

A Look at Pectin

By Getty Stewart

Pectin is naturally present in the non-woody parts of plants where it functions to help bind cells together. It is a polysaccharide (a complex carbohydrate) and considered a soluble dietary fibre. It can be easily extracted and used as a thickening/gelling agent.

Pectin content varies by fruit type and by ripeness of fruit. Pectin keeps the cell structure of fruit strong and tight, when fruit is crisp, ripe and fully formed with beautiful tight skin covering the fruit, pectin is at its highest level. As it ripens further, pectin levels drop and the structure of the fruit starts to soften and loosen – the fruit shrivels and starts looking not so great. Pectin is to fruit what botox is to movie stars! Slightly underripe fruit has the highest concentration of pectin. Highest levels of pectin in fruit is found in the core, rinds, peels and inner membranes (apple cores & peels, the white spongy pith (albedo) of citrus fruit and the inner membranes of citrus fruit (lamella). Commercially, pectin is produced primarily from citrus and apple pomace - the by products remaining after making juice.

Pectin Content of Common Fruit

High Pectin Fruit	Low Pectin Fruit
apples*	apricots
citrus with peel*	blueberries
crab apples*	cherries (sweet)
cranberries*	elderberries
currants (red and black)*	figs
gooseberries	peaches & nectarines
plums (damson)	pears
grapes (Valiant, concord varieties)	plums (prune)
quinces	pineapple
saskatoons	raspberries
sour cherries	strawberries
*best source	overripe fruit

Pectin alone is not enough to create a good set. In order to make jams and jellies using natural pectin sources you also need acid, sugar and heat. Getting the right combination requires a bit of trial and error. Combining high and low pectin fruit and/or adding lemon juice are techniques often used to get the right set.

When you have a combination of fruit you'd like to try, you can test the pectin content and then the gel set to see what kind of results you might get when making a bigger batch.

Here's how to test for Pectin Content and for the Gel Set once you have confirmed you have good pectin content.

Testing for Pectin Content

1 Tbsp rubbing alcohol

1 Tbsp fruit juice

1. Pour rubbing alcohol in small dish.
2. Add fruit juice.
3. Swirl the mixture around and observe results:
 - Watery liquid = no gelling ability, pectin concentration is zero or very low
 - Small rubbery particles = weak gelling ability, pectin level is low
 - Large rubbery clot = good gelling ability, pectin level is highThe larger the clots, the more pectin.
4. To improve the concentration of pectin, add apple cores, citrus pith or other high pectin fruits to your fruit mix.
5. Rubbing alcohol is not safe to consume - be sure to discard the test batch.

Testing for Gel Set

You can't rely on what the liquid in your pot looks like to determine if it will set properly. Because of the heat, it will never look like jelly or jam in the pot - no matter how long you wait! The best way to judge how it will set is to test it using one of the following three methods.

Because pectin can be over-boiled, remove your pot from the heat while testing for gel set.

1. Chilled Plate Test

Place a small plate in the freezer. Pour a spoonful of jelly on the plate and cool for 1 minute in freezer. Take the plate out of the freezer and run your finger through the center of the liquid. If it wrinkles and you can push it around, it is ready. If it remains liquidy, continue to boil.

2. Spoon Test

Dip a cold metal spoon into the mixture. Hold it above the pot, out of the steam. Turn the spoon so that the liquid drips off the spoon. Observe the drips. If the liquid drips off the spoon one or two drops at a time, it is not ready. When the drips flow together and drop off the side of the spoon in a liquidy sheet, the mix is ready.

3. Temperature Test

Cook your jam or jelly unit it reaches a temperature of 105°C/220°F. Insert a candy thermometer vertically into the mixture being sure the tip of the thermometer does not touch the pot. If you're confident of your pectin, acid, sugar and fruit mix, you're jam and jelly will be ready once you reach this temperature. If you're uncertain, combine this test with either the chilled plate or spoon test.

How to Make Homemade Pectin

If you're thinking of making your own pectin you're either a purist, extremist or home economist! Or maybe you're just really curious. If you've read this far, you should probably go for it, it's obvious you're totally into the homemade jam scene.

But here's an important note about using homemade pectin, it does impact the flavor of your final product. If you want to make black cherry jam with homemade apple pectin you'll have the distinct flavor of apple in your cherry jam. If you choose homemade citrus pectin, your black cherry jam will taste a little like marmalade. The changes in flavor profile is the main reason why I rarely use homemade pectin when I make jams and jellies for my family.

With that clearly stated, here's some more on making homemade pectin.

Why Make Your Own Pectin?

It's easy.

It's cheap.

It makes full use of every part of your fruit.

It leaves you in control of what goes into your food products.

It gives you a better understanding of what pectin is and how it works.

You don't need to worry about finding commercial pectin.

You can make it any time of the year and store it for when you need it.

It's empowering.

Why Not Make Your Own Pectin?

It takes time.

There are so many variables at play (how ripe the fruit is, what the content of the pectin is, the fruit you're mixing it with, the acidity of the fruit, etc.) that it is difficult to get a consistent end product.

Using your own pectin requires experimenting and adjusting - there are no foolproof recipes you can mindlessly whip up.

You need to test for the gel set.

Cooking time takes much longer than with commercial pectin (8-15 minutes vs 1 min).

The final product will take on the flavour of the pectin.

If, after weighing the pros and cons, you'd like to make your own pectin, here are two options to try - liquid apple pectin or liquid citrus pectin.

Homemade Apple Pectin or Apple Stock

Apple pectin or apple stock is best made with crab apples or tart apples such as Goodlands or Granny Smiths. Pectin concentration is highest when the apples are just slightly under-ripe. If you have overripe apples, toss in a few underripe apples to increase the pectin levels.

Most of the pectin in apples is found in the core and peels, so using apple leavings - the cores and peels left over when making other delicious apple products works very well. Of course, you can also use whole apples, especially whole crab apples.

If you just have a few apple cores and peels, you can keep them in the freezer until you've collected enough to fill a stock pot. The pectin will wait until you're ready! Once you have enough apples, crab apples or apple leavings, you're ready to make apple pectin.

Apple Pectin

2 ½ lbs/1 kg* apples or apple leavings *(or whatever amount, no need to measure)
10 cups/2.5 l water

1. Cut large apples into quarters and crab apples in halves.
2. Place apples or apple leavings in a large pot.
3. Add water (water should just cover the apples).
4. Bring to boil.
5. Reduce heat and simmer until soft, 30-60 minutes.
6. Strain apples through fine sieve or jelly bag overnight or at least 2 hours. To avoid a cloudy stock, do not squeeze or stir.
7. Once strained, boil and simmer the liquid to reduce by half. By evaporating off some of the water, the pectin concentration will be higher so you'll need less apple stock in the final product.
8. Use immediately or store in refrigerator for up to 2 weeks.
9. For future use, store in freezer for up to 1 year or pour into sterilized jars and process in a hot water canner for 5 minutes.

Yield: 3-4 cups/750-1000 ml of apple pectin

Test for Pectin Content

1 tbsp/15 ml rubbing alcohol
1 tsp/5 ml apple pectin

1. Pour rubbing alcohol in small dish.
2. Add apple pectin.
3. Swirl the mixture around and observe results:
 - Watery liquid = no gelling ability, pectin concentration is zero or very low
 - Small rubbery particles = weak gelling ability, pectin level is low
 - Large rubbery clot = good gelling ability, pectin level is high
4. To improve the concentration of pectin, bring the apple stock back to boiling and reduce further.
5. Rubbing alcohol is not safe to consume - be sure to discard the test batch.

Using Apple Pectin

To use your homemade apple pectin you will need to experiment because no two batches are alike. The type of fruit you're mixing it with will also impact how much stock you will need to use. For example if using strawberries (low pectin), you'll need more apple pectin than if using currants or plums (high pectin).

As a general guideline start with a ratio of 1 cup apple pectin to 4 cups prepared fruit or juice. Test for the gel set every 2 minutes after 10 minutes of boiling. If the gel is too weak, add more apple pectin.

Remember, pectin also needs sugar and acid to work effectively. The following provides a general reference for the mix of pectin, fruit, sugar and acid.

Ingredient	Large Batch (5-6 jars)	Small Batch (2-4 jars)
Apple Pectin	1 cup/250 ml	½ cup/125 ml
Prepared Juice/Fruit	4 cups/1 l	2 cups/500 ml
Sugar	4 cups/1 l	2 cups/500 ml
Lemon Juice (additional acid for low acid fruits)	2 tbsp/30ml	1 tbsp/15 ml

Pectin requires just the right amount of heat. Heating too long at low temperatures, boiling too short or boiling too long will result in poor gelling. For this reason, it is often recommended not to prepare very large batches of jam at a time - the heating time is extended and may jeopardize the gelling ability of the pectin. This also explains why it is recommended to turn off the element while testing for gel set and why you should test every 2 minutes - too much boiling may destroy the pectin.

Homemade Citrus Pectin

Citrus pectin can be made from any citrus fruit - lemons, limes, oranges, grapefruits, pomelo and kumquats. The zest, flesh and juice of citrus actually have very little pectin, the highest concentration of pectin is found in the white spongy pith (albedo) and the inner membranes of citrus fruit (lamella). These are also the bitter tasting portions of citrus fruit, so *be aware that homemade citrus pectin will impart a little of that flavour into your jams and jellies.*

Making your own citrus pectin allows you to use every portion of your citrus fruit because all you need is what is left over after zesting, juicing or segmenting citrus fruit. The leavings, the pith, inner membranes and seeds are all you need for citrus pectin.

If you don't have enough citrus leavings, store them in the freezer until you have enough.

Citrus Pectin

6-8	lemons/grapefruits/oranges
2-3cups/500-750 ml	water

1. Wash and scrub citrus fruit well.
2. Zest fruit. Keep zest for use in other recipes (can be frozen).
3. If using lemons or limes, cut in half and remove juice with juicer. Keep juice for use in other recipes (can be frozen, consider freezing in ice cube tray for convenient size).
4. If using oranges or grapefruits, separate the flesh from the inner membranes. Enjoy these fruit pieces in salads or yogurt parfaits.
5. After zesting, juicing or segmenting, place remaining peels, seeds and membranes in a pot.
6. Add water (water should just cover the citrus leavings).
7. Bring to boil.
8. Reduce heat and simmer for 15 minutes.
9. Strain mix through fine sieve or jelly bag.
10. Use immediately or store in refrigerator for up to 2 weeks.
11. For future use, store in freezer for up to 1 year or pour into sterilized jars and process in a hot water canner for 5 minutes.

Yield: 1-2 cups/250-500 ml of citrus pectin

Test for Pectin Content

1 tbsp/15 ml	rubbing alcohol
1 tsp/5 ml	citrus pectin

1. Pour rubbing alcohol in small dish.
2. Add citrus pectin.
3. Swirl the mixture around and observe results:
 - Watery liquid = no gelling ability, pectin concentration is zero or very low
 - Small rubbery particles = weak gelling ability, pectin level is low
 - Large rubbery clot = good gelling ability, pectin level is high
4. If needed, improve the concentration of pectin, by boiling and reducing further.
5. Remember, rubbing alcohol is not safe to consume - be sure to discard the test batch.

Using Citrus Pectin

To use your homemade citrus pectin you will need to experiment because no two batches are alike. The type and ripeness of the fruit you're mixing it with will also impact how much stock you will need. And remember, pectin also needs sugar and acid to work effectively. The following provides a general reference for the mix of pectin, fruit, sugar and acid.

Ingredient	Large Batch (5-6 jars)	Small Batch (2-4 jars)
Citrus Pectin	1/2 cup/125 ml	1/4 cup/60 ml
Prepared Juice/Fruit	4 cups/1 l	2 cups/500 ml
Sugar	4 cups/1 l	2 cups/500 ml
Lemon Juice (additional acid for low acid fruits)	2 tbsp/30ml	1 tbsp/15 ml

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