

Jam Making: Why all the sugar?

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The coming of the hot weather means that berry season has arrived - first strawberries, then raspberries and blueberries, just to mention a few. These will be followed by peaches and other fruits. Fortunately for us, this provides the chance to prepare delicious homemade jams and jellies.

In jam-making, one of the questions that frequently arises is, "Why do I need all this sugar?" Many people seem to view sugar as something evil and want to avoid it as an unnecessary source of calories, or a threat to their health. However, don't be too quick to condemn it just yet.

The thing to keep in mind is that sugar is essential for successful jam-making. Cutting down on the sugar in a jam recipe is just asking for failure. You will end up with a runny mess to show for all your work. While it is true that sugar contributes to the sweetness of the jam, it does much more than that.

A typical batch of cooked strawberry jam may call for about 4 cups of mashed berries, a few tablespoons of lemon juice, and as much as 7 cups of sugar. Once these have been brought to a boil, some form of liquid or crystal pectin product is blended thoroughly into the mixture before filling the jars and sealing them.

Let's take a quick look at the role of each ingredient in strawberry jam to get a better understand what's actually happening.

The function of the fruit itself should be rather obvious, so we don't need to worry too much about that aspect.

Strawberries contain about 90% water by weight. When sugar is added to the mashed berries, it dissolves in the strawberry juice. Once a sufficiently high concentration has been reached, some rather interesting reactions begin to take place between the sugar and the water inside the fruit. The sugar draws water out of the fruit and forms chemical bonds which "bind" the water molecules to the sugar molecules. The bound water is held so tightly that it is no longer available to support the growth of many types of microorganisms. In this way, sugar acts as a means of preservation against future microbial growth problems.

Sugar also helps in the development of flavour and texture. For me, a favourite way to enjoy this flavour is with homemade strawberry jam and Devon cream on freshly baked scones.

Pectin, generally the last ingredient added to the jam mixture, is obtained from the peels of citrus fruits, especially oranges. It can also be extracted from the fleshy part of apples left after the apples have been squeezed to remove their juice.

Pectin itself is a large molecular compound which is capable of forming bonds with other pectin molecules to form a gel under certain conditions. It is these conditions which we want to optimize when making jam. With the sugar binding much of the water in the fruit, the pectin can then form a gel with the proper strength to create the desired texture in the jam.

If too much water is present, the pectin cannot form a strong enough gel which results in a runny texture. This is why the sugar is so important, since it is responsible for taking care of the water by chemically binding it and effectively preventing it from reacting with anything else in the jam mixture.

The lemon juice helps ensure that there is sufficient acidity in the jam to promote the formation of gels by the pectin. The abundance of sugar helps mask the sour taste of the citric acid found in the lemon juice.

For those who are concerned about the sugar levels in various jams and jellies, forms of pectin have been developed that can function with more water present. These are typically marketed as “light” products and can reduce the calorie content of jams by as much as one-third.

Whatever pectin product you use, be sure to follow the instructions carefully and do not make any un-recommended adjustments. Of course, cleaning all your jars and good sanitation practices are important parts of the jam-making process as well.