FCS3-331

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

# Preparing & Canning Jams & Jellies

**Featuring new, research-based recommendations for safer and better quality food at home**

AGRICULTURE & NATURAL RESOURCES • FAMILY & CONSUMER SCIENCES
4-H/YOUTH DEVELOPMENT • RURAL & ECONOMIC DEVELOPMENT

## Know Your Altitude

It is important to know your approximate elevation or altitude above sea level in order to determine a safe processing time for canned foods. Since the boiling temperature of liquid is lower at higher elevations, it is critical that additional time be given for the safe processing of foods at altitudes above sea level.

All towns and communities in Kentucky are below 2,000 feet. The processing times given in this canning guide are for altitudes up to 3,000 feet and are safe for all parts of our state.

## DANGER! Guard Against Food Poisoning

Pressure canning is the only recommended method for canning meat, poultry, seafood, and most vegetables. The bacterium *Clostridium botulinum* in low-acid foods is destroyed when they are processed at the correct time and pressure in pressure canners. Using boiling-water canners for these foods poses a real risk of botulism poisoning.

If these bacteria survive and grow inside a sealed jar of food, they can produce a poisonous toxin. Even a taste of food containing this toxin can be fatal. Low-acid foods should be boiled after their jars are opened, even if you detect no signs of spoilage and are certain the food has been properly processed. In Kentucky, boiling for 13 minutes destroys the toxin that causes poisoning.

This guide, containing up-to-date instructions for preparing safe home-canned foods, is based on research conducted at the Pennsylvania State University. It is adapted from the USDA Complete Guide to Home Canning.

**Other publications in the home-canning series include:**

- FCS3-121, *Canning Tomatoes and Tomato Juice*
- FCS3-325, *Principles of Home Canning*
- FCS3-326, *Selecting, Preparing, and Canning Fruit and Fruit Products*
- FCS3-327, *Selecting, Preparing, and Canning Tomatoes and Tomato Products*
- FCS3-328, *Selecting, Preparing, and Canning Vegetables and Vegetable Products*
- FCS3-329, *Preparing and Canning Poultry, Red Meat, and Fish*
- FCS3-330, *Preparing and Canning Fermented Foods and Pickled Vegetables*

These publications are also available on our web site at:
http://www.ca.uky.edu/agc/pubs/pubs.htm

*No product endorsement is implied, nor discrimination against similar products intended, by the mention of brand names in this publication.*

---

*Revised and adapted for use in Kentucky by Fudeko Maruyama, former Food and Nutrition Specialist*

*Contact: Sandra Bastin, Ph.D., R.D., Extension Specialist in Food and Nutrition*

# Contents

Jellies, Jams, Marmalades, and Butters ..... 4
Ingredients ..... 4
Jams and Jellies with Reduced Sugar ..... 4
Preventing Spoilage ..... 5
Equipment & Containers ..... 5
Sterilizing Empty Jars ..... 5
Methods of Making Jams & Jellies..... 5
Making Jellies without Added Pectin .... 6
Extracting Juices and Making Jellies ... 6
Making Jams without Added Pectin ..... 7
Making Jams and Jellies with Added Pectin ..... 8
Pear-Apple Jam ..... 8
Strawberry-Rhubarb Jelly ..... 8
Blueberry-Spice Jam ..... 9
Grape-Plum Jelly ..... 9
Making Reduced-Sugar Fruit Spreads ..... 9
Peach-Pineapple Spread..... 10
Refrigerated Apple Spread (made with gelatin) ..... 10
Refrigerated Grape Spread (made with gelatin) ..... 10
Remaking Soft Jellies ..... 11

# Introduction to the Complete Guide to Home Canning

Home canning has changed greatly in the 170 years since it was introduced as a way to preserve food. Scientists have found ways to produce safer, higher quality products. The first part of this series explains the scientific principles on which canning techniques are based, discusses canning equipment, and describes the proper use of jars and lids. It describes basic canning ingredients and procedures and how to use them to achieve safe, high-quality canned products.

The remaining publications in this series consist of canning guides for specific foods. These guides offer detailed directions for canning fruits and fruit products, tomatoes and tomato products, vegetables, red meats, poultry and fish, pickles and relishes, and jams and jellies. Handy guidelines for choosing the correct quantity and quality of raw foods accompany each set of directions for fruits, tomatoes, and vegetables. Most recipes are designed to yield a full canner load of pints or quarts.

This publication contains many new research-based recommendations for canning safer and better quality food at home. It is an invaluable resource for persons who are canning for the first time. Experienced canners will find updated information to help them improve their canning practices.

# Jellies, Jams, Marmalades, and Butters

Sweet spreads are a class of foods with many textures, flavors, and colors. They all consist of fruits preserved mostly by means of sugar, and they are thickened or jellied to some extent.

Fruit jelly is a semi-solid mixture of fruit juice and sugar that is clear. It is firm enough to hold its shape.

Other spreads are made from crushed or ground fruit:

- Jam also will hold its shape, but it is less firm than jelly. Jam is made from crushed or chopped fruits and sugar.
- Conserves are like jams but are made from a mixture of fruits, especially citrus fruits, and nuts, raisins, or coconut.
- Preserves are made of small, whole fruits or uniform-size pieces of fruit in a clear, thick, slightly jellied syrup.
- Marmalades are soft fruit jellies with small pieces of fruit or citrus peel evenly suspended in a transparent jelly.
- Fruit butters are made from fruit pulp that has been cooked with sugar until thickened to a spreadable consistency.

# Ingredients

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

Pectins are substances in fruits that form a gel if they are 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 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 underripe.

The proper level of acidity 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 serves as a preserving agent, contributes flavor, and aids gelling. Cane and beet sugar are the usual ingredients in 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 yeasts and molds to grow.

# Jams and Jellies with Reduced Sugar

Jellies and jams that contain modified pectin, gelatin, or gums may be made with noncaloric sweeteners. Jams with less sugar than usual also may be made with concentrated fruit pulp, which contains less liquid and less sugar.

Two types of modified pectin are available for home use. One gels with one-third less sugar. The other is a low-methoxyl pectin which requires a source of calcium for gelling. To prevent spoilage, jars of these products must be processed longer in a boiling-water canner. Recipes and processing times provided with each modified pectin

product must be followed carefully. The proportions of acids and fruits should not be altered, as spoilage may result.

Acceptably gelled refrigerator fruit spreads also may be made with gelatin and sugar substitutes. Such products spoil at room temperature and, therefore, must be kept refrigerated. They should be eaten within one month.

## Preventing Spoilage

Even though sugar helps preserve jellies and jams, molds can grow on the surface of these products. Research now indicates the mold that 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 still are 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, fill products hot into half-pint or pint canning jars, leaving ¼-inch headspace. Seal jars with self-sealing lids and process 10 minutes in a boiling-water canner. This process is safe for all elevations in Kentucky. However, if you know that your elevation is less than 1,000 feet, a 5-minute processing time may be used.

## Equipment & Containers

A large kettle is essential, as jellies and jams have a tendency to boil over. An 8- or 10-quart kettle with a broad flat bottom is recommended.

A jelly or candy thermometer is an aid in making jellied fruit products without added pectin. Determining doneness by measuring temperature is more accurate than using the sheet or freezer test.

A boiling-water canner is necessary for processing all fruit spreads, including jelly. Paraffin seals are no longer recommended because of the danger of mold growth.

Half-pint or pint canning jars and two-piece lids should be used for all fruit spreads. The only exceptions are the special reduced-sugar spreads made with gelatin and the freezer jams. Since these products are not processed, they may be put up in ordinary commercial jars.

## Sterilizing Empty Jars

All products including jams and jellies that are processed less than 10 minutes should be filled into sterile empty jars. To sterilize empty jars, place them right side up on the rack in a boiling-water canner. Fill the canner and jars with hot (not boiling) water to 1 inch above the tops of the jars. Boil 10 minutes. Remove and drain hot sterilized jars one at a time. Save the hot water for processing filled jars.

## Methods of Making Jams & Jellies

There are two basic methods of making jams and jellies. The standard method, which does not require added pectin, works best with fruits naturally high in pectin. The other method, which requires the use of commercial liquid or powdered pectin, is much quicker. The gelling ability of various pectins differs. To make uniformly gelled products, be sure to add the quantities of commercial pectins to specific fruits as instructed on

each package. Overcooking may break down pectin and prevent proper gelling. When using either method, make one batch at a time, according to the recipe. Increasing the quantities often results in soft gels. Stir constantly while cooking to prevent burning. Recipes are developed for specific jar sizes. If jellies are filled into larger jars, excessively soft products may result.

# Making Jellies without Added Pectin

Use only firm fruits naturally high in pectin. Select a mixture of about three-fourths ripe and one-fourth underripe 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 (see guide below). Put fruit and water in a large saucepan and bring to a boil. Simmer until the fruit is soft (see guide below). Stir to prevent scorching. One pound of fruit should yield at least 1 cup of clear juice.

# Extracting Juices and Making Jellies

To extract juice, follow the guide below.

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.

Using no more than 6 to 8 cups of extracted fruit juice at a time, measure fruit juice, sugar, and lemon juice (see guide below), and heat to boiling. Stir until the sugar is dissolved. Boil over high heat to the jellying point.

To test jellies for doneness, use one of the following methods.

**Temperature test**—Using a jelly or candy thermometer to monitor temperature, boil mixture until it reaches the proper temperature in degrees Fahrenheit for your altitude.

| Altitude | Sea Level | 1000 Feet | 2000 Feet | 3000 Feet |
|---|---|---|---|---|
| Degrees F | 220° | 218° | 216° | 214° |

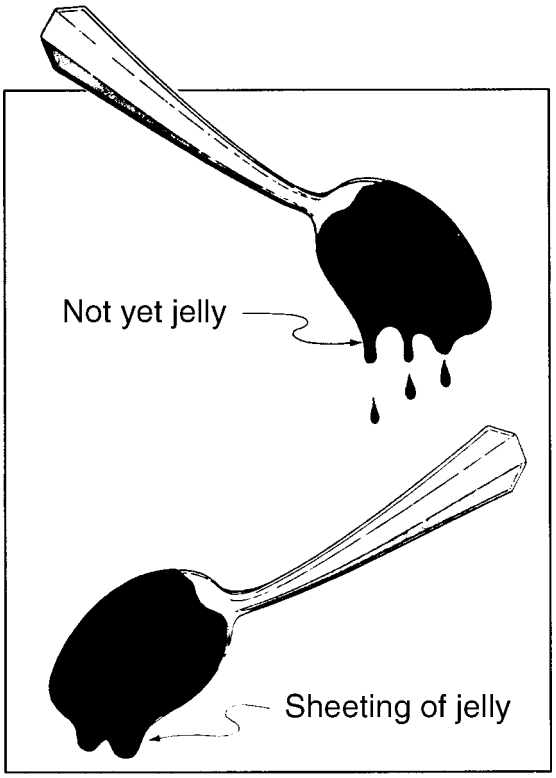
## Guide for Making Jellies without Added Pectin

| | | | Ingredients Added to Each Cup of Strained Juice | | |
|---|---|---|---|---|---|
| | Cups of Water to Be Added per Pound of Fruit | Minutes to Simmer Fruit before Extracting Juice | Sugar (cups) | Lemon Juice (tsp.) | Yield From 4 Cups of Juice (Half-pints) |
| **Apples** | 1 | 20 to 25 | 3/4 | 1½ (opt) | 4 to 5 |
| **Blackberries** | None or 1/4 | 5 to 10 | 3/4 to 1 | None | 7 to 8 |
| **Crabapples** | 1 | 20 to 25 | 1 | None | 4 to 5 |
| **Grapes** | None or 1/4 | 5 to 10 | 3/4 to 1 | None | 8 to 9 |
| **Plums** | ½ | 15 to 20 | 3/4 | None | 8 to 9 |

**Sheet or spoon test**—Dip a cool metal spoon into the boiling 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 mixture 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 jars with jelly. To do so, use a measuring cup to dip or ladle the jelly through a widemouthed funnel into the jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.




# Making Jams without Added Pectin

Wash and rinse all fruits thoroughly before cooking. Do not soak. For best flavor, use fully ripened fruit. Remove stems, skins, and pits from fruit; cut into pieces and crush. For berries, remove stems and blossoms and crush. Seedy berries can be put through a sieve or food mill. Measure crushed fruit into a large saucepan using the ingredient quantities specified in the guide below.

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 are ready. Remember to allow for thickening during cooling.

**Temperature test**—Using a jelly or candy thermometer to monitor the temperature, boil until the mixture reaches the proper temperature for your altitude (see "Extracting Juices and Making Jellies" on page 6 of this guide).

**Freezer test**—Remove the mixture from the heat. Pour a small amount of the boiling mixture onto a cold plate, and put it in the freezing compartment of a refrigerator for a few minutes. If the mixture gels, it is ready.

Remove from heat and quickly skim off foam. Fill jars with jam. To do so, use a measuring cup to dip or ladle the jam through a widemouthed funnel into the jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

## Guide for Making Jams without Added Pectin

| Fruit | Cups Crushed Fruit | Cups Sugar | Tbsp. Bottled 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 |

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

# Making Jams and Jellies with Added Pectin

Fresh fruits and juices as well as commercially canned or frozen fruit juice can be used with commercially prepared powdered or liquid pectins. The order of combining ingredients depends on the type of pectin used. Complete directions for a variety of fruits are provided with packaged pectin. Jellies or jams made with added pectin require less cooking and generally give a larger yield. These products have more natural fruit flavors, too. In addition, using added pectin eliminates the need to test hot jellies and jams for proper gelling. Adding one-half teaspoon of butter or margarine with the juice and pectin will reduce foaming. However, this may cause an off-flavor in long-term storage of jellies and jams.

**Recipes available using packaged pectin include:**

- **Jellies**—apple, crab apple, blackberry, boysenberry, dewberry, currant, elderberry, grape, mayhaw, mint, peach, plum, black or red raspberry, loganberry, rhubarb, and strawberry.
- **Jams**—apricot, blackberry, boysenberry, dewberry, loganberry, raspberry, youngberry, blueberry, cherry, currant, fig, gooseberry, grape, orange marmalade, peach, pear, plum, rhubarb, strawberry, and spiced tomato.

Be sure to use canning jars, self-sealing two-piece lids and a 10-minute processing time in a boiling-water canner.

Purchase fresh pectin each year. Old pectin may result in poor gels. Follow the instructions with each package and process as below.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

The following are additional jelly and jam recipes for use with packaged pectin.

## Pear-Apple Jam

**2 cups peeled, cored and finely chopped pears (about 2 pounds)**

**1 cup peeled, cored and finely chopped apples**

**¼ teaspoon ground cinnamon**

**6½ cups sugar**

**⅔ cup bottled lemon juice**

**6 ounces liquid pectin**

YIELD:
About 7 to 8 half-pints.

PROCEDURE:
Crush apples and pears in a large saucepan; stir in cinnamon. Thoroughly mix sugar and lemon juice with fruits and bring to a boil over high heat, stirring constantly. Immediately stir in pectin. Bring to a full rolling boil; boil hard 1 minute, stirring constantly. Remove from heat, quickly skim off foam, and fill jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

## Strawberry-Rhubarb Jelly

**1½ pounds red stalks of rhubarb**

**1½ quarts ripe strawberries**

**½ teaspoon butter or margarine to reduce foaming (optional)**

**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, stem, and crush strawberries, one layer at a time, in a saucepan. Place 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.

Add butter and sugar, thoroughly mixing into juice. Bring to a boil over high heat, stirring constantly. Immediately stir in pectin. Bring to a full rolling boil; boil hard for 1 minute, stirring constantly. Remove from heat, quickly skim off foam, and fill jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

## Blueberry-Spice Jam

**2½ pints ripe blueberries**

**1 tablespoon lemon juice**

**½ teaspoon ground nutmeg or cinnamon**

**¾ cup water**

**1 (1¾-ounce) box powdered pectin**

**5½ cups sugar**

YIELD:
About 5 half-pints.

PROCEDURE:
Wash and thoroughly crush blueberries, one layer at a time, in a saucepan. Add lemon juice, spice, and water. Stir in pectin and bring to a full rolling boil over high heat, stirring 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 fill jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

## Grape-Plum Jelly

**3½ pounds ripe plums**

**3 pounds ripe Concord grapes**

**1 cup water**

**8½ cups sugar**

**½ teaspoon butter or margarine to reduce foaming (optional)**

**1 (1¾-ounce) box powdered pectin**

YIELD:
About 10 half-pints.

PROCEDURE:
Wash and pit plums; do not peel. Thoroughly crush the plums and grapes, one layer at a time, in a 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 butter and pectin in a large saucepan. 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, quickly skim off foam, and fill jars, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints or pints for 10 minutes.

# Making Reduced-Sugar Fruit Spreads

A variety of tasty fruit spreads may be made that are lower in sugar and calories than regular jams and jellies.

Gelatin may be used as a thickening agent, as indicated in two recipes. Sweet fruits, apple juice, spices, or liquid low-calorie nutritive sweetener are used to provide the sweet flavor of the fruit spreads. When gelatin is used in the recipe, the jars of spread should not be processed. They should be refrigerated and used within 4 weeks.

The following are recipes for reduced-sugar fruit spreads.

## Peach-Pineapple Spread

**4 cups drained peach pulp (prepared as directed below)**

**2 cups drained unsweetened crushed pineapple**

**¼ cup bottled lemon juice**

**2 cups sugar (optional )**

This recipe may be made with any combination of peaches, nectarines, apricots, and plums. This recipe also may be made without sugar or with as little as 2 cups of sugar. Nonnutritive sweeteners may be added. If aspartame, a low-calorie nutritive sweetener, is used, its sweetening power may be lost within 3 to 4 weeks.

YIELD:
5 to 6 half-pints.

PROCEDURE:
Thoroughly wash 4 to 6 pounds of firm, ripe peaches. Drain well. Peel and remove pits. Grind fruit flesh with a medium or coarse blade, or crush with a fork. Do not use a blender. Place ground or crushed fruit in a 2-quart saucepan. Heat slowly to release juice, stirring constantly, until fruit is tender. Place cooked fruit in a jelly bag or strainer lined with 4 layers of cheesecloth. Allow juice to drip about 15 minutes. Save the juice for jelly or other uses. Measure 4 cups of drained fruit pulp for making spread. Combine the 4 cups of pulp, pineapple, and lemon juice in a 4-quart saucepan. Add 2 cups of sugar and mix well. Heat to a boil. Boil gently for 10 to 15 minutes, stirring just enough to prevent sticking. Fill jars quickly, leaving ¼-inch headspace. Adjust lids and process.

PROCESSING TIME:
- *Boiling-water Canner*—Hot Pack: process half-pints for 20 minutes or pints for 25 minutes.

## Refrigerated Apple Spread (made with gelatin)

**2 tablespoons unflavored gelatin powder**

**1 quart bottled unsweetened apple juice**

**2 tablespoons bottled lemon juice**

**2 tablespoons liquid low-calorie sweetener**

**Food coloring (optional)**

YIELD:
4 half-pints.

PROCEDURE:
In a saucepan, soften the gelatin in the apple and lemon juices. Bring juice mixture to a full rolling boil to dissolve gelatin. Boil 2 minutes. Remove from heat. Stir in sweetener and food coloring. Fill jars, leaving ¼-inch headspace. Adjust lids. Do not process or freeze. Store in refrigerator and use within 4 weeks.

*Optional*: For spiced apple jelly, add 2 sticks of cinnamon and 4 whole cloves to mixture before boiling. Remove spices before adding the sweetener and food coloring.

## Refrigerated Grape Spread (made with gelatin)

**2 tablespoons unflavored gelatin powder**

**1 (24-ounce) bottle unsweetened grape juice**

**2 tablespoons bottled lemon juice**

**2 tablespoons liquid low-calorie sweetener**

YIELD:
3 half-pints.

PROCEDURE:
In a saucepan, soften the gelatin in the grape and lemon juices. Bring juice mixture to a full rolling boil to dissolve gelatin. Boil 1 minute. Remove from heat. Stir in sweetener. Fill jars quickly, leaving ¼-inch headspace. Adjust lids. Do not process or freeze. Store in refrigerator and use within 4 weeks.

# 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, combine 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 for 30 seconds. Remove from heat, quickly skim foam off jelly and fill jars, leaving ¼-inch head-space. Adjust new lids and process half-pints or pints 10 minutes in a boiling-water canner.

**To remake with liquid pectin**: For each quart of jelly, measure ¾ cup sugar, 2 tablespoons bottled lemon juice, and 2 tablespoons liquid pectin; set aside. Bring jelly only to a boil over high heat, while stirring. Remove from heat and quickly add the sugar, lemon juice, and pectin. Bring to a rolling boil, stirring constantly. Boil hard for 30 seconds. Quickly skim off foam and fill jars, leaving ¼-inch headspace. Adjust new lids and process half-pints or pints 10 minutes in a boiling-water canner.

**To remake without added pectin:** To each quart of jelly, add 2 tablespoons bottled lemon juice. Heat to boiling. Boil 3 to 4 minutes. To determine doneness, see "Extracting Juices and Making Jellies" on page 6 of this guide. Remove from heat, quickly skim off foam and fill jars, leaving ¼-inch headspace. Adjust new lids and process half-pints or pints 10 minutes in a boiling-water canner.

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin. Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, C. Oran Little, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort. Copyright © 2000 for materials developed by the University of Kentucky Cooperative Extension Service. This publication may be reproduced in portions or its entirety for educational or nonprofit purposes only. Permitted users shall give credit to the author(s) and include this copyright notice. Publications are also available on the World Wide Web at: http://www.ca.uky.edu. Issued 3-1990, Revised 6-2000, Last printed 6-2000, 2000 copies, 36100 copies to date.