

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.



Figure 1: Woman showing Ash Gourd, Practical Action Bangladesh

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.

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.

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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

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.

Fischer Scientific

Bishop Meadow Road
Loughborough
LE11 5RG
UK
Tel: +44 1509 231166
Fax: +44 1509 231893
Email: fisher@fisher.co.uk
Web: www.fisher.co.uk

Essae-Teraoka Ltd

377/22 6th Cross Wilson Garden
Bangalore 560027
India
Tel: =91 80 2216185/2241165

Alvan Blanch

UK (see above)

Narangs Corporation

India (see above)

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

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
E-mail: info@lehmans.com
Website: <http://www.lehmans.com>

Alvan Blanch
UK (see above)

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

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

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

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

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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

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

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
1st Floor, 31 Parekh Street
Mumbai 400004
India
Tel: +91 22 2385 1258

Kundasala Engineers

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

Alvan Blanch

United Kingdom (See above)

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

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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
(10th 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
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,
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

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 Sinhadgad 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

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Autopack Machines Pvt Ltd

101-C Poonam Cambers
A Wing, 1st 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
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
1st Floor, Near Crawford Market
Mumbai, India
Tel: +91 22 2344 2902
Fax: +91 22 2345 2532
yusufs@vsnl.com; mmmb@vsnl.com;
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)

Refractometers

The refractometer is used to measure the sugar content.

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

Alvan Blanch

UK (see above)

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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
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
Web: 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
- Food labelling
- Passion Fruit Jam
- Pineapple Jam

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.

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