amounts given in Table 3 (Page 6) and measure crushed fruit and sugar into a large saucepan. Bring to a boil while stirring rapidly and constantly. Continue to boil until the jam thickens. When testing for thickness, remember that jam continues to thicken as it cools. Test for thickness using one of the following methods:

Temperature test

Use a jelly or candy thermometer and boil until jam reaches the right temperature for your altitude. (See directions for jelly.)

Refrigerator test

Remove all the jam from the heat and pour a small amount of boiling jam on a cold plate. Put the plate in the freezing compartment of a refrigerator for a few minutes. If the jam gels, it is thick enough.

When jam is done, remove it from the heat and quickly skim off foam. Use a wide-mouth funnel to pour the jam into sterilized jars. Leave ¼-inch headspace. Adjust lids and process as directed in Table 1 (Page 5).

Making jelly and jam with added pectin

You may use fresh fruits and juices or commercially canned or frozen juices (or a combination) with commercially prepared powdered or liquid pectins. Complete directions for a variety of fruits are provided with packaged pectin. Always follow package directions for combining ingredients.

Jelly or jam made with added pectin requires less cooking, usually gives a larger yield and has more natural fruit flavor. Also, using added pectin eliminates the need to test for doneness.

You may add ½ teaspoon of butter or margarine to the juice and pectin to reduce foaming; however, this may cause off-flavors during long-term storage.

The following recipes are usually available with packaged pectins:

Jellies

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

Jams

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

Old pectin may not gel. Purchase it as needed every year.

Grape-plum jelly with pectin

- 3½ pounds ripe plums
- 3 pounds ripe Concord grapes
- 1 cup water
- ½ teaspoon butter or margarine (optional ingredient to reduce foaming)
- 8½ cups sugar

- 1 box (1¾ ounces) powdered pectin

Yield

About 10 half-pints

Procedure

Wash and pit plums; do not peel. Thoroughly crush plums and grapes, one layer at a time, in a large saucepan. Add water. Bring to a boil. Cover and simmer 10 minutes.

Strain juice through a jelly bag or double layer of cheesecloth. Measure sugar and set aside. Combine 6½ cups of juice with pectin in a large saucepan. Add butter if desired. Bring to a hard boil over high heat, stirring constantly. Add the sugar and return to a full, rolling boil. Boil hard for 1 minute, stirring constantly. Remove from heat, skim off foam and quickly pour into sterilized half-pint jars. Leave ¼-inch headspace. Adjust lids, and process the jars as directed in Table 1 (Page 5).

Blueberry-spice jam with pectin

- 2½ pints ripe blueberries
- 1 tablespoon lemon juice
- ½ teaspoon ground nutmeg or cinnamon
- 5½ cups sugar
- ¾ cup water
- 1 box (1¾ ounces) powdered pectin

Yield

About 5 half-pints

Procedure

Wash and thoroughly crush blueberries, one layer at a time, in a large saucepan. Add lemon juice, spice and water. Stir in pectin, and bring to a full, rolling boil over high heat. Stir frequently. Add the sugar and return to a full, rolling boil. Boil hard for 1 minute, stirring constantly. Remove from heat, quickly skim off foam and

pour into sterilized half-pint jars. Leave ¼-inch headspace. Adjust lids and process the jars as directed in Table 1 (Page 5).

Pear-apple jam with pectin

- 2 cups fully ripe pears, peeled, cored and finely chopped (about 2 pounds)
- 1 cup apples, peeled, cored and finely chopped (about 1 large)
- 6½ cups sugar
- ¼ teaspoon ground cinnamon
- ⅓ cup bottled lemon juice
- 6 ounces liquid pectin

Yield

About 7 half-pints to 8 half-pints

Procedure

Crush pears and apples in a large saucepan and stir in cinnamon. Thoroughly mix sugar and lemon juice into fruits, and bring to a boil over high heat, stirring constantly. Immediately stir in pectin. Bring to a full, rolling boil and boil 1 minute. Stir constantly. Remove from heat; quickly skim off foam and pour into sterilized, half-pint jars. Leave ¼-inch headspace. Adjust lids and process the jars as directed in Table 1 (Page 5).

Strawberry-rhubarb jelly with pectin

- 1½ pounds red stalks of rhubarb
- 1½ quarts ripe strawberries
- ½ teaspoon butter or margarine (optional ingredient to reduce foaming)
- 6 cups sugar
- 6 ounces liquid pectin

Yield

About 7 half-pints.

Procedure

Wash and cut rhubarb into 1-inch pieces and blend or grind. Wash and stem strawberries, then crush berries

one layer at a time. Put both fruits in a jelly bag or double layer of cheesecloth and gently squeeze out juice. Measure 3½ cups of juice into a large saucepan. Thoroughly mix sugar into juice and add butter if desired. Bring to a boil over high heat, stirring constantly. Immediately stir in pectin. Bring to a full, rolling boil and boil hard 1 minute. Stir constantly. Remove from heat, quickly skim off foam and pour into sterilized, half-pint jars. Leave ¼-inch headspace. Adjust lids and process the jars as directed in Table 1 (Page 5).

Berry syrup

Juices from fresh or frozen blueberries, cherries, grapes, raspberries (black or red) and strawberries are easily made into toppings for use on ice cream and pastries.

Yield

About 9 half-pints

Procedure

Select 6½ cups of fresh or frozen fruit of your choice. Wash, cap and stem fresh fruit and crush in a saucepan. Heat to boiling and simmer until soft (5 to 10 minutes). Strain hot berries through a colander and let drain until cool enough to handle. Strain the collected juice through a double layer of cheesecloth or jelly bag. Discard the dry pulp. The yield of the pressed juice should be about 4½ cups to 5 cups.

Combine the juice with 6¾ cups of sugar in a large saucepan, bring to boil and simmer 1 minute. To make a syrup with whole fruit pieces, save 1 or 2 cups of the whole fresh or frozen fruit, combine with the sugar and crushed fruit and simmer as in making regular syrup. Remove from heat, skim off foam and pour into clean, half-pint or pint jars. Leave ½-inch headspace. Adjust lids and process as directed in Table 1.

Apple butter

Use Jonathan, Winesap, Stayman, Golden Delicious, MacIntosh, or other tasty apple varieties for good results.

- 8 pounds apples
- 2 cups cider
- 2 cups vinegar
- 2¼ cups white sugar
- 2¼ cups packed brown sugar
- 2 tablespoons ground cinnamon
- 1 tablespoon ground cloves

Yield

About 9 half-pints to 10 half-pints

Procedure

Wash, remove stems, quarter and core fruit. Cook slowly in cider and vinegar until soft. Press fruit through a colander, food mill or strainer. Cook fruit pulp with sugar and spices, stirring frequently. To test for doneness, remove a spoonful and hold it away from steam for two minutes. Apple butter is done if it remains mounded on the spoon. Or, test for doneness by spooning a small amount onto a plate. When a rim of liquid does not separate around the edge of the apple butter, it is ready for processing. Fill hot, sterilized, half-pint or pint jars. Leave ¼-inch headspace. Adjust lids and process as directed in Table 1 (Page 5).

Remaking soft jellies

Measure jelly to be recooked. Work with no more than 4 to 6 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 pour into sterilized jars. Leave ¼-inch headspace. Adjust new lids and process the jars as directed in Table 1 (below).

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 full rolling boil, stirring constantly.

Boil hard for 1 minute, then remove from heat. Quickly skim off foam and fill sterilized jars. Leave ¼-inch headspace. Adjust new lids and process the jars as directed in Table 1 (below).

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 above to determine if jelly is done.

Remove from heat, quickly skim off foam and fill sterilized jars. Leave ¼-inch headspace. Adjust new lids and process the jars as directed in Table 1 (below).

Table 1. Recommended processing times for sweet spreads in a boiling-water canner

| Product | Style of pack | Jar size | Process times at different altitudes (in minutes) | |
|---|---------------|---------------------|---|------------------|
| | | | 0–1,000 feet | 1,001–6,000 feet |
| All jellies and jams with or without added pectin | Hot | Half-pints or pints | 5 | 10 |
| Berry syrup | Hot | Half-pints or pints | 10 | 15 |
| Apple butter | Hot | Half-pints or pints | 5 | 10 |

When the jars have been processed in boiling water for the recommended time, turn off the heat and remove the canner lid. Wait 5 minutes. Remove jars from canner; use a jar lifter and keep jars upright. Carefully place them directly onto a towel or cake cooling rack, leaving at least 1 inch of space between the jars during cooling. Avoid placing the jars on a cold surface or in a cold draft. Cool jars upright for 12–24 hours while vacuum seal is drawn and jam or jelly sets up.

Table 2. Making jelly without added pectin

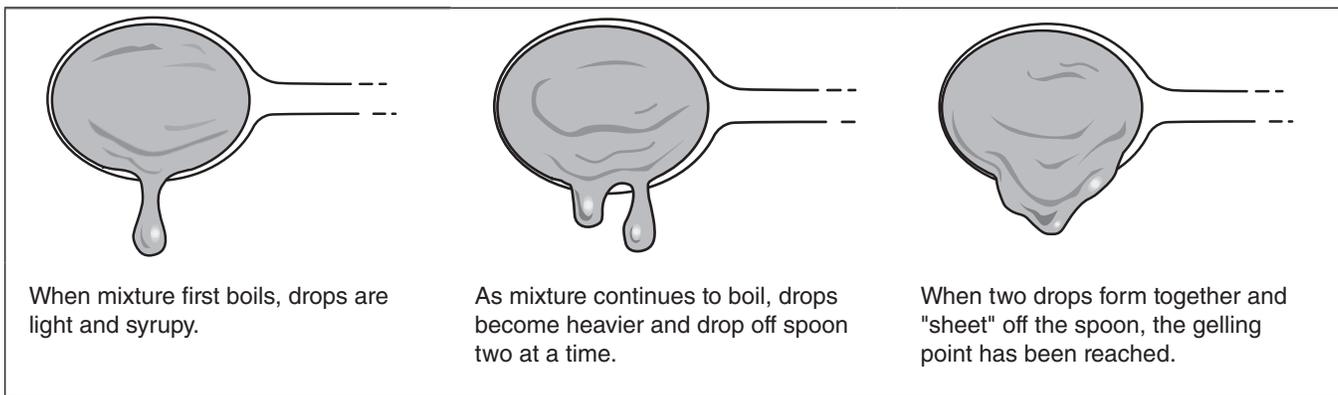
| Fruit | To make juice | | To make jelly | | |
|-------------------------|--|---|--|------------------------|--|
| | Cups of water to be added per pound of fruit | Minutes to simmer before separating out juice | Cups of sugar to add to each cup of strained juice | Lemon juice (optional) | How many half-pints of jelly you will get from 4 cups of juice |
| Apples, tart | 1 | 20–25 | ¾ | 1½ teaspoons | 4–5 |
| Berries | 0–¼ | 5–10 | ¾–1 | none | 7–8 |
| Crabapples | 1 | 20–25 | 1 | none | 4–5 |
| Grapes, Eastern Concord | 0–¼ | 5–10 | ¾–1 | none | 8–9 |
| Plums, not Italian | ½ | 15–20 | ¾ | none | 8–9 |

Table 3. Making jam without added pectin

| Fruit | Cups of crushed fruit | Cups of sugar to add to crushed fruit | Tablespoons of lemon juice | How many half-pints you will get |
|----------|-----------------------|---------------------------------------|----------------------------|----------------------------------|
| Apricots | 4–4½ | 4 | 2 | 5–6 |
| Berries* | 4 | 4 | 0 | 3–4 |
| Peaches | 5½–6 | 4–5 | 2 | 6–7 |

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

Figure 1. The spoon or sheet test



For more information, visit MU Extension:

<http://extension.missouri.edu>