



# STRAWBERRY FLAVOURED JAM

## Introduction

Strawberry *flavoured* jam can be made from ash gourd with the addition of artificial strawberry flavouring and red food colouring. It should not be confused with strawberry jam which is made from real strawberries.



Ash gourd is a cheap fruit which can be stored for up to a year without deterioration. It is fairly tasteless and so can be used as the base for several different products. Flavourings and food colourings are added to give a range of products. The yield of usable fruit material from the whole fruit is approximately 75%. Ash gourd has enough natural pectin present to make a good jam without the addition of artificial pectin. It is extremely important that the label on the jar states that this product is *strawberry flavoured* rather than *strawberry* jam. See the technical brief on labelling for more information on the legalities of labelling foods.

This technical brief should be read together with the general brief on jam and jelly making which contains detailed information on quality assurance, recipes and equipment suppliers.

**Figure 1: Woman showing Ash Gourd,  
Practical Action Bangladesh**

## Recipe

Fruit pulp	44%	
Sugar	55%	(starting recipe before boiling)
Citric acid	0.53%	
Strawberry flavouring	0.12%	
Red food-grade colouring	0.032%	

## Quality assurance

The main areas of quality control that are needed to produce uniformly high quality products are as follows: fruit selection and preparation, accurate weighing and mixing of ingredients, hygienic preparation of fruits, correct acidity, moisture content and final total soluble solids content.

Practical Action, The Schumacher Centre, Bourton on Dunsmore, Rugby, Warwickshire, CV23 9QZ, UK  
T +44 (0)1926 634400 | F +44 (0)1926 634401 | E [infoserv@practicalaction.org.uk](mailto:infoserv@practicalaction.org.uk) | W [www.practicalaction.org](http://www.practicalaction.org)

Practical Action is a registered charity and company limited by guarantee.  
Company Reg. No. 871954, England | Reg. Charity No.247257 | VAT No. 880 9924 76 |  
Patron HRH The Prince of Wales, KG, KT, GCB

## Fruit selection and preparation

Select mature fruit that has no bruising or insect damage. Very ripe or over-ripe fruit has low levels of pectin and is not suitable for jam making and should not be used. Fruit that is very under-ripe is also not recommended as the taste and sweetness of the fruit are under-developed. Wash the fruit well in clean water.

Remove the peel from the gourd and chop the flesh into small pieces. Add a small amount of water. If the fruit pieces are left standing for a long time they will start to turn brown, therefore the cut pieces should be covered in water while the rest of the gourd is prepared. Once a batch of gourd is prepared, it is best to boil it to make a pulp rather than leave it standing around where it is open to contamination by flies and dust.

## Ingredient mixing

Use accurate scales to weigh out the ingredients and take care to weigh out the correct amount for each batch of jam.

## Production/preparation

### Fruit pulp

Boil the fruit pieces in the water for about 30 minutes until they are soft. Remove the pieces from the water and mash them into a smooth pulp. Keep the pulp covered to prevent contamination from flies.

### Food colours and preservatives

Ash gourd does not have a colour or taste, therefore a food-grade red colour and strawberry flavouring are added towards the end of the boiling period. It is important that the colouring used is of food grade and is permitted for use in your country. Check with the local Bureau of Standards to see which colours are allowed in your particular country and the permitted levels. Only buy colours from reputable suppliers. Some colourings are tainted with illegal (toxic) dyes and should not be used for food products. Most consumers prefer to eat preserves that are free from artificial colourings therefore it is better if natural fruit colours can be used – for example, adding dark red fruits or berries can give a more attractive and natural colour to jams. As a processor, you are likely to get a higher price for products that are more natural and free from colours.

In most countries, it is illegal to add preservative (such as benzoic acid, sodium or potassium benzoate or sulphur dioxide) to jams. Besides, if the correct recipe is used, good quality assurance procedures are in place, the method is followed accurately and the jam is made under hygienic conditions, it is not necessary to add preservatives to jams. The sugar acts as a preservative. The only exception is in jam that is made from fruit pulp that has been stored with chemical preservatives. In this case, a residue of preservative (either 100ppm sulphur dioxide or 500ppm benzoic acid) is allowed in the jam.

Citric acid is not a preservative. It is added to the ash gourd pulp to adjust the pH so that the pectin will form a good gel. Jams give a gel when there is the correct ratio of pectin to water and the pH is between 2.5-3.45 pH. The optimum pH to give a good gel is pH 3.0.

## Boiling to reach the final sugar concentration

The aim of boiling is to reduce the water content of the mixture and concentrate the fruit and sugar in as short a time as possible. The final Total Soluble Solids (TSS) content of a jam (also known as the “Degrees Brix” or “end-point of the jam”) should be 65 to 68% (the TSS is a measure of the amount of material that is soluble in water. It is expressed as a percentage -a product with 100% soluble solids, has no water and one with 0% soluble solids is all water).

The correct sugar content is critical for proper gel formation and for preservation of the jam or jelly. If the final TSS of jam is lower than 65-68% the shelf life will be reduced. The jam will have a runny consistency and bacteria and moulds will be able to grow in the product. If the TSS is higher than 68%, the jam will be very stiff and the sugar might start to form crystals in the jam.

The end-point of boiling is measured in different ways. The most accurate method is to use a refractometer to measure the total sugar concentration. Remove the pan from the heat during testing as the jam will continue to cook and may become over-cooked. It is always possible to cook the jam a little bit more, but once it is over-cooked (and too thick) it cannot be reversed.

Cool the sample before it is measured 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 heating, otherwise it may burn at the bottom of the saucepan, causing off flavours and discoloration.

This method is not really suitable for home-use as a refractometer costs about US\$ 150. It is only when making jam for sale that a refractometer is necessary, to ensure consistency

between different batches of the jam. When making jam for home consumption, other methods can be used to determine the end point: these include the drop test, the skin wrinkle test, or the use of a jam thermometer to test the temperature (68% sugar corresponds to a jam temperature of 105°C).

When the jam starts to thicken, it is important to test for the end point at frequent intervals. Remember to remove the pan from the heat source while you test or it will continue to thicken and may burn.

#### **Filling into jars, cooling and labelling**

Wash and sterilise the glass jars and lids by placing in a pan of water and boiling for 10 minutes. Remove the jars from the water with a pair of tongs and stand upside down to drain. Do not dry with a towel as this could contaminate the jars.

If glass jars are not available, use plastic jars. These cannot be sterilised with boiling water as they will melt. They should be thoroughly cleaned in warm soapy water and rinsed with a weak solution of sodium metabisulphite. Sterilising tablets (made of sodium metabisulphite) can be bought for this purpose.

Allow the jam to cool slightly (to about 80°C for glass jars and 60°C for plastic jars) and then pour it into clean, sterilised jars. The jars should still be warm to prevent them from cracking when the hot jam is poured in. If the jam is cooled too much it will be difficult to pour. Place the clean lids on top and fasten. Invert the jars to form a seal. 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 should not be too cold or the glass may crack. Also, the water level must be kept below the lid of the jar. The gel starts to form as the temperature of the jam reduces (about 55°C) and continues until it is cold. The jars should not be moved or shaken while they are cooling or the gel will not form and the jam will not set.

Jam that is hygienically prepared, boiled until it reaches the correct final total soluble solids (68%) and which is packaged in sterilised glass jars can be stored for up to a year so long as it is kept in a cool place away from direct sunlight. Jam that is packaged in plastic containers has a shorter shelf life – up to 4 months.

#### **Equipment List**

Glass jars, Omnia lids and labels  
Omnia capper  
Cooking facilities, gas ring, electric ring, etc  
Stainless steel saucepan

Stainless steel cutting knife and spoon  
Wooden spoon for stirring  
Refractometer  
Cutting board

Thermometer in protective jacket

Scales

Liquidiser or mashing tool

## Equipment Suppliers

Note: This is a selective list of suppliers and does not imply endorsement by Practical Action

### Cutting and slicing equipment

A range of manual and powered cutting and slicing machinery is available.

#### Eastend Engineering Company

173/1 Gopal Lal Thakur Road  
Calcutta 700 035  
India

Tel: +91 33 2553 6397

#### Narangs Corporation

P-25 Connaught Place  
New Delhi 110001  
India

Tel: +91 11 2336 3547

Fax: +91 11 2374 6705

#### Gardners Corporation

158 Golf Links  
New Delhi 110003  
India

Tel: +91 11 2334 4287/2336 3640

Fax: +91 11 2371 7179

#### Alvan Blanch

Chelworth  
Malmesbury  
Wiltshire

SN16 9SG

United Kingdom

Tel: +44 (0) 666 577333

Fax: +44 (0) 666 577339

E-mail: [info@alvanblanch.co.uk](mailto:info@alvanblanch.co.uk)

Website: <http://www.alvanblanch.co.uk>

### Weighing machines

It is important to have accurate weighing machines. Quite often more than one machine is required - a large one to weigh the fruit and a small one for weighing out the dry ingredients such as pectin and spices.

#### Fisher Scientific

Bishop Meadow Road  
Loughborough  
LE11 5RG

UK

Tel: +44 1509 231166

Fax: +44 1509 231893

Email: [fisher@fisher.co.uk](mailto:fisher@fisher.co.uk)

Web: [www.fisher.co.uk](http://www.fisher.co.uk)

#### Essae-Teraoka Ltd

377/22 6<sup>th</sup> Cross Wilson Garden  
Bangalore 560027  
India

Tel: =91 80 2216185/2241165

#### [Gardners Corporation](#)

India (see above)

#### [Narangs Corporation](#)

India (see above)

### Juice extractors and pulpers

A variety of juice extractors and pulpers is available from a wide range of suppliers. They are available in different capacities and either manual or powered (either electric or diesel).

#### Kenwood Limited

New Lane  
Havant  
Hampshire  
PO9 2NH  
United Kingdom

#### Lehman Hardware and Appliances Inc.

P.O. Box 41  
Kidron  
Ohio 44636  
USA

Tel orders: +1 877 438 5346

Tel enquiries: +1 888 438 5346

Tel: +44 (0) 23 9247 6000  
 Fax: +44 (0) 23 9239 2400  
 Website: <http://www.kenwood.co.uk>

**Robot Coupe**

12 Avenue Cal Leclerc  
 BP 134  
 71303 Montceau-les-Mines  
 France  
 Tel: +33 3 85 58 80 80

**DISEG (Diseno Industrial y Servicios Generales)**

Av Jose Carlos Mariategui 1256  
 Villa Maria del Triunfo  
 Lima  
 Peru  
 Tel: +51 14 283 1417

**Servifabri SA**

JR Alberto Aberd  
 No. 400 Urb Miguel Grau (ex Pinote)  
 San Martin de Porres  
 Lima  
 Peru  
 Tel: +51 14 481 1967

**Bajaj Machine Private Limited**

7/20, 7/27, Jai Lakshmi Industrial Estate,  
 Side-IV  
 Sahibabad Industrial Area  
 Ghaziabad-201301  
 U.P  
 India  
 Tel: +91 120 22775119/22775137  
 Fax: +91 120 22775137  
 Website: [www.indiamart.com/bajajmachine](http://www.indiamart.com/bajajmachine)

**Buhler (India) Pvt Ltd**

13-D, K A I D B Industrial Area, Attibele  
 Bangalore  
 Karnataka 562107  
 India  
 Tel: +91 80- 27820000  
 Fax: +91 80-7820001  
 Website: [www.buhlergroup.com](http://www.buhlergroup.com)

**Delhi Industries**

4 Paharganj Lane,  
 New Delhi 110055  
 India  
 Tel: +91 11 2529720, 27525200,  
 27536888  
 Fax: +91 11 25791291

E-mail: [info@lehmans.com](mailto:info@lehmans.com)  
 Website: <http://www.lehmans.com>

**Eastend Engineering Company**

India (see above)+

**Florachem**

Flat No. 1119, Hemkunt Chambers, 89,  
 Nehru Place  
 New Delhi 110019  
 India  
 Tel: +91 11 25589502

**Gardners Corporation**

India (see above)

**Food Packs Indiana**

Thrikkariyoor, Kothamangalam, Ernakulam  
 Kerala 686692  
 India  
 Tel: +91 485-2522134, 2523610

**Geeta Food Engineering**

Plot No C-7/1 TTC Area  
 Pawana MIDC Thane Belapur Road  
 Behind Davita Chemicals Ltd  
 Navi Mumbai 400 705  
 India  
 Tel: +91 22 2782 6626/2766 2098  
 Fax: +91 22 2782 6337

**Narangs Corporation**

India (see above)

**Praj Industries Ltd**

Praj House Bavdhan  
 Pune, Maharashtra 411021  
 India  
 Tel: +91 20-22951511, 22952214  
 Fax: +91 20-22951511 / 22952214  
 Website: [www.praj.net](http://www.praj.net)

technical brief

**Do-All-Engineering Industries**

87/12, Industrial Suburb, Yeshawanthpur  
Bangalore  
Karnataka 560022  
India  
Tel: +91 80 23345754, 23372298  
Fax: +91 80 23346138

**Udaya Industries**

Uda Aludeniya, Welligalla  
Gampola  
Sri Lanka  
Tel: +94 8 388586  
Fax: +94 8 388909

**Mark Industries (Pvt) Ltd**

348/1 Dilu Road  
Mokbazar  
Dhaka 1000  
Bangladesh  
Tel: +880 2 9331778/835629/835578  
Fax: +880 2 842048  
Email: [markind@citechco.net](mailto:markind@citechco.net)

**For boiling**

Boiling pans should be made of aluminium, enamelled metal or stainless steel. For larger quantities it is necessary to buy equipment which does not cause burning or sticking of the product to the bottom of the pan. Stainless steel steam jacketed kettles, which are double walled pans are suitable for boiling large quantities of jam and are available in a range of sizes (from 5 to 500litres).

**Gardners Corporation**

India (See above)

**HRS Process Systems Pvt Ltd**

Asia Division, Praj House,  
Bavdhan, Pune  
Maharashtra 411021  
India  
Tel: +91 20- 22951511  
Fax: +91 20- 22951718  
Website: [www.hrsasia.co.in](http://www.hrsasia.co.in)

**Raylons Metal Works**

Kondivita Lane  
J. B. Nagar Post Office  
Post Box No. 17426  
Andheri (E) Andheri - Kurla Road,  
Mumbai - 400 059  
India  
Tel: +91 22 26323288 / 6325932

**Techno Equipments**

Saraswati Sadan  
1<sup>st</sup> Floor, 31 Parekh Street  
Mumbai 400004  
India  
Tel: +91 22 2385 1258

**Kundasala Engineers**

Digana Road  
Kundasala  
Kandy  
Sri Lanka  
Tel: +94 8 420482

**Israel Newton Limited**

Summerley Works  
All Alone Road  
Bradford  
West Yorkshire BD10 8TT  
United Kingdom  
Tel: +44 (0)1274 612059  
Fax: +44 (0)1274 612059

**APV Baker Limited**

Manor Drive  
Paston Parkway  
Peterborough  
Cambridgeshire  
PE4 7AP  
United Kingdom  
Tel: +44 (0)1733 283000  
Fax: +44 (0)1733 283005

# technical brief

**Sri Rajalakshmi Commercial Kitchen Equipment**

No.57, (old No. 30/1) Silver Jubilee Park Road  
Bangalore - 560 002  
India  
Tel: +91 (0)812 2222 1054/223 9738  
Fax: +91 (0)812 2222 2047

**United Engineering (Eastern) Corporation**

Shantiniketan Site No.2 & 3  
(10<sup>th</sup> Floor) 8 Camac Street  
Kolkata, West Bengal 700017  
India  
Tel: +91 33-22823914, 22820157  
Fax: +91 33-22823742

**Bottle filling and packaging equipment****H Erben Limited**

Lady Lane  
Hadleigh  
Suffolk  
IP7 6AS  
United Kingdom  
Tel: +44 (0)1473 823011  
Fax: +44 (0)1473 828252  
Website: <http://www.erben.co.uk>

**Sussex and Berkshire Machinery Company PLC**

Blacknest  
Alton, Hants GU34 4PX  
United Kingdom  
Tel: + 44 (0)1420 22669  
Fax: + 44 (0)1420 22687  
E-mail: [technical@sabplc.uk](mailto:technical@sabplc.uk)  
Website: <http://www.sabplc.co.uk/>

**Acufil Machines**

S. F. No. 120/2, Kalapatty Post Office  
Coimbatore - 641 035  
Tamil Nadu, India  
Tel: +91 422 2666108/2669909  
Fax: +91 422 2666255  
Email : [acufilmachines@yahoo.co.in](mailto:acufilmachines@yahoo.co.in),  
[acufilmachines@hotmail.com](mailto:acufilmachines@hotmail.com)  
<http://www.indiamart.com/acufilmachines/#products>

**Giusti and Son Limited**

Rixon Road, Finedon Road Industrial Estate  
Wellingborough,  
Northamptonshire NN8 4BA  
United Kingdom  
Tel: + 44 (0)1933 229933  
Fax: + 44 (0)1933 272363  
Website: [www.giusti.co.uk](http://www.giusti.co.uk)

**Orbit Equipments Pvt Ltd**

175 - B, Plassy Lane  
Bowenpally  
Secunderabad - 500011, Andhra Pradesh  
India  
Tel: +91 40 32504222  
  
Fax: +91 40 27742638  
Website : <http://www.orbitequipments.com>

**Pharmaco Machines**

Unit No. 4, S.No.25 A  
Opp Savali Dhaba, Nr.Indo-Max  
Nanded Phata, Off Sinhagad Rd.  
Pune - 411041, India  
Tel: +91 20 65706009  
Fax: +91 20 24393377

**Rank and Company**

A-p6/3, Wazirpur Industrial Estate  
Delhi - 110 052  
India  
Tel: +91 11 27376101  
Fax: +91 11 7234126  
[Rank@poboxes.com](mailto:Rank@poboxes.com)

# technical brief

**Autopack Machines Pvt Ltd**

101-C Poonam Cambers  
A Wing, 1<sup>st</sup> Floor  
Dr Annie Besant Road, Worli  
Mumbai 400018  
India  
Tel: +91 22 2493 4406/2497 4800/2492 4806  
Fax: +91 22 2496 4926  
E-mail: [autopack@bom3.vsml.net.in](mailto:autopack@bom3.vsml.net.in)  
[www.autopackmachines.com](http://www.autopackmachines.com)

**Bombay Engineering Industry**

R NO 6 (Extn) Sevantibai Bhavan  
Chimatpada  
Marol Naka Andheri (East)  
Mumbai 400059  
India  
Tel: +91 22 2836 9368/2821 5795  
Fax: +91 22 2413 5828

**MMM Buxabhoj & Co**

140 Sarang Street  
1<sup>st</sup> Floor, Near Crawford Market  
Mumbai, India  
Tel: +91 22 2344 2902  
Fax: +91 22 2345 2532  
[yusufs@vsnl.com](mailto:yusufs@vsnl.com); [mmmb@vsnl.com](mailto:mmmb@vsnl.com);  
[yusuf@mmmb.in](mailto:yusuf@mmmb.in)

**Gardners Corporation**

India (see above)

**Gurdeep Packaging Machines**

Harichand Mill compound  
LBS Marg, Vikhroli  
Mumbai 400 079  
India  
Tel: +91 22 2578 3521/577 5846/579 5982  
Fax: +91 22 2577 2846

**Eastend Engineering Company**

India (See above)

**Narangs Corporation**

India (see above)

**Banyong Engineering**

94 Moo 4 Sukhaphibaon No 2 Rd  
Industrial Estate Bangchan  
Bankapi  
Thailand  
Tel: +66 2 5179215-9

**Alfa Technology Transfer Centre**

301 Cach Mang Thang 8  
Tan Binh District  
Ho Chi Minh City  
Vietnam  
Tel: +84 8 9700868  
Fax: +84 8 8640252

**Technology and Equipment Development  
Centre (LIDUTA)**

360 Bis Ben Van Don St  
District 4  
Ho Chi Minh City  
Vietnam  
Tel: +84 8 9400906  
Fax: +84 8 9400906

**Mark Industries (Pvt) Ltd**

Bangladesh (See above)

**John Kojo Arthur**

University of Science and Technology  
Kumasi  
Ghana

technical brief



## Refractometers

The refractometer is used to measure the sugar content.

### Bellingham + Stanley Ltd.

Longfield Road, North Farm Industrial Estate  
Tunbridge Wells, Kent TN2 3EY  
United Kingdom  
Tel: +44 1892 500400  
Fax: +44 1892 543115  
E-mail: [sales@bs-ltd.com](mailto:sales@bs-ltd.com)  
Website: <http://www.bs-ltd.com>

### International Ripening Company

1185 Pnieridge Road  
Norfolk  
Virginia 23502-2095  
USA  
Tel: +1 757 855 3094  
Fax: +1 757 855 4155  
Email: [info@QAsupplies.com](mailto:info@QAsupplies.com)  
Web: [www.qasupplies.com](http://www.qasupplies.com)

### [Fisher Scientific UK Ltd](#)

UK (see above)

### [Gardners Corporation](#)

India (see above)

## References and further reading

Practical Action technical briefs:

[Jam, Jellies & Marmalade](#)  
[Passion fruit jam](#)  
[Lime marmalade](#)  
[Pineapple jam](#)  
[Watermelon jelly](#)  
[Food labelling](#)  
[Fruit waste utilisation](#)  
[Juices and Drinks](#)  
[Snack Foods](#)

[Technical manual on small-scale processing of fruits and vegetables](#), Food and Agriculture Organization of the United Nations (FAO)

[Setting up and Running a Small Fruit or Vegetable Processing Enterprise: Opportunities in Food Processing](#) CTA

[Starting a Small Food Processing Enterprise](#) by Peter Fellows, Ernesto Franco & Walter Rios Practical Action Publishing/CTA 1996

[Small Scale Food Processing](#) 2<sup>nd</sup> Ed. P Fellows & S Azam Ali, Practical Action Publishing, 2003

[Fruit and Vegetable Processing](#) UNIFEM Practical Action Publishing, 1993

This document was updated by Dr. S Azam Ali for Practical Action June 2009.  
Dr. S Azam-Ali is a consultant in food processing and nutrition with over 15 years experience of working with small-scale processors in developing countries.

Practical Action  
The Schumacher Centre  
Bourton-on-Dunsmore  
Rugby, Warwickshire, CV23 9QZ  
United Kingdom  
Tel: +44 (0)1926 634400  
Fax: +44 (0)1926 634401  
E-mail: [inforse@practicalaction.org.uk](mailto:inforse@practicalaction.org.uk)  
Website: <http://practicalaction.org/practicalanswers/>

Practical Action is a development charity with a difference. We know the simplest ideas can have the most profound, life-changing effect on poor people across the world. For over 40 years, we have been working closely with some of the world's poorest people - using simple technology to fight poverty and transform their lives for the better. We currently work in 15 countries in Africa, South Asia and Latin America.