



CANNING: FRUIT SPREADS

Jams, jellies, marmalades, preserves, and conserves are sweet spreads made from fruit or juice; they differ in firmness, clarity, and ingredients. **Jam** is made from crushed or ground fruit and usually has a thick consistency. **Jelly** is made from fruit juice and contains no visible pieces of fruit. It is clear and firm enough to hold its shape when turned out of the jar. **Marmalade** is a soft gel with pieces of fruit and citrus peel. **Preserves** are made by cooking whole or large pieces of fruit in a clear, light jellied syrup. **Conserves** are a mixture of fruits, citrus fruit, nuts, and raisins. **Fruit butters** are thickened fruit sauces with added spices.

ESSENTIAL INGREDIENTS

Pectin is necessary for thickening or gel formation. It is present naturally in fruit and also is commercially available in powdered or liquid form. Pectin is formed as fruit ripens, or as underripe fruit is cooked. All fruits have some pectin. Apples, crabapples, gooseberries, citrus peel, and certain plums contain large amounts of pectin. Other fruits, like blueberries, strawberries, cherries, or huckleberries, contain little pectin and will thicken only if combined with fruit rich in pectin, or combined with powdered or liquid pectin.

Most recipes call for powdered or liquid pectin. Commercial pectins have standardized jelling ability for use in jelly and jam. Their jelling ability is greatest when fresh therefore buy fresh pectin yearly. When using a recipe that calls for pectin remember to: use the correct form of pectin; follow the preparation instructions; use the correct amount of sugar and fruit. Keep unused pectin in a cool, dry place. This will keep its gel strength.

Acid is needed for a gel to form as well as for flavor. Since the amount of acid in fruit varies and depends on ripeness, most fruits need added acid. Lemon juice is usually added; however a $\frac{1}{8}$ teaspoon of citric acid can be substituted for each tablespoon of lemon juice if desired.

Sugar helps gel formation and adds sweetness and firmness. About 65 to 68% of jams and jellies are sugar. If they have less than this the gel will be weak or runny. Sugar is important in determining the shelf life of fruit spreads. Low sugar fruit spreads will mold more easily than the standard kind.

Honey, corn syrup, low-calorie sweeteners may not be substituted one for one for sugar in fruit spreads. If you plan to use these, be sure to use a tested and reliable recipe that uses these specifically.

START WITH TESTED RECIPES

For best results, always use tested recipes from a reliable source. Measure ingredients carefully and follow the directions exactly. Do not change the amount of sugar or fruit. Do not substitute one type of pectin for another.

If you want a larger yield, prepare the recipe twice or as many times as necessary. Do not double the recipe since the larger quantity may not cook to the proper stage in the time suggested in the recipe. Likewise, do not cut the recipe in half.

Many people prefer to make uncooked or freezer jams because they are quick and have a more pronounced fresh fruit flavor. Recipes for freezer jams are included with most pectin products. Be sure to follow the recipe exactly.

USE STANDARD JARS AND LIDS

Half-pint canning or jelly jars and self-sealing, two-piece lids are recommended. Do not use commercial mayonnaise or salad dressing jars. Even though the two-piece lids may fit on these jars types, breakage and seal failures are more likely. Check jars for cracks or chips and check lids for dents or rust; these defects may cause sealing failures. Lids should be purchased yearly; just buy what you need. Prepare the lids and bands according to the manufacturer's directions.

If the processing time is less than 10 minutes, the jars will need to be sterilized. To sterilize empty jars, put them right side up on the rack in a boiling water canner. Add hot (not boiling) water, filling jars and canner to 1 inch over tops of jars. Heat till water boils, then start timing. Boil for 10 minutes. Remove and drain jars one at a time. Fill with food, add lids, tighten screw bands and process. Leave hot water in canner for processing filled jars. Do not seal with parafin.

PREPARING FRUIT SPREADS

Jams and Jellies with Added Pectin Fruit spreads made with added pectin require less cooking and usually give a larger yield. Commercial pectins provide a complete set of directions for a variety of fruits. Follow these directions exactly to ensure a safe and quality product. Remember to purchase fresh pectin yearly to guarantee the best jelling action.

Jelly without added Pectin Use only firm fruits naturally high in pectin (e.g., apples, blackberries, crabapples, plums). About $\frac{3}{4}$ of the fruit should be ripe and $\frac{1}{4}$ under ripe. Clean the fruit, then process according to the recipe.

Jam without added Pectin Use fully ripe fruit. Clean fruit thoroughly removing stems, skins, and pits from fruit, cut into pieces and crush. For berries remove stems and blossoms and crush. Process according to the recipe.

Freezer Jams Made with added pectin but are not processed. They are easier to make than regular jam but cannot be stored at room temperatures. They will keep for a few weeks in the refrigerator, or one to three years in the freezer. Recipes are often available in packages of commercial pectin.

Jams made with gelatin Jams and jellies made with commercial powdered gelatin should be made in small batches and refrigerated (up to 4 weeks). They should not be frozen or canned.

TESTING FOR DONENESS

Temperature Test Use a jelly or candy thermometer and boil until the mixture reaches 220°F (sea level), 218°F (1000 ft), 216 (2000 ft).

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 the 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 hands off the edge.

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 freezer for a few minutes. If it jells, its done.

PROCESS ALL FRUIT SPREADS

To prevent mold growth, flavor loss, change of color, and surface darkening, all cooked fruit spreads must be heat processed. Due to the risk of harmful mold contamination, paraffin seals are not recommended.

To heat process, place jars in water bath canner filled with hot water. Water should be 1 inch over jar tops. Heat to boiling, then begin timing for the time indicated in the tested recipe. Do not reduce the processing time. Keep water boiling (212°F) during the entire processing time. If water evaporates, add boiling water to keep it at least 1 inch over the top of jars. Leave the lid on the canner. When processed for the recommended time, turn off the heat and remove the canner lid. Wait five minutes before removing the jars. This is a new recommendation and part of the heating time.

Remove jars from canner and place on a rack or folded cloth away from drafts. Do not tighten the screw bands. When the jars have cooled completely, check seals by pressing on the center of the lid. The lid should be curved downward. If lid is down and will not move, jar is sealed. Refrigerate any unsealed jars.

REMAKING SOFT FRUIT SPREADS

Since fruits vary, a recipe may not always give the exact results time after time. Overcooked jelly cannot be redone; however you can dilute it with water and heat it to make pancake syrup. Fruit spreads that are too soft sometimes can be saved by recooking. Have clean jars and new lids ready before starting.

To remake with powdered pectin: Measure 4 cups of jelly; set aside. In a large saucepan combine $\frac{1}{2}$ cup water, $\frac{1}{4}$ cup sugar, 2 tablespoons bottled lemon juice, and 4 teaspoons powdered pectin. Heat to boiling, stirring constantly. Add 4 cups jelly and bring to a rolling boil over high heat, stirring constantly. Boil hard 30 seconds. Remove from heat, quickly skim off foam and fill sterile jars with jelly, leaving $\frac{1}{4}$ -inch headspace. Wipe jar rims. Adjust new lids and heat process in boiling water canner as directed.

To remake with liquid pectin: For each quart of jelly, have ready $\frac{3}{4}$ cup sugar, 2 tablespoons bottled lemon juice, and 2 tablespoons liquid pectin. Measure 4 cups jelly into large saucepan and bring to a boil over high heat, stirring constantly. 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 with jelly, leaving $\frac{1}{4}$ -inch headspace. Wipe jar rims. Adjust new lids and process in boiling water canner as directed.

Typical Fruit Spread Problems and Causes

PROBLEM	CAUSES	PREVENTION
Contains glasslike particles or crystals	<ol style="list-style-type: none"> 1. Sugar may not have dissolved completely due to undercooking. 2. Long, slow cooking may have resulted in too much evaporation of water. 3. Undissolved sugar, which was sticking to the pan, washed into the fruit spread as it was poured. 4. If grape fruit spread, the crystals may be tartaric acid, a natural substance in grapes. 	<ol style="list-style-type: none"> 1. Time cooking accurately. 2. Fruit spread should be boiled rapidly, not simmered. 3. Ladle fruit spread into jars instead of pouring it. Or, carefully wipe side of pan free of sugar crystals with a damp cloth before filling jars. 4. Allow juice to stand in refrigerator for 24 to 48 hours; then strain through double thickness of damp cheesecloth before preparing fruit spread. Carefully pour off juice without disturbing sediment.
Lacks flavor	<ol style="list-style-type: none"> 1. Under ripe fruit. 2. Fruit spread stored too long. 3. Storage area was too warm. 	<ol style="list-style-type: none"> 1. Fruit spread should be eaten within 1 year. 2. Storage area should be cool, dark, dry.
"Weeping"	<ol style="list-style-type: none"> 1. Usually occurs in quick-setting jellies and is due to amount of acid and quality of pectin in the fruit. 2. Storage area was too warm. 	<ol style="list-style-type: none"> 1. Follow reliable, tested recipe. Use only 4 to 6 cups of juice per batch. Do not alter the recipe. 2. Storage area should be cool and dark.
Cloudy	<ol style="list-style-type: none"> 1. Fruit was too green. 2. Fruit may have been cooked too long before straining. 3. Juice may have been squeezed from fruit. 4. Fruit spread poured into jars too slowly. 5. Fruit spread mixture was allowed to stand before it was poured into jars. 	<ol style="list-style-type: none"> 1. Fruit should be firm but ripe. 2. Fruit should be cooked only until tender. 3. To obtain the clearest fruit spread possible, let juice drip through cotton flannel bag, but do not squeeze. 4. Work quickly. 5. Immediately fill and seal jars.
Bubbles (may denote spoilage)	<ol style="list-style-type: none"> 1. If bubbles are moving, fruit spread is spoiled; usually the airtight seal has been broken. (Do not use.) 2. If bubbles are standing still, utensil from which fruit spread was poured was held too far from top of jar or fruit spread was poured slowly and air was trapped in the hot fruit spread. 	<ol style="list-style-type: none"> 1. Use sterilized jars. Fill jars while fruit spread is boiling hot. Heat process as directed. Test seals before storing. 2. Hold pan or ladle close to jar and pour quickly.
Mold (do not use)	<ol style="list-style-type: none"> 1. Processing did not result in airtight seal 2. Lack of sanitation (did not sterilize jars) 3. Too little sugar 	<ol style="list-style-type: none"> 1. Use sterilized jars. 2. Fill jars while fruit spread is boiling hot. 3. Heat process as directed. 4. Test seals before storing.
Tough or stiff	<ol style="list-style-type: none"> 1. Too much pectin in fruit. 2. Fruit spread was overcooked. 3. Too little sugar, so mixture had to be cooked too long to reach jelling stage. 	<ol style="list-style-type: none"> 1. Use riper fruit. 2. Cook jelly for recommended time (follow correct timing procedure; do not alter processing method) 3. Measure sugar accurately and use amount specified.
Wine-like flavor or odor (do not use)	Yeasts grow on fruit spread when seal is not airtight.	<ol style="list-style-type: none"> 1. Sterilize jars before using. 2. Fill jars while fruit spread is boiling hot. 3. Heat process as directed. 4. Test seals before storing.
Dark on surface	Harmless browning reaction due to enzymes naturally present in fruit.	Eliminate air from the jar by heat processing so that the reaction won't occur.

RECIPES

Strawberry Jam Yield: About 8 half-pints

About 2 quarts whole strawberries
7 cups sugar
¼ cup lemon juice
1 pouch liquid pectin (3 fluid ounces)

Sort and wash ripe strawberries; remove stems and caps. Crush berries with potato masher or by pressing through a strainer. If using a food processor, pulse or chop only; do not puree. Measure 3¾ cups crushed berries into large kettle. Add sugar and lemon juice; stir well. Place on high heat; bring quickly to a full rolling boil. Boil hard for 1 minute, stirring constantly. Remove from heat and stir in pectin. Skim off foam with metal spoon. Immediately fill sterile jars, leaving ¼-inch headspace. Wipe rims, adjust lids and heat process for 5 minutes at altitudes of less than 1,000 feet, or for 10 minutes at altitudes above 1,000 feet.

Freezer Strawberry Jam Yield: About 6 half-pints

About 1 quart fully ripe strawberries
4 cups sugar
¾ cup water
1 box powdered fruit pectin

Sort and wash fruit; remove stems and caps; crush berries with potato masher or by pressing through a strainer. If using a food processor, pulse or chop only; do not puree. Measure 2 cups crushed strawberries into a large bowl. Add sugar, mix well, and let stand. In a small saucepan, combine water and pectin. Bring to a boil and boil 1 minute, stirring constantly. Remove from heat and stir pectin mixture into fruit mixture. Continue stirring about 3 minutes. A few sugar crystals will remain. Quickly ladle into freezer containers. Wipe off top edge and cover at once with tight lids leaving ¼-to ½-inch headspace. Let stand at room temperature for 24 hours. Freeze for long-term storage, or refrigerate and use within 3 weeks.

Apple Butter Yield: 8 to 9 pints

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

To prepare pulp, quarter and core apples, but do not peel. Cook apples slowly in vinegar and cider until tender. Press fruit through a strainer or food mill.

To prepare butter, put apple pulp in a large kettle. Add sugar and spices. Cook slowly until thick, about 1 hour, stirring frequently. To test for doneness, remove a spoonful and hold it away from steam for 2 minutes. If apple butter remains mounded on the spoon, it's done. Or, spoon a small quantity of apple butter onto a plate. When a rim of liquid does not form around the edge of the butter, it has been cooked adequately and is ready for canning.

Immediately fill sterile, half-pint or pint jars, leaving ¼-inch head- space. Wipe rims, adjust lids, and process in a boiling water canner for 5 minutes if at altitudes of less than 1,000 feet, or for 10 minutes if altitude is above 1,000 feet.

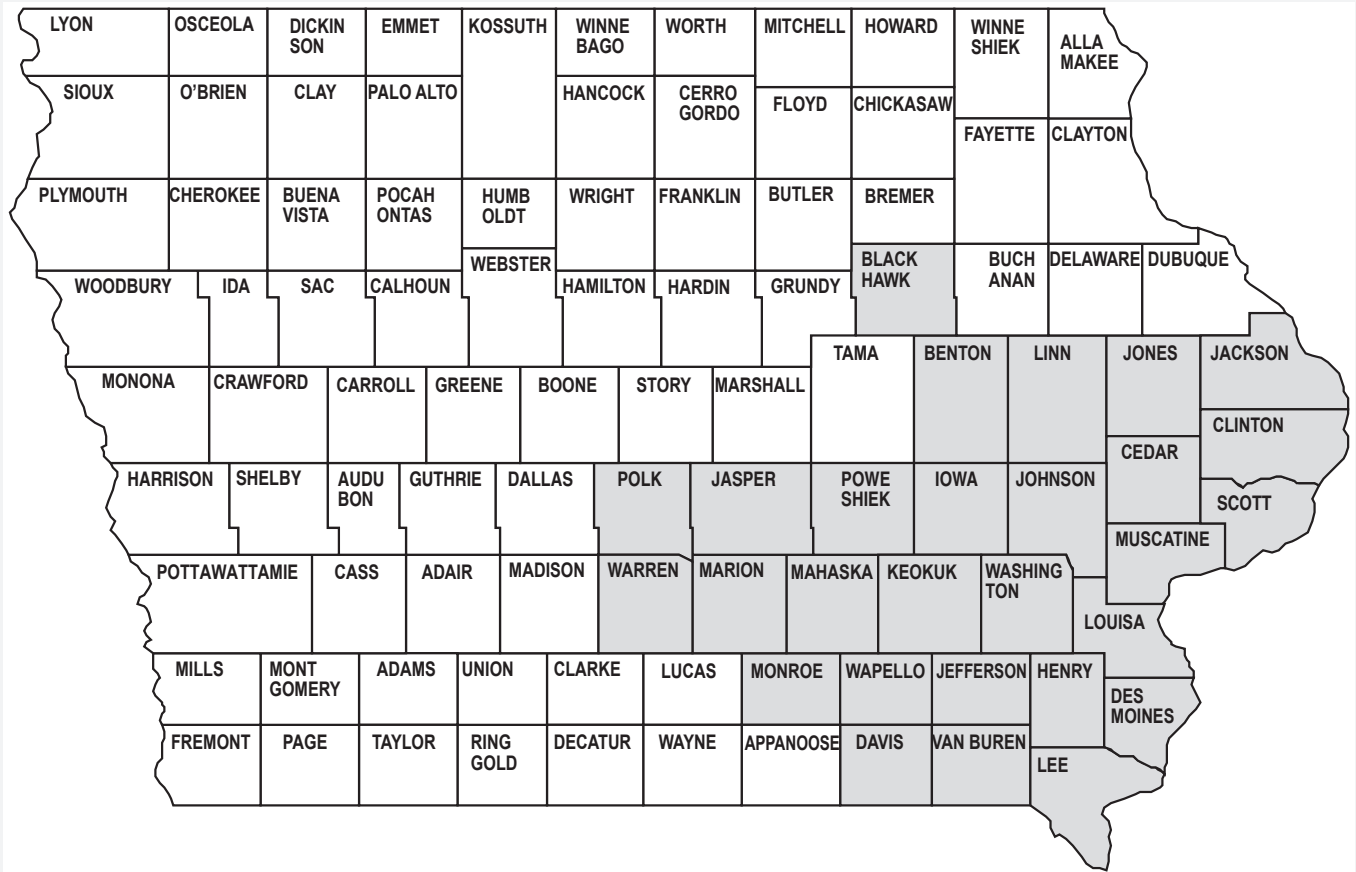
Orange Jelly Yield: About 6 half-pints

12 ounces frozen orange juice concentrate, thawed
2½ cups water
1 box powdered pectin
4½ cups sugar

Mix juice and water in saucepan. Add pectin and bring to a boil. Add sugar all at once. Bring to a full rolling boil, stirring constantly. Boil hard for 1 minute. Remove from heat and skim off foam with a metal spoon. Immediately fill sterile jars, leaving ¼-inch headspace. Wipe rims, adjust lids and heat process in a boiling water canner for 5 minutes if at altitudes of less than 1,000 feet, or for 10 minutes if altitude is above 1,000 feet.

Altitudes of Iowa Counties

Shaded areas are less than 1,000 feet • Unshaded areas are 1,000 to 2,000 feet



FOR MORE FOOD PRESERVATION INFORMATION

- Call AnswerLine (800) 262-3804 (voice) or (800) 735-2942 (telecommunications device for deaf)
- Download ISU Extension and Outreach fact sheets from store.extension.iastate.edu
- Access the U.S. Department of Agriculture's *Complete Guide to Home Canning* at nchfp.uga.edu

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