



PASSION FRUIT JAM SMALL-SCALE PRODUCTION

Passion fruit is found in many tropical and sub-tropical countries, it is an ovoid shape fruit which gives a juice with a very strong exotic flavour and a bright orange colour.

The juice has a pH 2.6-3.0 and an unusually high starch content. There are approximately 25-35 fruits to the kilo. The bigger fruits (more than 30g) are more suitable for food processing as they have more juice and less rind. There are two important commercial varieties, purple passions fruit (*Passiflora edulis*), and yellow passion fruit, (*Passiflora edulis* for *flavicarpa*), the latter has larger fruits and more acidic juice, and a less preferred flavour. The fruits are most suitable for processing when all greenness has disappeared and the outer skin has a smooth or slightly crinkled surface.

The fresh whole fruit can only be stored for a few days at ambient temperature before it deteriorates, at 6.5°C they can be stored for 3-4 weeks before any major deterioration. The pulp can be stored for long periods in bulk with 1000-1500ppm of sulphur dioxide or benzoic acid or a mixture of both, but there is a reduction in the quality of the flavour. During heat preservation the main problem to overcome is the loss of the extremely heat sensitive flavour, which is susceptible to quick oxidation.

The seeds are not suitable for stock feeding due to their very high crude fibre content, however, it is of use, after refining, in the manufacture of soap, paint, varnish and cooking oils.

The skin of passion fruit is a good source of pectin, and makes a good manure. It can also be used to make an artificial, pears in sugar syrup product.

Recipe		
Sugar	49%	
Fruit juice	20%	(starting recipe
Skin pulp	20%	before boiling)
Water	11%	
Sodium bicarbonate	0.015%	

In most countries, preservative is not allowed to be added to the jam. Only a residue of preservative is allowed in jam which has been made from fruit pulp which has been stored with chemical preservatives (100ppm sulphur dioxide or 500ppm benzoic acid). Sodium bicarbonate is not a preservative, it is added to adjust the pH. Jams give a gel when there is the correct ratio of pectin to water and the pH is between 2.5-3.45pH. The optimum pH to give a good gel is pH 3.0

Method

Wash whole fruits in clean water and discard any bad fruits.

Cut fruits in half with a stainless steel knife and scoop out pulp with stainless steel spoon.

Extract the juice from the pulp by liquidising the pulp at a very low speed (this stops the chipping of the seeds, which turn out as black specks in the jam, they are very hard to remove and look like dirt) for about one minute. Tip the contents into a muslin cloth and squeeze out the juice leaving the seeds behind. This method will give a yield of raw juice from whole fruit of between 30-35%.

To make skin pulp take the same quantity of skins, as skin pulp required; boil the skins for approximately 30 minutes, until the flesh of the skin is soft and translucent. Then remove the skins from the water and scoop out the flesh from the outer cuticle. Liquidise this softened flesh with water, (2 parts softened flesh, to 1 part water {take the water in which the skins were boiled this will contain pectin washed out during the boiling}) to a smooth cream, then squeeze the mixture through a muslin cloth to remove hard pieces of pith. Skin pulp is added to the jam as it contains natural pectin and so saves adding artificial pectin which is expensive.

Mix the raw juice with sodium bicarbonate first (if the NaHCO_3 is added during boiling the jam will bubble-up over the top of the saucepan). Boil all the ingredients in a stainless steel saucepan to the 'end point'. Jam should not be boiled for more than 12-15 minutes otherwise this can give rise to caramel flavours, over sweetness and discolouration, apart from being a waste of energy. By reducing the amount of water in the starting recipe, the boiling time can be reduced. The 'end point' is reached when the total soluble solids is up to 70%, this is measured with a refractometer, (In most countries the legal minimum sugar levels in jam, are 65% in hermetically sealed containers, and 68.5% in non air tight containers.) 70% gives a safety factor. Jam with over 70% sugar can give problems during storage as sugar will re-crystallise out into large chunks. The 'end point' is usually reached around 106-108°C (depending on barometric pressure and height above sea level). When the jam has nearly reached this temperature samples are taken and tested on a refractometer, the sample must be cooled before being measured. This can be done by smearing it on a cold dry plate or saucepan lid. All implements used to take the sample must be dry, otherwise the reading will be reduced. It is important to stir the jam at all times during the heating process, otherwise burning will occur at the bottom of the saucepan, causing off flavours and discolouration. When the 'end point' has been reached the jam should be filled into jars which have been cleaned and then steamed to sterilise them, and are still hot so that the jars do not crack. The jars should be filled as quickly as possible so that the jam is not heated for longer than necessary, or recontaminated because it has cooled down before being sealed in the jar. The lip of the jar should be clean and dry (wipe with clean tissue paper) before placing the lid on it. The filled jars can be placed in water to cool down the jam so that it does not keep cooking in the jar, the water level should be kept below the lid of the jar. The gel formation takes place as the temperature comes down to around 55°C, if the jam is moved when the gel is forming the gel structure will be broken and the jam will not set.

Equipment list

- Jars, omnia lids and labels
- Omnia capper
- Cooking facilities, gas ring, electric ring, etc
- Stainless steel saucepan
- Thermometer in protective jacket
- Stainless steel cutting knife and spoon
- Wooden spoon for stirring
- Refractometer
- Steam generator
- Cutting board
- Scales
- Measuring cylinder
- Funnel
- Liquidiser
- Mashing tool

References and further reading

- Jam Jellies & Marmalade* Practical Action Technical Brief
- Lime marmalade* Practical Action Technical Brief
- Pineapple Jam* Practical Action Technical Brief
- Strawberry Jam* Practical Action Technical Brief
- Watermelon Jam* Practical Action Technical Brief