15 Farm Marketing Workshop A: Success Strategies for Safe and High Quality Jams and Jellies

Where: Grand Gallery Room E & F
Moderator: Christine Venema

9:00 AM
Jams and Jellies are profitable items for many farm marketers. Dr. Andress will build on her previous presentation to help jam and jelly makers with product success, consistency and quality to ensure customer satisfaction and return sales.

- Elizabeth Andress, University of Georgia

11:00 AM **Session Ends**

Success Strategies for Safe and High Quality Jams and Jellies

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Professor and Extension Food Safety Specialist
December 6, 2018

College of Family and Consumer Sciences
UNIVERSITY OF GEORGIA

Session Objectives

- Review pectin gel chemistry
- Critical points in making jams and jellies
- Quality controls
- Determining gelling point
- Pectin added methods
- Critique of samples

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Types of Pectin Spreads

- **Jelly** - firm gel made from juice.
- **Jam** - sweet spread that holds shape, made with crushed or chopped fruit.

- **Marmalades** – citrus base or citrus added, usually with peel and a transparent jelly
- **Conserves** – jam-like consistency, two or more fruits, with nuts, commonly with raisins, coconut

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Key Preservation Points

- Jellies, Jams, Other Spreads
- Sweetening and Acidifying
  - Acidity
    - ➢ of fruit, or added
  - Less available water
    - ➢ Pectin and/or sugar ties up water present
  - Removal of oxygen
    - ➢ sealed jar if canned
  - Heat if cooked, canned
    - ➢ water bath processed

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The Pectin Gel

The basis for traditional jellies and jams.

fruit
pectin – sugar – acid

(jar size)

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Pectin

- Actually variety of molecules (heat "activates" by changing the form)
- Concentrated in skins and cores
- Amount varies w/ fruit and maturity
  - under-ripe has more
- Overcooking destroys gelation
- Powdered/liquid pectins not interchangeable in recipes.
- 0.5 to 1.0% pectin produces good gel
- Needs acidic solution to gel
  - pH ideal at 2.8-3.5

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Natural Fruit Pectin

Protopectin (insoluble)

hydrolysis ↓ Enzymes in plant; Boiling in acid solution

Pectin (soluble)

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Natural Fruit Pectin

Pectin (soluble)

hydrolysis ↓

Pectic acid (insoluble)

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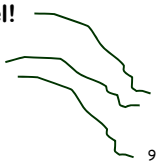
Pectin Molecule

- Why boil in acid mixture?
- In water, the molecules naturally repel each other (from negative charges along the molecule).
- So those certainly won't form a gel!



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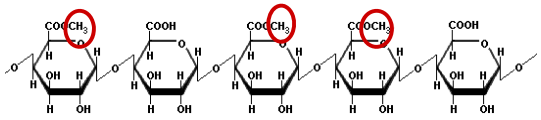
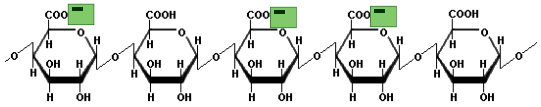
Pectin Molecule



In water



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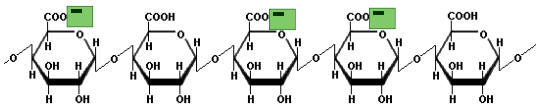
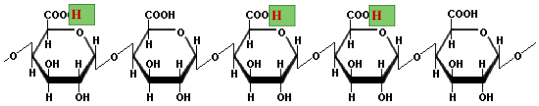
Pectin Molecule

In water



In acid



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Sugar

- Cane or beet sucrose the standard
  - No dextrose.
- Preservative effect for microorganisms
  - Dehydrates bacteria, molds and yeasts.
  - Draws water from fruit cells and binds it.
    - That water unavailable for microorganisms
    - Lowered "water activity"
- Contributes to flavor (sweetness)
- Sugar must be present in the proper ratio with pectin and acid for a gel to form
- Sugar helps define allowable labeling of commercial spreads

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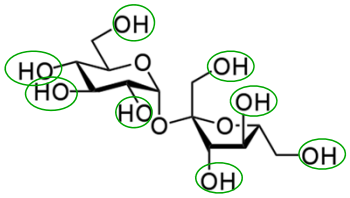
Sucrose Molecule



- High affinity for water due to many bonding sites.
- Attracts additional water so less is available to pectin.

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Sugar

- In cooked jams and jellies, the sucrose also undergoes INVERSION
- This is a change to glucose and fructose components
- Important to prevent crystallization
  - Too much sucrose will cause precipitation

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Acid

- Necessary for gelation
- Comes from fruit or added as ingredient
- Low pH (high acidity) necessary for typical treatment as low-risk shelf stable food

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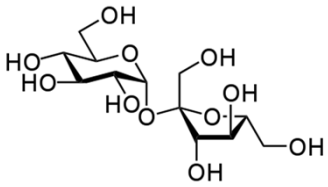
Pectin Gels without Sugar?



- Pectin is modified so crossbonds are formed without the sugar content
- Sugar can still be used for sweetening, but lower amounts work

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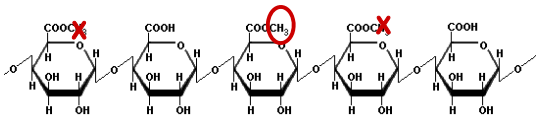
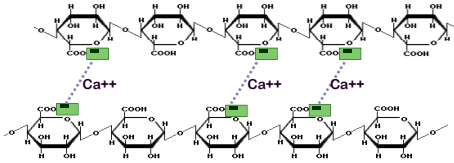
Low-Methoxyl Pectin Molecule



Bind with divalent ion, usually Ca++



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Spreads Without Added Sugar

- Thickened or gelled by:
  - Special pectins
    - low methoxyl (calcium bonds) (LMP)
  - Vegetable gums (powdered)
  - Gelatin
  - Long boiling to concentrate fruit pulp/product; these are spreads and not really pectin jams
- Lack structural, preservative and flavor effects of sugar

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Spreads Without Added Sugar

- Artificial sweeteners can not be interchanged for sugar in traditional pectin recipes
  - Must use special recipe and pectin
  - Read labels carefully - some lose sweetening power after heating or storage
- Sweeteners are for flavor only in LMP
  - Not for preservation.

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So I want a product with less sugar. What should I do?

- Purchase a special pectin product made to be used with less or no sugar.
- Look for "light" or "no sugar needed" on the package label.
- Follow the recipes or formulas for THAT pectin, for the type of jelly or jam you are making.
- Or count on needing a canning process vs. hot fill, and a longer process than traditional jam or jelly.
  - Treat more like a fruit puree or non-gelled product.
  - Sales approval will depend on finished product.

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Let's Recap

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Types of Pectin Jams and Jellies

- No pectin added
  - Also called long-boil
  - Requires "full sugar" and fruits high enough in natural pectin
- Pectin added
  - With full sugar
  - With reduced sugar*
  - With no sugar added*
  - Uncooked (a/k/a freezer or "instant")

* require modified pectins that gel without sugar

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With or Without Purchased Pectin?

Without added pectin:

Long boiling time with fruit and sugar
Less added sugar, but concentrated natural sugar
Loss of flavor from long boiling

With added pectin:

Greater yield from measure of fruit.
Fresher fruit flavor, but some flavor may be masked.
Brighter colors (less cooking time) .
Less chance of failure.

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Purchased Pectins

- "Full" Sugar; regular
  - Powdered or liquid
- Reduced Sugar
  - Powdered
- No sugar
  - Powdered
- Uncooked – Freezer or "instant"
  - Powdered if special purpose
  - Liquid or powdered if "full sugar" pectins

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Equipment – Small Batches

- Measuring equipment, bowl for sugar
- Heavy, metal pot – large!
- Ladle
- Jar filler/funnel
- Jars and lids
- Boiling water canner and rack
- Jar lifter

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Other Possible Equipment

- Scales
- Sieve, food mill, fruit press
- Jelly bag
- Thermometer - jelly or candy

Using a Jelly Bag

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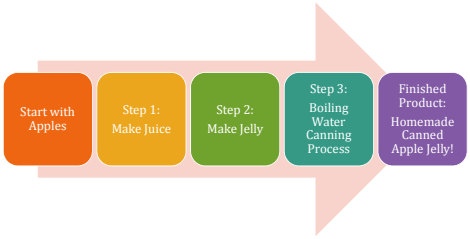
Making Apple Jelly

with homemade apple juice

From Apples to Jelly...



Apple Jelly from *So Easy To Preserve, 6th ed.*

INGREDIENTS:

for about 4 half-pint jars

- 4 cups apple juice
  (about 3 pounds apples and 3 cups water)
- 2 tablespoons lemon juice,
  if needed or desired
- 3 cups sugar

EQUIPMENT:

For Making Juice	For Making Jelly	For Canning
• Stovetop range	• Stovetop range	• Stovetop range with timer
• Colander	• Large saucepot with lid	• Boiling water canner with rack
• Cutting board	• Measuring cups	• Half-pint canning jars, two-piece metal canning lids and ring bands
• Knife	• Measuring spoons	• Permanent marker
• Large stockpot with lid	• Stirring spoon	• Ladle and spoon
• Measuring cups	• Small glass jar	• Towel or cake-cooling rack
• Stirring spoon	• Small saucepan and/or rubbing alcohol	• Jar funnel and jar lifter
• Jelly bag, strainer, and stand	• Candy/jelly thermometer and/or metal spoon and/or small plate and freezer	• Headspace tool
• Large mixing bowl		• Paper towels
• Ladle, funnel, and jars (with lids)		

Step One: Make Juice

- **Prepare apples**
- **Extract juice**

Prepare Apples

- Select ¼ slightly under-ripe and ¾ fully ripe apples. Weigh them. For one batch of jelly, use 3 pounds. For best chance of getting a good gel, make only one batch at a time. Use no more than 6-8 cups of juice (two batches).
- Sort and rinse, then remove stems (and blossom ends if desired). Do NOT remove core and skin, which contain a high concentration of pectin.
- Cut apples into small pieces.
- Place apple pieces in a large stockpot and add one cup of water per pound of apples (3 cups for 3 pounds apples).
- Bring to a boil on high heat then reduce heat to simmer for 20-25 minutes or until apples are soft.

Extract Juice

- Ladle the apple mixture into a damp jelly bag, suspended over a large bowl. (Or use a fruit press.)
- To make a more clear juice, do not press or squeeze the apples while they are straining. You may re-strain as much as is needed to produce a more clear juice if desired. If a press is used, then re-strain through a jelly bag to make a more clear juice.

Step Two: Make Jelly

- **Prepare jars**
- **Test for pectin**
- **Test for acid**
- **Cook until gelling point**

Prepare Jars and Lids

- Wash jars well with soap and water, rinse well.
- Check ring bands and discard any with bends or rust.
- Label and prepare lids as instructed by manufacturer.
- Place canner rack in the bottom of a boiling water canner and fill canner half-full with clean water.

Apple jelly can be processed in boiling water for 5 minutes at sea level in pre-sterilized jars or for 10 minutes in clean jars with no pre-sterilization. So, you choose:

- If you are going to process the filled jars of jelly for 10 minutes, then preheat the empty jars in the canner and leave them there to keep warm until filling. Lower empty jars onto rack in boiling water canner and heat canner water to 180°F.

- Or, if you are going to process the jelly for less than 10 minutes then pre-sterilize jars first. Pre-sterilize glass jars by placing them on the rack in your canner, completely covering them with water, and bringing the water to a boil. Boil the empty jars for 10 minutes (plus one minute for each additional 1,000 feet above sea level). Reduce heat and keep the jars warm until filling time. The canner water should be about 180°F when it is time to add the filled jars of jelly.

Test for Pectin – Choose one:

- Cooking test
  - Measure ⅓ cup juice and ¼ cup sugar into saucepan. Heat and stir until sugar dissolves. Bring to a boil until it gives the sheeting test (two drops form together and "sheet" off a cool spoon). Pour into a clean, hot glass jar or bowl and let cool. If the cooled mixture is jelly-like, the juice will gel.

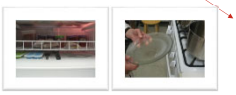
- Alcohol test
  - Measure 1 teaspoon juice and 1 tablespoon rubbing alcohol into a clean glass jar and stir or shake the mixture. If a solid jelly-like clump forms such that it can be picked up with a fork, then the juice will gel.

Test for acid

- There is no objective or common home test for determining the exact acidity, but one method is a simple taste test:
  - Mix 1 teaspoon bottled lemon juice, 3 tablespoons water, and ½ teaspoon sugar. Taste this mixture.
  - Now taste your apple juice.
  - If your juice is not as tart as the mixture, then add 1 tablespoon lemon juice or 1/8 teaspoon citric acid to each cup of apple juice.

Cook until Gelling Point

- Measure 4 cups apple juice into a saucepot.
- Add 2 tablespoons bottled lemon juice (or amount determined by acid test) and 3 cups sugar. Stir over high heat.
- Test for doneness.



- There are three ways to test for doneness:
  - Temperature test: Boil to 8°F above boiling point of water as measured by candy or jelly thermometer (220°F at sea level and 220°F minus 2°F for each 1,000 feet above sea level).
  - Spoon or Sheet test: Dip a cool metal spoon into the boiling jelly mixture and lift out so the mixture runs off the side. As it thickens, it will become heavier. When two drops form together and "sheet" off the spoon, it is done.
  - Freezer test: Pour a small amount of the boiling jelly mixture on a plate and put in a freezer for a few minutes. If this mixture gels, the jelly is done.

Note:

- When using the temperature test, first test the accuracy of the thermometer by placing in boiling water. It should read 212°F when boiling at sea level and 2°F less for each 1,000 feet of altitude (i.e. 210°F at 1,000 feet, 208°F at 2,000 feet, etc.).
- Also, make sure the bulb of the thermometer is not touching the bottom of the saucepot and is completely submerged in jelly.
- To read the thermometer accurately, place the thermometer at a vertical position and read at eye level.

Step Three: Boiling Water Canning

- **Fill hot jars**
- **Immediately process in canner**
- **Cool and check**
- **Store**

Fill Jars

- Remove stockpot from heat (and/or turn off heat) as soon as gelling point is reached.
- Skim off foam quickly, with a spoon.
- Lift jars from canner using jar lifter and place on cutting board or towel-covered countertop, emptying any water in jars back into canner.
- Immediately rest jar funnel in jar opening and ladle hot jelly into hot jars. Leave ¼-inch headspace.
- Wipe jar rims with clean paper towel, apply lids, and adjust bands until fingertip tight.

Process in Canner

- Lift jars onto rack in canner, keeping upright. Canner water should be hot but not boiling, 180°F. Make sure water covers jars by 1-2 inches.
- Turn heat to high and wait for a boil.
- Begin timer when water reaches a full boil. Process for 5 minutes if jars were pre-sterilized and for 10 minutes if they were simply cleaned and kept warm (at sea level). Add one additional minute per 1,000 feet altitude.

Cool and Check

- When timer sounds, turn off heat and remove canner lid. Allow jars to sit in canner for 5 minutes.
- Using jar lifter, remove jars one at a time and place them onto a towel or a cooling rack with at least 1-inch space between each jar. Keep jars upright at all times; do not tilt even to pour water off lids.
- Let jars cool for 12-24 hours, without disturbing.
- Once completely cool, remove bands and check for seals by feeling and looking for concaveness in center of lid. Put any unsealed jars in the fridge and use first.

Store

- Clean jars and lids to remove any residue.
- Store in a cool, dry location out of direct sunlight.
- Ring bands can be washed, dried and stored separately for later re-use.
- ENJOY!

Credits

This recipe and step-by-step directions are adapted from the instructions for Making Jellies and Apple Jelly in "So Easy to Preserve", 6th ed. 2014. Bulletin 989, Cooperative Extension Service, The University of Georgia, Athens. Revised by Elizabeth L. Andress. Ph.D. and Judy A. Harrison, Ph.D., Extension Foods Specialists.

This presentation was made by Kasey Christian, M.Ed., Program Coordinator for the National Center for Home Food Preservation (NCHFP). Photos by Kasey Christian. Reviewed by Elizabeth Andress, Ph.D., Professor and Extension Food Safety Specialist, and Carolyn Ainslie, M.Ed., Educational Program Specialist.

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This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2011-51110-30995.

Methods of Making

With purchased pectin:

- **Combine ingredients in order listed.**
  - **Will be different for powdered and liquid pectins.**
- **Cook as pectin manufacturer describes and stop.**
  - **Usually will not thicken in pan as with natural pectin gels**
  - **NO TESTS for doneness; cooking is specifically timed.**

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Step By Step Preserving – Strawberry Kiwi Jam

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Ingredients

- 3 cups crushed strawberries
- 3 kiwi, peeled and diced
- 1 tablespoon lemon juice
- 1 tablespoon minced crystallized ginger
- 1 package powdered regular pectin
- 5 cups sugar

50

Cleaning the Strawberries

- Thoroughly wash the strawberries under cold running water in a colander.
- DO NOT SOAK.
- Discard immature, unripe berries or spoiled fruit.

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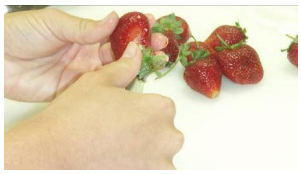
Preparing the Strawberries

- After washing the strawberries, use a paring knife to cut out the hull and stem.
- Remove any damaged areas.
- Rinse again if necessary, to remove any hull or stem.



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Preparing the Strawberries

- Spread the strawberries on a clean baking tray with four edges. Crush the berries (a potato masher works well).
- Measure out 3 cups of crushed berries.

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Preparing the Kiwi

- Use a peeler to peel each kiwi.
- Next, use a paring knife to dice the kiwi.

54

Preparing the Ginger

- Use a knife to mince the crystallized ginger.

55

Preparing the canner

- Prepare the clean boiling water canner.
- Fill the canner with about 6" of water, or enough so that when filled jars are added, they are covered by 1 to 2 inches over their tops.
- Preheat the water to simmering (180ºF).
  - It does not have to be exact, but it should not be boiling or too cold when the jars are added.

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Preparing the jars

- Check half-pint canning jars for nicks or cracks. Only use jars with no defects. Wash and rinse well in warm water.
- Keep warm until ready to fill, using your boiling water canner, or a clean dishpan filled with warm water.

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Preparing the lids

- Prepare lids and ring bands according to manufacturer's directions.
- Check ring bands and use only those without rusting or dents. Wash and rinse ring bands.

58

Cooking the Jam

- Combine the strawberries, kiwi, lemon juice, ginger, and powdered pectin in a large saucepot. Stir to thoroughly mix. Bring mixture quickly to a boil, stirring frequently.

59

Cooking the Jam, continued

- Add sugar, stirring until dissolved. Return to a rolling boil. Boil hard for 1 minute, stirring constantly.

60

Cooking the Jam, continued

- Remove cooked jam from heat. Skim foam from the top if necessary.

61

Filling the Jars

- Ladle the hot jam into the warm jars, leaving ¼ inch headspace.

62

Filling the Jars, continued

- Wipe the jar rims using a clean, damp paper towel. This will ensure that none of the jam gets left on the sealing surface and interferes with the lid sealing properly.

63

Filling the Jars, continued

- Attach the prepared lids and bands according to manufacturer's recommendations for your brand.

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Processing the jam

- Using a jar lifter, place the jars in the boiling water canner, being careful not to tilt the jars.
- The water in the canner should be about simmering (180ºF) before adding jars.

65

Processing the jam, continued

- After all the jars are in the canner, the water should be 1-2 inches over the tops of the jars. Turn the heat on high and allow the water to come to a rolling boil over the jars.
- After the water is fully boiling, process the jars for ten minutes at boiling.
- After processing, turn off the burner, remove the canner lid, and allow the jars to sit for 5 more minutes.

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Cooling the Jars

- Using the jar lifter, remove the jars from the canner, again without tilting them, and set them on a clean towel, or plastic or wooden cutting board to cool.

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Checking the Seals

- Allow jars to sit for 12 to 24 hours before their seals are checked, or before they are stored or opened.
- Remove ring bands from the sealed jars. Wash and dry the sealing area and threads of the jar. Store jars without ring bands in a cool, dark, dry place.
- Store unsealed jars in the refrigerator.

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Credits

- This slide set was developed by Kayla Madden as a student project in FDNS 3010, Department of Foods and Nutrition, The University of Georgia.
- Edited by staff of the National Center for Home Food Preservation, June 2016.
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- This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 00-51110-9762.

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Making Jams/Jellies Shelf Stable

- Processing vs. Hot-Fill
  - Size of container influences gel strength as well as the chemistry.
  - Shelf stability requires a vacuum seal.
    - Minimal vacuums can produce hermetic seal.
    - Not all vacuums are the same; the better the vacuum, the more oxygen removed and the better product quality in storage.
  - If not processing, hot fill requires minimum fill temperature. Headspace and fill temperature affect vacuum obtained.

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Making Jams/Jellies Shelf Stable

- Processing vs. Hot-Fill
  - With true pectin gelled acid product, can process in boiling water
  - The typical 5-10 minute process time in boiling water, however, is dependent on formulation for traditional pectin-sugar gel
  - Other spreads may require longer process.
  - Boiling water only acceptable for acid (pH < 4.6) products
    - Actual pH can determine which microorganisms can still function, however.

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But I want a product that's not made with acid fruit? What do I do?

- To create a pectin gel, you will have to add an acid ingredient to obtain a pH for pectin gelling.
- You will also need to add commercial pectin to get a pectin gel. (will not have the natural fruit pectin)
- Or, you will be making a spread that is not a pectin gel, just a thickened mixture.
- You may need special process approval to sell.
- If making for own use, be wary of safety in following any preservation instructions that look like acid gels.
  - Most likely need to refrigerate.

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Corn Cob Jelly

- Have made three batches (all with Sure-Jell® so far)
- First made with purchased yellow corn on cob (grocery store)
  - pH tap water = 7.51
  - pH corn cob "juice" = 6.2
  - Finished jelly = pH 2.82, Aw 0.79

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Corn Cob Jelly

- Made additional batches with red corn cobs, gotten from the field!
  - pH tap water = 7.51
  - pH corn cob "juice" = 6.2
  - Finished jelly = pH 2.82, Aw 0.79

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Dandelion Jelly

- Three batches so far; two years
- Used picked wild dandelions; two locations
  - pH tap water ~ 7.5
  - pH dandelion "juice" ~ 6.2
  - Finished jelly = pH 2.4-2.5 - , Aw ~0.80 – 0.82

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Scaling Up

- Cooking time can influence gel formation.
  - Batch size matters
    - Longer boiling temps can change pectin structure
    - As you size up, may need to change recipe
  - Pan size matters.
  - Using natural pectin: If making jelly with extracted juice and no added pectin, do not OVERCOOK or you will change the pectin structure and it may not gel.

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Scaling Up

- For larger batches, may work with pectin supplier for different types of pectins.
  - Grades of pectin change # parts of sugar that one part of pectin will gel.
  - Household pectins have some other ingredients that commercial pectins will not, so recipes can vary.

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If selling…

- Regulatory definitions of jams and jellies
- States vary in requirements for approvals
- Even if no regulatory recipe approval, use best practices for your customer

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Let's Review

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Critical Controls

- **Sugar Concentrates**
  - Selection of quality fruit ingredients
  - Heat when extracting juice
  - Sugar and pectin concentration for pectin gels
  - Acidity or pH for gelling and packaging/processing
  - Selection of appropriate pectin for pectin-added
  - Order of adding ingredients
  - Cooking time and determination of boiling
  - Filling jars
    - Temperature, headspace, adjusting lids
  - Processing
  - Cooling
  - Checking seals

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Critical Controls

- **For "regular" pectin gels**
  - For non-pectin added gels:
    - Natural pectin in fruit; natural acidity of fruit
    - Amount of sugar
    - Doneness tests; determining jellying point/final Aw
  - For pectin-added gels:
    - Dry and liquid pectin not interchangeable
    - Order of adding sugar and pectin matters
    - Timed boilings
  - Cannot reduce sugar

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Critical Controls

- **For reduced sugar pectin gels**
  - Only make from acid fruits or use recipe with enough acid to "preserve" without sugar
  - Must have modified pectin
    - Follow recipes with the pectins or tested
    - Timed boilings
    - Amount of sugar not important to gelling
    - Sweetened to taste with variety of optional sweeteners
  - If making without added pectin (thickened purees), determination of appropriate heat processing

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Quality Controls

- **Sugar Concentrates**
  - Selection of quality fruit ingredients
  - Color control of fresh fruits
  - Piece size for jams
  - Vaccum in headspace/removal of oxygen from food and jar

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Critical Controls

- **For traditional Southern preserves**
  - Amount of sugar MATTERS for SAFETY
  - Amount of acid MATTERS

- If people want these preserves with reduced sugar, they will need to use special pectin and make a jam-like product.

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Sweet Spread Problems

JELLY:

- Crystals
- Bubbles
- Too Soft
- Syneresis or "Weeping"
- Darkening
- Cloudiness
- Fermentation
- Mold
- Stiff or Tough

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Sweet Spread Problems

JAM:

- Crystals
- Bubbles; air
- Too Soft
- Stiff or Tough
- Darkening
- Fermentation
- Mold
- Syneresis or "Weeping"

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Summary

- Acidity, sugar and pectin concentration and form all affect gelling
- Pectin gelling without sugar (sucrose) requires modified commercially purchased pectins
- Size of batches will influence gelling through influence of cooking on pectin molecular structure
- Size of container will influence gelling

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Summary, cont.

- Making up your own recipe/formulation will take experimentation
- Commercial pectins are available in different grades (# parts sugar to one part pectin)
- Household pectins have added ingredients; recipes might not transfer to commercial pectin.
- If selling, need to consider labeling and regulatory definitions.

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Thank you

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Water Activity

Water activity: a measure of the amount of moisture in foods that is available for microbes to use.

≠ amount or % moisture

Scale: measured on a scale from 0 to 1.0, with distilled water having a value of 1.0

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Water Activity

- Amount of "free" or available water
  - available to microorganisms
- Is expressed as

$$\frac{\text{ERH}}{100} \quad \begin{matrix}\text{(equilibrium relative humidity)} \\ \text{(ERH pure water)}\end{matrix}$$

- Food values are < 1.00
  - Distilled water = 1.00

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Water Activity

• Distilled water	1.00
• Meats, raw fruits, veggies	0.95 - 0.99
• Jelly	0.80 - 0.85
• Cocoa powder	0.40
• Crackers	0.30
• Dried milk	0.20

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Decagon Aqua Lab

https://www.metergroup.com/food/events/water-activity-101/

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Federal and State Regulations on Selling Jams and Jellies

Standards of Identity[4]

Jellies - Jelled foods made from a mixture of one or a permitted combination of fruit juice ingredients described in 21 CFR 150.140(b). It may or may not include any combination of optional ingredients in 21 CFR 150.140(c). The jelly must have no less than 45 parts by weight of fruit juice ingredients measured in accordance with 21 CFR 150.140(d)(2) to each 55 parts by weight of saccharine ingredient as measured in accordance with 21 CFR 150.140 (d)(4). The soluble solids content of the finished jelly must not be less than 65%.

Jams/preserves - Jams/ preserves are viscous or semi-solid foods, each of which is made from a mixture composed of one or a permitted combination of the fruit ingredients in 21 CFR 150.160(b) and one or any combination of the optional ingredients in 21 CFR 150.160(c) that meets the specifications in 21 CFR 150.160 (d). The mixture must be 45 [47 if using only group 1 fruits as defined in 21 CFR 150.160(b)] parts by weight of the fruit ingredients to each 55 parts by weight of the saccharine ingredient. The soluble solids content of the finished jam or preserve is not less than 65%.

Introduction[1,2,3]

Jams, jellies, fruit butters, and preserves are shelf-stable food products. They contain high amounts of sugar and acid which lower the water activity and pH, respectively, of the product to minimize the growth of bacteria. Moisture migration, mold growth, and oxidation are reduced by hermetically sealing the jar. Important to the safety of jams and jellies is ensuring the pH of the product is below 4.6. Below this pH, *Clostridium botulinum*, a very serious human pathogen, cannot produce its deadly toxin.

Making low or no sugar jams, jellies, and preserves not only affects the type of pectin used to set the fruit but also can affect the microbiological safety and quality of the product. Sugar binds water in jams and jellies, reducing the water activity. Bacteria and molds grow well at high water activities and cause illness. By reducing the sugar in a jam or jelly recipe, the water activity is increased and pathogenic organisms can grow. Be sure to accurately follow verified recipes and process the jams and jellies well to kill pathogenic bacteria that may be present. Water activity below 0.85 prevents bacterial growth. If the water activity is too high, pathogenic (harmful) bacteria can grow and cause illness. Water activity is a ratio that represents the water available for microorganisms to use for growth. It is different from moisture content which is the total water contained in a food. Pepper jellies and other vegetable jellies do not have as much acid naturally present as fruit jellies. Low acid foods, pepper and other vegetable jellies, have strict standards and regulations due to their enhanced safety risk. Be sure to check with your state on the production of low acid foods.

The information below pertains to specific types of manufacturers. Manufacturers that sell their product directly to consumers through farmers' markets, roadside stands, or other similar venues should direct their attention to the "For Manufacturers Selling Directly to Consumers" portion of this document. Manufacturers that do not sell directly to consumers (those that sell to restaurants, grocery stores, or other manufacturers) should view the "For Manufacturers Not Selling Directly to Consumers" portion of this document, directly below.

North Central Region
Center for FSMA Training, Extension and Technical Assistance

Standards of Identity[4]

Fruit butters - fruit butters are smooth semisolid foods made from a mixture of one or a permitted combination of the optional fruit ingredients in 21 CFR 150.110(b) and one or any combination of the optional ingredients in 21 CFR 150.110(c). The mixture must not be less than five parts by weigh of the fruit ingredient to each two parts by weight of nutritive carbohydrate sweetener. The soluble solids content of the finished fruit butter must not be less than 43%.

For Manufacturers Not Selling Directly to Consumers

Federal[5]

In general, jam and jelly manufacturers are subject to the Current Good Manufacturing Practice, Hazard Analysis and Risk-based Preventive Controls for Human Food rule [21 CFR Part 117], also known as CGMP & PC rule, unless an exemption applies [21 CFR 117.5 for exemptions]. Under the Current Good Manufacturing Practice provisions, processors must address their personnel, plants and grounds, sanitary operations, sanitary facilities and controls, equipment and utensils, processes and controls, warehousing and distribution, holding and distribution of human food by-products for use as animal food and defect action level. Current Good Manufacturing Practices minimize the possibility for the physical, microbial, and chemical, including allergen, contamination of equipment, finished foods, and raw materials. Personnel must be trained to do their jobs, and to be trained in food safety and food hygiene [21 CFR 117.4].

Small or very small businesses that only perform on-farm production of jams and jellies from acid fruits and vegetables which must have a pH of 4.6 or below are recognized as exempt from PC rule. Very small businesses are also exempt from the qualified facility requirements [21 CFR 117.201]. If no exemptions apply, jam and jelly producers are required to develop a food safety plan consisting of written documentation of a hazard analysis, any identified preventive controls or an explanation of why preventive controls are not required, a supply-chain program, a recall plan, procedures for monitoring preventive controls, corrective action procedures, and verification procedures, including validation of process preventive controls, (e.g., that microbial hazards are controlled by the canning process).

For Manufacturers Selling Directly to Consumers

Illinois[6,7,8]

Jams, Jellies, and Preserves - Only high acid jams, jellies, and preserves made from the following fruits are permitted: apple, apricot, grape, peach, plum, quince, orange, nectarine, tangerine, blackberry, raspberry, blueberry, boysenberry, cherry, cranberry, strawberry, red currants, or a combination of those fruits.

Any other jams, jellies, butters, or preserves not listed may be produced by a cottage food operation provided the recipe has been tested. The testing must be conducted by a commercial laboratory at the expense of the cottage food operation. The lab report must document that the product is not potentially hazardous, containing a pH equilibrium of less than 4.6 or has been specified and adopted as allowed in administrative rules by the Department.

Low Sugar Jams and Jellies - The best practice for low sugar jams and jellies or those using sugar substitute is that they be processed only in a boiling water canner for a minimum of ten (10) minutes and not by any other methods unless water activity is determined by a commercial lab to be less than 0.85. Other flavors-any other jams, jellies, or preserves not listed may be produced by a cottage food operation provided their recipe has been tested and documented by a commercial laboratory as containing a pH level equilibrium of less than 4.6.

General Guidance - Name and residence of the person preparing and selling products as a cottage food operation must be registered with the county health department of a unit of local government where the cottage food operation resides. A fee may be charged for registration. The person preparing and selling products as a cottage food operation needs a current Department of Public Health approved Food Service Sanitation Management Certificate. Foods must be labelled as described by University of Illinois Extension.[4]

Indiana[9,10]

Jams and Jellies - Traditionally prepared fruit-based jams and jellies, e.g., grape, strawberry, blueberry,, raspberry, blackberry, etc. can be sold by a Home-Based Vendor.

Fruit butters (e.g., apple, pear, pumpkin) and "low sugar" or "no sugar added" jams and jellies - Not allowed to be sold by a Home-Based Vendor.

General Guidance - All Home-Based Vendors foods must have the following statement printed at a minimum type size of 10 points on product labels: "This product is home produced and processed and the production area has not been inspected by the State Department of Health." The product must include a detailed label.

Iowa[11,12]

Jams, jellies, and preserves – Must meet the standard of identity for jams and jellies specified in Title 21 of the Code of Federal Regulations, Part 150. If they do, they can be sold without a license.

General Guidelines - Home food operations in Iowa are allowed to produce such food products. Non-Temperature Control for Safety food products can only be sold direct to consumer (face-to-face only) from the operator's home or at farmers markets. No licensing or inspection of kitchen is required. Should have a simple label on the product.

Kansas[13]

Home canned fruit jams and jellies – Home canned fruit jams and jellies as well as jams and jellies flavored with pepper-flavored vinegar or small amounts of pepper powder can be sold without a license, but must follow labeling requirements.

Pepper jams and jellies - Water activity must be tested. If product is determined to have a low water activity, product can be sold without a license. Otherwise, KDA license required.

Low-sugar fruit jams and jellies - Must be canned and shelf-stable. To determine shelf stability, the pH, water activity, and product formulation must be evaluated by an accredited lab. If the product is determined to be an acid food, formulated acid, or low water activity food, no license is required. Otherwise, KDA license required.

General Guidelines- While not all food producers and processors are legally required to follow specific regulatory requirements due to the type of products they produce, all can and should utilize some basic Good Manufacturing Practices (GMPs), which are the basic sanitary and processing requirements necessary to ensure the production of safe food. GMPs are also essential to meeting current and future FDA and USDA food safety requirements, and are a key pre-requisite for Hazard Analysis and Critical Control Point (HACCP) programs, which are required for certain food products, including meat and poultry, juice, seafood, and some vacuum packed products, and by some food buyers.

Verified Recipes

National Center for Home Food Preservation

http://nchfp.uga.edu/

http://nchfp.uga.edu/how/can7_jam_jelly.html

http://nchfp.uga.edu/publications/publications_usda.html

https://nchfp.uga.edu/publications/usda/GUIDE07_HomeCan_rev0715.pdf

Wyoming Extension

http://www.wyomingextension.org/agpubs/pubs/B1210-3.pdf

Ball™

http://www.freshpreserving.com/canning-101-getting-started.html

http://www.freshpreserving.com/recipes-all/

Michigan[14]

Fruit jams and jellies– if sold in glass jars that can be stored at room temperature (except vegetable jams/jellies), they meet the requirements for cottage foods and can be prepared in a home kitchen and sold directly to consumers without a license. Vegetable jams/jellies and fruit/vegetable butters (e.g., hot pepper jelly) must be produced in a licensed kitchen.

General Guidelines– Must follow labeling requirements and include the following statement: "*Made in a home kitchen that has not been inspected by the Michigan Department of Agriculture & Rural Development*" in at least the equivalent of 11-point font (about 1/8" tall) and in a color that provides a clear contrast to the background (All capital letters or upper/lower case are both acceptable).

Minnesota[15]

Fruit butters, Jams, Jellies, Preserves - Exempt from licensing, except for non-tested recipes that add peppers, herbs, etc., will need to be tested and then submitted to MDA for approval consideration prior to production.
Adding alcohol, flowers, flavorings like lavender, or low acid ingredients is NOT allowed.

General Guidelines - Cottage food producers must do the following:

1. Register with the Minnesota Department of Agriculture (MDA) before selling exempt food regardless of the amount of food sold.
2. Take an approved food safety course once every three years while actively selling cottage food.
3. Register with the MDA each year food is sold under the Cottage Food Exemption.
4. Prepare and sell only NON-potentially hazardous food (such as baked goods, certain jams and jellies) and/or home canned pickles, vegetables, or fruits with a pH of 4.6 or lower.
5. Label food with your name and address, the date produced, and the ingredients, including potential allergens.
6. Display a sign that says “These products are homemade and not subject to state inspection.” If you are selling on the Internet, post this statement on your webpage.
7. Deliver food directly to the ultimate consumer. The person who makes the food must be the same person who sells and delivers the food.
8. Sell from a private home, at farmer’s markets, community events, or on the Internet.
9. Check with your local city, county, or township regarding business licensing or sales prohibitions due to zoning requirements.
10. Sell less than $18,000 in a calendar year. If you sell between $5,000 and $18,000 per year, a $50 fee applies to your registration.

Missouri[16,17]

Jams, Jellies, and Preserves - Generally jams and jellies may be produced in an uninspected kitchen; exceptions are sugar-free or no sugar added jams or jellies, ones made with fruit juices or jams or jellies made with non-standard ingredients (pepper jelly is an example).

General Guidelines - Products are exempt if the seller is the producer of the food or an immediate family member residing in the producer’s household and familiar with the food, • foods are sold only to the end consumer, • packaged foods must be labeled according to the code including a statement that the food was made in a kitchen not subject to inspection, or • a sign is posted at the stand for unpackaged foods, that they were prepared in an uninspected kitchen.

Nebraska[18]

Jams and Jellies- You can sell traditional jams and jellies without a permit. You need a permit to sell jams and jellies that have jalapeno or other added ingredients. Rhubarb jelly made with pectin, not gelatin, is allowed to be sold without a permit.

General Guidelines- A clearly visible placard is required at the sale location stating the food was prepared in a kitchen that is not inspected or licensed by the regulatory authority.

North Dakota[19,20]

The North Dakota Department of Health (NDDOH) is currently revising administrative rules after the 2017 legislature passed new laws around the cottage food industry. The new guidelines are expected to go into effect in 2018.

Jams and Jellies - Jams and jellies that are highly acidic in nature (pH less than or equal to 4.6) and do not require time and temperature control for food safety are allowed to be home-processed and sold. High risk jams and jellies (pH greater than 4.6), such as pepper jellies, are not considered approved cottage food products by definition.

General Guidelines- Each food container and/or food item sold must include the following statement in a front size that is prominent, conspicuous, and easy to read, "This product is made in a home kitchen that is not inspected by the state or local health department."

Ohio[21]

Jams and Jellies– May be sold as a cottage food and do not require a license. Home processing of low acid jams/jellies (those with pH greater than 4.6 and a water activity greater than 0.85) are not all to be sold or distributed.

General Guidance– Products must be labelled with the Statement of Identity (the name of the food product), the net quantity of contents (the net weight, in both U.S. Customary System and International System units), ingredient list (listed in descending order of predominance by weight), statement of responsibility (the name and address of the business), and must contain the following statement ten-point type: "This Product is Home Produced".

South Dakota[22,23]

Jams, Jellies, Fruit Syrups, and most fruits – May be sold without a license at farmers' markets and roadside stands. Jams and jellies with a pH greater than 4.6 may not be sold without a license.

General Guidance – All products must have official verification from a third party processing authority in writing. Products must be clearly labeled and include the disclaimer that states "This product was not produced in a commercial kitchen. It has been home processed in a kitchen that may also process common food allergens such as tree nuts, peanuts, egg, soy, wheat, milk, fish, and crustacean shellfish."

Wisconsin[24,25]

Jams and Jellies - Fruit and vegetable jams are allowed to be sold without a license if they have an equilibrium pH of 4.6 or lower.

General Guidance - To sell without license, no more than $5,000 in sales per year, direct from producer to consumer, only at community or social events, such as bazaars, or at farmers' markets.

Resources

[1]https://ag.tennessee.edu/foodscience/Documents/Low%20or%20no%20sugar%20in%20jams,%20jellies%20and%20preserves.pdf

[2] http://ucanr.edu/sites/cottagefoods/files/199766.pdf

[3] http://blog.extension.uconn.edu/2015/08/19/home-canning-food-safety-and-botulism/

[4] 21 CFR 117(b) https://www.ecfr.gov/cgi-bin/text-idx?SID=01afb009a9de6f6797d02757e59ef157&mc=true&node=pt21.2.117&rgn=div5#sp21.2.117.b

[5] http://web.extension.illinois.edu/cottage/foods.cfm

[6] http://web.extension.illinois.edu/cottage/business.cfm

[7] http://web.extension.illinois.edu/cottage/labeling.cfm

[8] https://ag.purdue.edu/foodsci/pages/in-hea-1309-info.aspx

[9] https://www.extension.purdue.edu/extmedia/FS/FS-18-W.pdf

[10] https://store.extension.iastate.edu/Product/15225

[11]https://dia.iowa.gov/sites/default/files/documents/2016/07/basic_requirements_for_farmers_markets.pdf

[12] https://www.bookstore.ksre.ksu.edu/pubs/MF3138.pdf

[13] http://www.michigan.gov/mdard/0,4610,7-125-50772_45851-240577--,00.html

[14] https://www.mda.state.mn.us/licensing/licensetypes/cottagefood.aspx

[15] http://health.mo.gov/safety/foodsafety/pdf/FarmersMarketsBrochure.pdf

[16] http://health.mo.gov/safety/foodsafety/pdf/JamsJelliesBakedGoodsBrochure.pdf

[17] http://www.nda.nebraska.gov/publications/foods/food_safety_farmers_markets_craft_shows.pdf

[18] http://www.ndhealth.gov/FoodLodging/CottageFood.asp

[19] http://www.ndhealth.gov/FoodLodging/PDF/Cottage%20Food/Cottage_Foods_Memo_8.1.17_Final.pdf

[20] http://www.agri.ohio.gov/foodsafety/food-cottageindex.htm

[21] https://doh.sd.gov/food/farmers-markets.aspx?

[22] igrow.org/up/resources/04-2004-2013.pdf

[23] https://datcp.wi.gov/Pages/Programs_Services/FSHomeCannedFoods.aspx

[24] https://datcp.wi.gov/Documents/HomeCannedFood%20FD-PUB-61-web.pdf

[25] 21 CFR 150 https://www.ecfr.gov/cgi-bin/text-idx?SID=1c8978d7d9015c56c6fed1063ed6a916&mc=true&tpl=/ecfrbrowse/Title21/21cfr150_main_02.tpl

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North Central Region
Center for FSMA Training, Extension and Technical Assistance

IOWA STATE UNIVERSITY
Extension and Outreach

Water Activity and Growth of Microorganisms in Food*

	Range of a_w	*Microorganisms Generally Inhibited by Lowest a_w in This Range*	*Foods Generally within This Range*
	1.00–0.95	*Pseudomonas, Escherichia, Proteus, Shigells, Klebsiella, Bacillus, Clostridium perfringens, some yeasts*	Highly perishable (fresh) foods and canned fruits, vegetables, meat, fish, milk, and beverages
	0.95–0.91	*Salmonella, Vibrio parahaemolyticus, C. botulinum, Serratia, Lactobacillus, Pediococcus, some molds, yeasts (Rhodotorula, Pichia)*	Some cheeses (Cheddar, Swiss, Muenster, Provolone), cured meat (ham), bread, tortillas
	0.91–0.87	*Many yeasts (Candida, Torulopsis, Hansenula), Micrococcus*	Fermented sausage (salami), sponge cakes, dry cheeses, margarine
	0.87–0.80	*Most molds (mycotoxigenic penicillia), Staphyloccocus aureus, most Saccharomyces (bailii) spp., Debaryomyces*	Most fruit juice concentrates, sweetened condensed milk, syrups, jams, jellies, soft pet food
	0.80–0.75	*Most halophilic bacteria, mycotoxigenic aspergilli*	Marmalade, marzipan, glacé fruits, beef jerky
	0.75–0.65	*Xerophilic molds (Aspergillus chevalieri, A. candidus, Wallemia sebi), Saccharomyces bisporus*	Molasses, raw cane sugar, some dried fruits, nuts, snack bars, snack cakes
	0.65–0.60	*Osmophilic yeasts (Saccharomyces rouxii), few molds (Aspergillus echinulatus, Monascus bisporus)*	Dried fruits containing 15-20% moisture; some toffees and caramels; honey, candies
	0.60–0.50	*No microbial proliferation*	Dry pasta, spices, rice, confections, wheat
	0.50–0.40	*No microbial proliferation*	Whole egg powder, chewing gum, flour, beans
	0.40–0.30	*No microbial proliferation*	Cookies, crackers, bread crusts, breakfast cereals, dry pet food, peanut butter
	0.30–0.20	*No microbial proliferation*	Whole milk powder, dried vegetables, freeze dried, corn starch, potato chips, corn chips

* *Adapted from L.R. Beuchat, Cereal Foods World, 26:345 (1981).*

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Title 21: Food and Drugs
PART 150—FRUIT BUTTERS, JELLIES, PRESERVES, AND RELATED PRODUCTS

Subpart B—Requirements for Specific Standardized Fruit Butters, Jellies, Preserves, and Related Products

Contents

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§150.110 Fruit butter.

(a) The fruit butters for which definitions and standards of identity are prescribed by this section are the smooth, semisolid foods each of which is made from a mixture of one or a permitted combination of the optional fruit ingredients specified in paragraph (b) of this section and one or any combination of the optional ingredients specified in paragraph (c) of this section, which meets the specifications in paragraph (d) of this section, and which is labeled in accordance with paragraph (e) of this section. Such mixture is concentrated with or without heat. The volatile flavoring materials or essence from such mixture may be captured during concentration, separately concentrated, and added back to any such mixture, together with any concentrated essence accompanying any optional fruit ingredient.

(b)(1) Each of the optional fruit ingredients referred to in paragraph (a) of this section is prepared by cooking one of the following fresh, frozen, canned, and/or dried (evaporated) mature fruits, with or without added water, and screening out skins, seeds, pits, and cores:

FACTOR REFERRED TO IN PARAGRAPH (D)(2) OF THIS SECTION

Name of fruit	
Apple	7.5
Apricot	7.0
Grape	7.0
Peach	8.5
Pear	6.5
Plum (other than prune)	7.0
Prune	7.0
Quince	7.5

(2) The permitted combinations are of two, three, four, and five of the fruit ingredients specified in paragraph (b)(1) of this section; the weight of each is not less than one-fifth of the weight of the combination. Each such fruit ingredient in any such combination is an optional ingredient.

(c) The following safe and suitable optional ingredients may be used:

(1) Nutritive carbohydrate sweeteners.

(2) Spice.

(3) Flavoring (other than artificial flavoring).

(4) Salt.

(5) Acidifying agents.

(6) Fruit juice or diluted fruit juice or concentrated fruit juice, in a quantity not less than one-half the weight of the optional fruit ingredient.

(7) Preservatives.

(8) Antifoaming agents except those derived from animal fats.

(9) Pectin, in a quantity which reasonably compensates for deficiency, if any, of the natural pectin content of the fruit ingredient.

(d) For the purposes of this section:

(1) The mixture referred to in paragraph (a) of this section shall contain not less than five parts by weight of the fruit ingredient as measured in accordance with paragraph (d)(2) of this section to each two parts by weight of nutritive carbohydrate sweetener as measured in accordance with paragraph (d)(4) of this section.

(2) Any requirement with respect to the weight of any optional fruit ingredient, whether concentrated, unconcentrated, or diluted, means the weight determined by the following method: (i) Determine the percent of soluble solids in the optional fruit ingredient by the method for soluble solids referred to in paragraph (d)(3) of this section; (ii) multiply the percent so found by the weight of such fruit ingredient; (iii) divide the result by 100; (iv) subtract from the quotient the weight of any nutritive sweetener solids or other added solids; and (v) multiply the remainder by the factor for such ingredient prescribed in paragraph (b)(1) of this section. The result is the weight of the optional fruit ingredient.

(3) The soluble solids content of the finished fruit butter is not less than 43 percent, as determined by the method prescribed in "Official Methods of Analysis of the Association of Official Analytical Chemists" (AOAC), 13th Ed. (1980), section 22.024, under "Soluble Solids by Refractometer in Fresh and Canned Fruits, Fruit Jellies, Marmalades, and Preserves—Official Final Action," which is incorporated by reference, except that no correction is made for water-insoluble solids. Copies may be obtained from the AOAC INTERNATIONAL, 481 North Frederick Ave., suite 500, Gaithersburg, MD 20877, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(4) The weight of any nutritive carbohydrate sweetener means the weight of the solids of such ingredient.

(5) The weight of fruit juice or diluted fruit juice or concentrated fruit juice (optional ingredient, paragraph (c)(6)) from a fruit specified in paragraph (b)(1) of this section is the weight of such juice, as determined by the method prescribed in paragraph (d)(2) of this section, except that the percent of soluble solids is determined by the method prescribed in the AOAC, 13th Ed. (1980), section 31.011, under "Solids by Means of Refractometer—Official Final Action," which is incorporated by reference; the weight of diluted concentrated juice from any other fruits is the original weight of the juice before it was diluted or concentrated. The availability of this incorporation by reference is given in paragraph (d)(3) of this section.

(e)(1) *Label declaration.* Each of the ingredients used in the food shall be declared on the label as required by the applicable sections of parts 101 and 130 of this chapter, except that:

(i) In case the fruit butter is made from a single fruit ingredient, the name is "Butter", preceded by the name where by such fruit is designated in paragraph (b)(1) of this section.

(ii) In case the fruit butter is made from a combination of two, three, four, or five fruit ingredients, the name is "Butter", preceded by the words "Mixed fruit" or by the names whereby such fruits are designated in paragraph (b)(1) of this section, in the order of predominance, if any, of the weight of such fruit ingredients in the combination.

(2) Each of the optional ingredients specified in paragraphs (b) and (c) of this section shall be declared on the label as required by the applicable sections of part 101 of this chapter, except that:

(i) Other than in the case of dried (evaporated) fruit the name(s) of the fruit or fruits used may be declared without specifying the particular form of the fruit or fruits used. When the optional fruit ingredient is prepared in whole or in part from dried fruit, the label shall bear the words "prepared from" or "prepared in part from", as the case may be, followed by the word "evaporated" or "dried", followed by the name whereby such fruit is designated in paragraph (c) of this section. When two or more such optional fruit ingredients are used, such names, each preceded by the word "evaporated" or "dried", shall appear in the order of predominance, if any, of the weight of such ingredients in the combination.

(ii) [Reserved]

[42 FR 14445, Mar. 15, 1977, as amended at 47 FR 11831, Mar. 19, 1982; 49 FR 10101, Mar. 19, 1984; 54 FR 24895, June 12, 1989; 58 FR 2882, Jan. 6, 1993; 63 FR 14035, Mar. 24, 1998]

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§150.140 Fruit jelly.

(a) The jellies for which definitions and standards of identity are prescribed by this section are the jelled foods each of which is made from a mixture of one or a permitted combination of the fruit juice ingredients specified in paragraph (b) of this section and one or any combination of the optional ingredients specified in paragraph (c) of this section, which meets the specifications in paragraph (d) of this section and which is labeled in accordance with paragraph (e) of this section. Such mixture is concentrated with or without heat. The volatile flavoring materials or essence from such mixture may be captured during concentration, separately concentrated, and added back to any such mixture, together with any concentrated essence accompanying any optional fruit ingredient.

(b)(1) Each of the fruit juice ingredients referred to in paragraph (a) of this section is the filtered or strained liquid extracted with or without the application of heat and with or without the addition of water, from one of the following mature, properly prepared fruits which are fresh, frozen and/or canned:

Factor Referred to in Paragraph (d)(2) of This Section

Name of fruit	
Apple	7.5
Apricot	7.0
Blackberry (other than dewberry)	10.0
Black raspberry	9.0
Boysenberry	10.0
Cherry	7.0
Crabapple	6.5
Cranberry	9.5
Damson, damson plum	7.0
Dewberry (other than boysenberry, loganberry, and youngberry)	10.0
Fig	5.5
Gooseberry	12.0
Grape	7.0
Grapefruit	11.0
Greengage, greengage plum	7.0
Guava	13.0
Loganberry	9.5
Orange	8.0
Peach	8.5
Pineapple	7.0
Plum (other than damson, greengage, and prune)	7.0
Pomegranate	5.5
Prickly pear	11.0
Quince	7.5
Raspberry, red raspberry	9.5
Red currant, currant (other than black currant)	9.5
Strawberry	12.5
Youngberry	10.0

(2) The permitted combinations are of two, three, four, or five of the fruit juice ingredients specified in paragraph (b)(1) of this section, the weight of each is not less than one-fifth of the weight of the combination. Each such fruit juice ingredient in any such combination is an optional ingredient.

(c) The following safe and suitable optional ingredients may be used:

(1) Nutritive carbohydrate sweeteners.

(2) Spice.

(3) Acidifying agents.

(4) Pectin, in a quantity which reasonably compensates for deficiency, if any, of the natural pectin content of the fruit juice ingredient.

(5) Buffering agents.

(6) Preservatives.

(7) Antifoaming agents except those derived from animal fats.

(8) Mint flavoring and artificial green coloring, in case the fruit juice ingredient or combination of fruit juice ingredients is extracted from apple, crabapple, pineapple, or two or all of such fruits.

(9) Cinnamon flavoring, other than artificial flavoring, and artificial red coloring in case the fruit juice ingredient or combination of fruit juice ingredients is extracted from apple or crabapple or both such fruits.

(d) For the purposes of this section:

(1) The mixture referred to in paragraph (a) of this section shall contain not less than 45 parts by weight of the fruit juice ingredients as measured in accordance with paragraph (d)(2) of this section to each 55 parts by weight of saccharine ingredient as measured in accordance with paragraph (d)(4) of this section.

(2) Any requirement with respect to the weight of any fruit juice ingredient, whether prepared from concentrated, unconcentrated, or diluted fruit juice means the weight determined by the following method: (i) Determine the percent of soluble solids in such fruit juice ingredient by the method for soluble solids referred to in paragraph (d)(3) of this section; (ii) multiply the percent so found by the weight of such fruit juice ingredient; (iii) divide the result by 100; (iv) subtract from the quotient the weight of any added saccharine ingredient solids or other added solids; and (v) multiply the remainder by the factor for such fruit juice ingredient prescribed in paragraph (b) of this section. The result is the weight of the fruit juice ingredient.

(3) The soluble-solids content of the finished jelly is not less than 65 percent, as determined by the method prescribed in "Official Methods of Analysis of the Association of Official Analytical Chemists," 13th Ed. (1980), section 31.011, under "Solids by Means of Refractometer—Official Final Action," which is incorporated by reference. Copies may be obtained from the AOAC INTERNATIONAL, 481 North Frederick Ave., suite 500, Gaithersburg, MD 20877, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(4) The weight of any optional saccharine ingredient means the weight of the solids of such ingredient.

(e)(1) The name of each jelly for which a definition and standard of identity is prescribed by this section is as follows:

(i) In case the jelly is made with a single fruit juice ingredient, the name is "Jelly", preceded or followed by the name or synonym whereby the fruit from which such fruit juice ingredient was extracted is designated in paragraph (b) of this section.

(ii) In case the jelly is made with a combination of two, three, four, or five fruit juice ingredients, the name is "Jelly", preceded or followed by the words "Mixed fruit" or by the names or synonyms whereby the fruits from which the fruit juice ingredients were extracted are designated in paragraph (b) of this section, in the order of predominance, if any, of the weights of any such fruit juice ingredients in the combination.

(2) *Label declaration.* Each of the ingredients used in the food shall be declared on the label as required by the applicable sections of parts 101 and 130 of this chapter, except that:

(i) The name(s) of the fruit or fruits used may be declared without specifying the particular form of the fruit or fruits used.

(ii) When the optional ingredients listed in paragraphs (c) (3), (4), and (5) of this section are declared on the label, the declaration may be followed by the statement "Used as needed" on all jellies to which they are customarily, but not always, added to compensate for natural variations in the fruit juice ingredients used.

[42 FR 14445, Mar. 15, 1977, as amended at 47 FR 11831, Mar. 19, 1982; 49 FR 10101, Mar. 19, 1984; 54 FR 24895, June 12, 1989; 58 FR 2882, Jan. 6, 1993; 63 FR 14035, Mar. 24, 1998]

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§150.160 Fruit preserves and jams.

(a) The preserves or jams for which definitions and standards of identity are prescribed by this section are the viscous or semi-solid foods, each of which is made from a mixture composed of one or a permitted combination of the fruit ingredients specified in paragraph (b) of this section and one or any combination of the optional ingredients specified in paragraph (c) of this section which meets the specifications in paragraph (d) of this section, and which is labeled in accordance with paragraph (e) of this section. Such mixture, with or without added water, is concentrated with or without heat. The volatile flavoring material from such mixture may be captured during concentration, separately concentrated, and added back to any such mixture, together with any concentrated essence accompanying any optional fruit ingredient.

(b)(1) The fruit ingredients referred to in paragraph (a) of this section are the following mature, properly prepared fruits which are fresh, concentrated, frozen and/or canned:

GROUP I

Blackberry (other than dewberry), Black raspberry, Blueberry, Boysenberry, Cherry, Crabapple, Dewberry (other than boysenberry, loganberry, and youngberry) Elderberry, Grape, Grapefruit, Huckleberry, Loganberry, Orange, Pineapple, Raspberry, red raspberry, Rhubarb, Strawberry, Tangerine, Tomato, Yellow tomato, Youngberry

GROUP II

Apricot, Cranberry, Damson, damson plum, Fig, Gooseberry, Greengage, greengage plum, Guava, Nectarine, Peach, Pear, Plum (other than greengage plum and damson plum), Quince, Red currant, currant (other than black currant)

(2) The following combinations of fruit ingredients may be used:

(i) Any combination of two, three, four, or five of such fruits in which the weight of each is not less than one-fifth of the weight of the combination; except that the weight of pineapple may be not less than one-tenth of the weight of the combination.

(ii) Any combination of apple and one, two, three, or four of such fruits in which the weight of each is not less than one-fifth and the weight of apple is not more than one-half of the weight of the combination; except that the weight of pineapple may be not less than one-tenth of the weight of the combination.

In any combination of two, three, four, or five fruits, each such fruit is an optional ingredient. For the purposes of this section the word “fruit” includes the vegetables specified in this paragraph.

(c) The following safe and suitable optional ingredients may be used:

(1) Nutritive carbohydrate sweeteners.

(2) Spice.

(3) Acidifying agents.

(4) Pectin, in a quantity which reasonably compensates for deficiency, if any, of the natural pectin content of the fruit ingredient.

(5) Buffering agents.

(6) Preservatives.

(7) Antifoaming agents, except those derived from animal fat.

(d) For the purposes of this section:

(1) The mixture referred to in paragraph (a) of this section shall be composed of not less than: (i) In the case of a fruit ingredient consisting of a Group I fruit or a permitted combination exclusively of Group I fruits, 47 parts by weight of the fruit ingredient to each 55 parts by weight of the saccharine ingredient; and (ii) in all other cases, 45 parts by weight of the fruit ingredient to each 55 parts by weight of the saccharine ingredient. The weight of the fruit ingredient shall be determined in accordance with paragraph (d)(2) of this section, and the weight of the saccharine ingredient shall be determined in accordance with paragraph (d)(5) of this section.

(2) Any requirement with respect to the weight of any fruit, combination of fruits, or fruit ingredient means:

(i) The weight of fruit exclusive of the weight of any sugar, water, or other substance added for any processing or packing or canning, or otherwise added to such fruit.

(ii) In the case of fruit prepared by the removal, in whole or in part, of pits, seeds, skins, cores, or other parts; the weight of such fruit, exclusive of the weight of all such substances removed therefrom.

(iii) In the cases of apricots, cherries, grapes, nectarines, peaches, and all varieties of plums, whether or not pits and seeds are removed therefrom; the weight of such fruit, exclusive of the weight of such pits and seeds.

(iv) In the case of concentrated fruit, the weight of the properly prepared fresh fruit used to produce such concentrated fruit.

(3) The term *concentrated fruit* means a concentrate made from the properly prepared edible portion of mature fresh or frozen fruits by removal of moisture with or without the use of heat or vacuum, but not to the point of drying. Such concentrate is canned or frozen without the addition of sugar or other sweetening agents and is identified to show or permit the calculation of the weight of the properly prepared fresh fruit used to produce any given quantity of such concentrate. The volatile flavoring material or essence from such fruits may be captured during concentration and separately concentrated for subsequent addition to the concentrated fruit either directly or during manufacture of the preserve or jam, in the original proportions present in the fruit.

(4) The weight of any optional saccharine ingredient means the weight of the solids of such ingredient.

(5) The soluble-solids content of the finished jam or preserve is not less than 65 percent, as determined by the method prescribed in “Official Methods of Analysis of the Association of Official Analytical Chemists,” 13th Ed. (1980), section 22.024, under “Soluble Solids by Refractometer in Fresh and Canned Fruits, Jellies, Marmalades, and Preserves—Official Final Action,” which is incorporated by reference, except that no correction is made for water-insoluble solids. Copies may be obtained from the AOAC INTERNATIONAL, 481 North Frederick Ave., suite 500, Gaithersburg, MD 20877, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(e)(1) The name of each preserve or jam for which a definition and standard of identity is prescribed by this section is as follows:

(i) If the fruit ingredient is a single fruit, the name is “Preserve” or “Jam”, preceded or followed by the name or synonym whereby such fruit is designated in paragraph (b) of this section.

(ii) If the fruit ingredient is a combination of two, three, four, or five fruits, the name is “Preserve” or “Jam”, preceded or followed by the words “Mixed fruit” or by the names or synonyms whereby such fruits are designated in paragraph (b) of this section, in the order of predominance, if any, of the weights of such fruits in the combination.

(2) *Label declaration.* Each of the ingredients used in the food shall be declared on the label as required by the applicable sections of parts 101 and 130 of this chapter, except that:

(i) The name(s) of the fruit or fruits used may be declared without specifying the particular form of the fruit or fruits used.

(ii) When the optional ingredients listed in paragraphs (c) (3), (4), and (5) of this section are declared on the label, the declaration may be followed by the statement “used as needed” on all preserves or jams to which they are customarily, but not always, added to compensate for natural variations in the fruit ingredients used.

[42 FR 14445, Mar. 15, 1977, as amended at 47 FR 11831, Mar. 19, 1982; 49 FR 10101, Mar. 19, 1984; 54 FR 24895, June 12, 1989; 58 FR 2882, Jan. 6, 1993; 63 FR 14035, Mar. 24, 1998]

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