



CHUTNEYS AND SAUCES

Introduction

The preparation of chutneys and sauces is a well known method of preserving fruit and vegetables. The basic principles of the preservation method are the addition of sugar and acid (acetic acid or vinegar) combined with concentration of the mixture by heating to reduce the water content. This technical brief describes how to make chutneys and sauces. Other technical briefs describe how to make lactic acid-fermented pickles.

A range of fruit and vegetables can be used to make chutneys and sauces. Often tomatoes are used as a base ingredient as they are acidic. You can add other fruit and vegetables and a range of herbs and spices according to local taste and availability.

Chutneys and sauces are safe products that have a fairly long shelf life due to the combination of high acidity and low moisture content. They can be made without any specialist equipment so are suitable for preparation at the home level. A pulper or juicer is needed to make sauces. Both a pH meter and refractometer are useful pieces of equipment that are used to test for the acidity and total solids content of sauces. However they are not essential for making sauces and chutneys.

Chutneys

Chutneys are thick, jam-like mixtures that are made from a variety of fruit and vegetables, with added vinegar, sugar and spices. They tend to be sweeter than pickles. The mixture is heated to reduce the moisture content. Any edible sour fruit or vegetable can be used to make chutney.

Vinegar and sugar are often quite expensive ingredients, which make the chutney expensive to make. Sometimes it can be more cost effective to make lactic acid fermented pickles that are made by adding salt to vegetables and allowing them to ferment (see the technical brief on lactic fermented pickles).

Sauces, ketchup and pastes

Sauces and purees are thick viscous liquids made from pulped fruit and vegetables. Salt, sugar and vinegar are added to the pulp to preserve the product. The sauce is pasteurised to remove spoilage micro-organisms. If sauces and purees are heated further to remove more water, they can be made into paste.

Quality control

When preparing a chutney or sauce, it is important that the correct levels of acidity and total sugar content are achieved, to ensure that the product does not spoil during storage. The **preservation index** is a measure of the combined acidity and total solids. It is calculated according to the following formula:

$$\frac{\text{Total acidity} \times 100}{(100 - \text{total solids})} = \text{not less than } 3.6\%$$

Sauce and chutney – process details and quality assurance

Selection and preparation of the fruit or vegetable

Sort the fruit and vegetables. Remove those that are over-ripe, rotten or bruised. Leave under-ripe products to ripen and use at a later date.

Wash the fruit and vegetables in clean water.

Some fruits, particularly tomatoes, are blanched in hot water for up to 5 minutes to soften the skin and to destroy enzymes and microbes. After blanching, they should be cooled by plunging into cold water.

Some fruits should be peeled before use. Chop the fruit and vegetables into various sized pieces according to the recipe.

Preparation of the jars and lids

For glass jars: Wash the jars and lids and put them into a large saucepan. Fill the saucepan with water so that the jars and lids are covered and heat until the water boils. Boil for about 5 minutes. Remove the jars and turn upside down so that the water can all drain out.

DO NOT dry them with a dirty cloth.

If you are using recycled plastic jars, clean them with a solution of chlorinated water (100ppm). Turn upside down so all the water can drain out.

Pulp/juice extraction – for sauce

Extract the fruit pulp with a manual pulper or a pulper-finisher that separates out the seeds and skins from the pulp. Pass the seeds and skin through the pulper a second time to obtain the maximum amount of juice and pulp from the fruit.

If you do not have a pulper or mouli, heat the fruit gently with a little water to extract the juice. Pass the fruit through a sieve or extract the juice using a muslin bag. The acidity of the pulp should be 4.0 or lower. The following recipes are all tried and tested so the pH does not need to be measured. If you are making your own chutney from a new recipe, you should check the acidity of the pulp with a pH meter or pH paper. If it is above 4.0, add lemon juice to reduce it.

Added ingredients

Spices

You can add a range of spices to chutneys and sauces to suit your taste. Any spices you use should be clean and in good condition. Some need to be roasted before use. If you are making products for sale, you need to make sure that you use the same recipe formulation and add **EXACTLY** the same amount of spice to each batch that you make. Always use the same measuring spoon or container.

Chemical preservatives

Sodium benzoate is sometimes added to sauces and purees to help preserve the products after the bottle has been opened. Some consumers do not like additives such as this, so prefer to buy products that do not contain them. Make sure that you do not add too much benzoate as it gives the product a bad taste. All countries have maximum permitted levels for preservatives. The recommended level for benzoate is 0.2%.

Heat treatment

Heat the mixture of pulp and added ingredients in a large open pan over a low heat. An open pan is best as it allows moisture to evaporate more quickly. Once you have softened the fruit or vegetables, add the sugar and heat slowly to dissolve it, before increasing the heat to boil the mixture. Stir continuously with a wooden spoon during heating to prevent burning. The bright red colour of tomato sauces can be preserved by very slow heating.

Filling and packaging

Hot-fill the sauce or chutney into hot, clean jars or bottles. If the glass jars are cold, there is the risk of breaking when the hot liquid is added. It is preferable to use glass jars with new screw-on lids but if these are not available, you can use plastic jars covered with foil lids. These are less expensive, but have a shorter shelf life than glass packaging. Alternatively, the chutney can be cooled and filled into polyethylene bags or pouches which are heat sealed.

Pasteurisation

Pasteurisation is an optional stage. It is not necessary if the chutney has a high concentration of sugar and has been boiled for sufficient time to reduce the moisture content. Sauces that are packed in glass bottles or jars can be pasteurised once they have been bottled to extend the shelf life. Immerse the jars or bottles in a large pan or water bath and heat. Both the time and temperature of pasteurisation are critical to achieve the correct shelf life and to retain the colour and flavour of the sauce.

Cooling and storage

Cool the bottles to room temperature by immersing them in clean cold water. If the bottles are cooled too quickly they will crack and break.

The high acidity of sauces and chutney gives them a long shelf life of up to 12 months. The products should be stored in a cool dry place away from direct sunlight to prevent any changes in the colour of the products.

Chutney and sauce recipes

The following recipes are examples of different types of chutney and sauce. You can vary the recipe by adding your own spices and herbs according to local taste.

Tamarind chutney

Tamarind chutney is a sour, spicy pickle that is eaten as an accompaniment to curries and other main meals. It is a mixture of tamarind and spices with a layer of oil on the surface. The product will store well for several months.

Ingredients

Tamarind 1kg

Sugar 1kg

Spices (per kg pulp):

Coriander 40g

Cumin 50g

Black cumin 30g

Cloves 3-4 pieces

Cardamom 3-4 pods

Cinnamon 3-4 pieces

Chillies 10-12

Salt 30g

Vegetable oil 250ml

Caraway seeds 15g

Pepper 30g

Process details

1. Select fresh mature but unripe tamarind fruits. Discard fruits that are ripe, over-ripe, infected or damaged. Rinse well in clean water.

Crack the pods by hand and separate the pulp from the broken shells.

2. Peel and remove the fibres, shell pieces and seeds from the pulp. For dried tamarind, soak the fruit in water for up to 12 hours until the fruit has softened. Remove the stones and fibres and drain off the excess water.

3. Add sugar to the pulp (1kg sugar per kg pulp)
4. Heat the pulp and sugar. Stir continuously to prevent it burning at the base of the pan.
5. Dry roast the individual spices and grind. Mix with the oil and salt to make a paste.
6. Add the spice paste to the thick tamarind pulp. Mix thoroughly and continue to heat for 20 minutes.
7. Pour the hot pickle into pre-sterilised jars and seal. Cool to room temperature, and label.

Tomato sauce

Ingredients:

Tomatoes (20kg)

Sugar (1.5kg)

Onions (finely chopped) (450g)

Salt (330g)

Vinegar (800ml)

Spices:

Mace (3.5g)

Cinnamon (9g)

Cardamom (11.25g)

Cumin (11.25g)

Ground black pepper (11.25g)

Ground white pepper (5g)

Ground ginger (5g)

A tomato chilli sauce can be made by adding 2.5g chilli powder to 10kg tomato pulp before processing.

Processing notes

Preparation of raw materials

Select good quality fully ripe red fruits that are free from infection, mould or rot. If available, choose the 'plum' type of tomatoes as these have a high solids content. Blanch in hot water for 3-5 minutes until the skin is loosened. Remove the skin. Chop or pulp the tomato in a hand grinder or a pulper, depending on what is available.

Mixing ingredients

Tie the spices in a small muslin bag, add to the tomatoes with 500g of sugar and the chopped onions.

Heating

Heat the mixture of tomato and spices to below boiling point in a heavy pan. Stir it continuously to prevent burning at the base of the pan. Continue to heat until the mixture has reduced to half the original volume. Remove the spice bag and add the remaining sugar, salt and vinegar. Continue heating for 5-10 minutes. Check the final total soluble solids (10-12%) with a refractometer.

Filling

Let the sauce cool to about 80°C and hot-fill the sterilised bottles or jars. Close the lids tightly and cool to room temperature.

Label the product with the product name, date of manufacture, use by date, ingredients, weight, brand name and name of manufacturer.

Store

If adequately packaged and stored in a cool place, the sauce can be stored for up to a year without any loss of flavour or taste. It should be stored out of direct sunlight to avoid any loss of colour.

Lapsi pickle

Lapsi is a small tree fruit that is found in Nepal and India. It can be used to make pickle. The amounts of spices added can be varied according to local taste and preference.

Ingredients:

Peeled and stoned lapsi (1kg)

Sugar (1 kg)

Salt 30g

Vegetable oil (250ml)

Spices:

Coriander 40g

Cumin 50g

Cloves (3-4 pieces)

Cardamom (3-4 pieces)

Chillies (10-12)

Pepper (30g)

Ground ginger (5g)

Processing notes**Preparation of raw materials**

Select ripe fruits that are free from bruising and damage. Wash in clean water. Boil the fruit in water (lapsi:water = 2:1) until the skin of the fruit splits. Drain the water using a sieve. Remove the peel manually and take out the seeds from the centre of the fruit. Weigh the peeled and de-seeded fruit into a large pan.

Heating and addition of spices

Add sugar (1kg per kg fruit pulp) and boil until the mixture thickens.

Grind the spices to make a paste with the oil. Add the spice mix and salt (30g per kg fruit pulp) to the hot lapsi mixture and mix thoroughly.

Continue heating for 30 minutes. Stir constantly to prevent the mixture burning.

Filling

Let the pickle cool to about 80°C and hot-fill into sterilised jars. Close the lids tightly and cool to room temperature.

Label the product with the product name, date of manufacture, use by date, ingredients, weight, brand name and name of manufacturer.

Store

If adequately packaged and stored in a cool place, the pickle can be stored for up to a year without any loss of flavour or taste. It should be stored out of direct sunlight to avoid any loss of colour.

Vegetable chutney**Ingredients (makes 3kg chutney)**

750g carrots 9 tea cups

600g cabbage 9 tea cups

100g capsicum 1 tea cup

450g onions 4 tea cups

120g chilli powder 3-9tbs

15g ginger powder	1 tbs
40g salt	3 level tbs
30g curry powder	6 level tsp
750ml sunflower oil	3 ¾ tea cups
300ml vinegar	1 ½ tea cups

If you do not have weighing scales, you can use a teacup to measure out the ingredients.

tbs = tablespoon (next size up from a teaspoon or equal to three teaspoons)

tsp = teaspoon (5ml)

Selection and preparation of the vegetables

Sort the vegetables and discard any unripe, over-ripe or damaged ones. Wash in clean cold water and drain.

Peel the onions and carrots. Chop the onions, cabbage and capsicum into small pieces about 5cm long. Do not use the core of the cabbage.

It is best to use a stainless steel knife to prevent marking the flesh of the fruit and vegetables, but if you do not have one, use a knife with a clean sharp blade.

Grate the carrots using the large holes on the grater.

Weigh out the ingredients accurately. Use weighing scales if you have them. If not, use the same measuring cup or container each time you make the product so that it is the same from one batch to the next.

Preparation of the jars and lids

For glass jars: wash the jars and lids and put them into a large saucepan. Fill the saucepan with water so that the jars and lids are covered and heat until the water boils. Boil for about 5 minutes. Remove the jars and turn upside down so that the water can all drain out. **DO NOT** dry them with a dirty cloth.

If you are using recycled plastic jars, clean them with a solution of chlorinated water (100ppm). Turn upside down so all the water can drain out.

Mix ingredients

Mix the dry spices- chilli powder, ginger powder, salt and curry powder.

Heat

Heat the dry spices in some of the sunflower oil (about 50ml). Stir well to prevent the spices burning. Add the onions to the spicy oil and fry until they are soft (about 5 minutes).

Add the rest of the oil and the vinegar. Stir well.

Add the cabbage and cook for 5 minutes. Stir to prevent burning.

Add the carrots and capsicum and cook for 5 minutes until the carrot is soft. Keep stirring to make sure the chutney does not burn.

Filling and packaging

Hot-fill the chutney into clean sterile jars. Fill them to within 2cm of the top of the jar. Seal with a lid and cool to room temperature. Make sure that there is a layer of liquid from the chutney covering the vegetables or they will spoil when the jar is opened. Clean the outside rim of the jar and put on the lid. Close the lid as tightly as possible.

Slowly turn the jar upside down so that any bacteria on the lid of the jar or in the space at the top are killed. Leave the jar upside down until it is cold. When the jars are cold test each lid to make sure it has a good seal.

Storage

Store the chutney in a cool dry place away from direct sunlight. It will store for up to 6 months.

References and further reading

Pickles Practical Action Technical Briefs
Pickled Cucumbers Practical Action Technical Briefs
Lime pickle Practical Action Technical Briefs
Pickled Cabbage (Kimchi) Practical Action Technical Briefs
Pickled Papaya Practical Action Technical Briefs
Preservation of Fruit and Vegetables: Agrodok 3, Agromisa, 1997
Pickles of Bangladesh, ITDG Publishing 1994

Useful organisations and contacts

Agromisa
 Postbus 41
 6700 AA Wageningen
 Netherlands
 Tel: +31 (0)317 412217
 Fax: +31 (0)317 419178
 E-mail: agromisa@wxs.nl

Web: <http://www.agralin.nl/agromisa>

Agromisa is a Dutch non-profit organisation affiliated with the Agricultural University of Wageningen in the Netherlands. Agromisa provides information and advice on small-scale sustainable agriculture and related topics in order to support and strengthen self-reliance of the rural populations in the South.

FAO
 Food and Agricultural Organization
 Via delle Terme di Caracalla
 00100 Rome
 Italy
 Fax: +39 65404297
 Website: <http://www.fao.org/>

Equipment suppliers

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

This website includes lists of companies in India who supply food processing equipment.
http://www.niir.org/directory/tag/z,,1b_0_32/fruit+processing/index.html

Pulpers and juicers

Bombay Industrial Engineers
 430 Hind Rajasthan Chambers
 D S Phalke Road, Dadar (C Rly)
 Mumbai 400 014
 India
 Tel: +91 22 2411 3999/2411 4275

Eastend Engineering Company
 173/1 Gopal Lal Thakur Road
 Calcutta 700 035
 India
 Tel: +91 33 2577 3416/6324
 Fax: +91 33 2556 6710/160

Gardners Corporation
 158 Golf Links
 New Delhi 110003
 India
 Tel: +91 11 23344287/23363640
 Fax: +91 11 23717179

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

Narangs Corporation

P-25 Connaught Place
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India
Tel: +91 11 2336 3547
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Kundasala Engineers

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

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

Servifabri SA

JR Albert Aberd
No 400 Urb Miguel Gau (Ex Pinote)
San Martin de Porres
Lima
Peru
Tel/Fax: +51 14 4811967

Techno Equipments

Saraswati Sadan
1st Floor, 31 Parekh Street
Mumbai – 400 004
India
Tel: +91 22 2385 1258

Udaya Industries

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

Robot Coupe

12 Avenue Gal Leclerc
BP 134
71303 Montceau-les-Mines
France
Tel: +33 3 85588080/85586666

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
info@lehmans.com
<http://www.lehmans.com>

Refractometers and pH meters**Fisher Scientific UK Ltd**

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

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

Gardners Corporation

India (see above)

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Packaging and labelling machines

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>

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

Narangs Corporation

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Pharmaco Machines

Unit No. 4, S.No.25 A
Opp Savali Dhaba, Nr.Indo-Max
Nanded Phata, Off Sinhagad Rd.
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Tel: +91 40 32504222
Fax: +91 40 27742638
Website : <http://www.orbitequipments.com>

Rank and Company

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technical brief

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