

DRYING OF APRICOTS

Introduction

Apricots are relatively easy to dry and dried apricots are a popular product worldwide. They are a good source of vitamin A, iron and sugar, and where they are in abundance, their processing can provide valuable income-generating opportunities.

The methods of drying apricots vary from simple sun drying through solar drying to large-scale artificial dryers. The traditional sun drying of apricots involves de-stoning the fruit and placing it on flat rocks for approximately six to nine days. This produces a dried fruit with an uneven dark brown colour and a tough, leathery texture. Using a solar dryer or artificial dryer produces a higher quality product which will attract a higher market price. The choice of drying method depends on several factors, including the local climate at the time of harvest and the intended end-use of the dried apricots. Sun drying is really only an option in dry climates with plenty of sunshine. In humid climates drying will take too long, during which time the apricots have the potential to spoil. For home use of the dried fruit, it is preferable to use the cheapest method available. In many cases this will be sun drying, but if a solar dryer is available, it is advantageous to use it as the drying process will be speeded up and the end result will be a higher quality dried fruit. Artificial dryers are only an option if there is a guaranteed market for the dried fruits. The Practical Action technical briefs on drying give a good overview of the principles and practicalities of drying and good advice on the choice of dryer.

In many places, sulphur dioxide is added to the fruit as a preservative and to give the dried product a brighter orange colour. Sulphur fumigation is a hygienic, low-cost preservation technique that maintains the colour of the food and kills the micro-organisms that cause spoilage. However, some people are allergic to sulphur dioxide and other consumers prefer to buy fruit that has not been treated with preservative. There is a small but growing market for naturally dried apricots that have not been treated with sulphur dioxide. This brief gives further advice on how to sulphur apricots if you wish to do so.

To produce a high quality dried apricot product the following recommendations should be followed:

Harvesting

Traditionally, apricots are harvested by shaking the tree and letting the fruit fall to the ground. The fruit is then either eaten fresh, sun-dried or heaped in the fields prior to pit removal. This practice of shaking the trees and letting the fruit fall to the ground, which is common in many countries, results in damaged, bruised and dirty fruit. A high quality dried apricot cannot be produced from a poor quality apricot so this method of harvesting should be discouraged. To reduce damage, the firm ripe fruit can be knocked from the tree and collected in outspread sheets held above ground level (see Figure 1).



Figure 1. Collecting apricots

The apricots should be picked by hand and placed carefully in a harvesting basket. The harvesting basket and the hands of the harvester should be clean.

For the best quality dried product the apricots should be picked when they are 'eating ripe' (firm and sweet) rather than 'juicy ripe' (soft and sweet). They should be deep yellow to golden orange in colour.

Preparation – sorting the fruit

Damaged and bruised fruits must be rejected as they produce low quality dried apricots. Under-ripe apricots should be rejected as these produce a bland colourless product and do not absorb sufficient sulphur dioxide during sulphuring. Over-ripe apricots should also be rejected as they absorb too much sulphur dioxide.

The apricots should be washed in clean water. If dried apricot halves are being produced, the apricots should be split into two and the kernels removed. The pits (or stones) are removed by running water through baskets full of the fruit and separating the flesh from the stone by hand. Be careful not to squash and bruise the fruit too much during this process. The two halves of the fruit should be separated as this produces a more attractive product than when they are left connected. The separated pits can be cracked to obtain the kernel, which can either be consumed or converted into cooking oil. Bitter pitted fruit can be fed to animals.

Pre-treatment

The apricots can be treated before they are dried. This is not essential but does produce a higher quality product. There are several options for pre-treating apricots, the most effective one being sulphuring. If you choose not to sulphur, a good alternative is syrup blanching. Apricots can also be pre-treated by dipping them in a solution of fruit juice.

The different pre-treatment methods are described below:

Sulphuring

Sulphur dioxide will help to maintain the bright orange colour of the apricots. There are two methods of adding sulphur dioxide to the apricots: they can be dipped in a solution of sodium metabisulphite (sulphiting) or they can be placed in a chamber in which sulphur is burnt (sulphuring) (see Figures 2 and 3).

Sulphuring is the preferred option because in sulphiting, there is often an uneven penetration of sulphur dioxide, the fruit is made

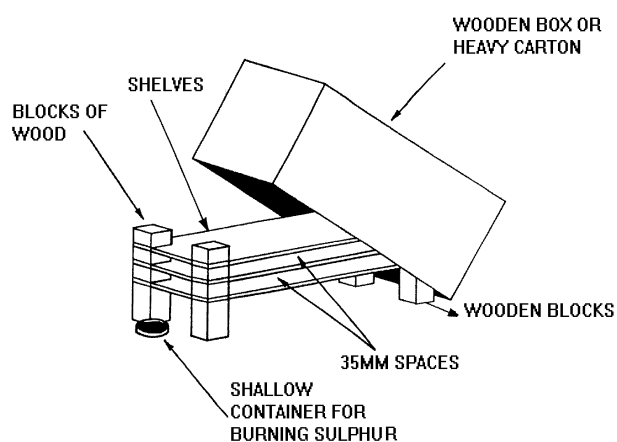


Figure 2. Traditional sulphuring

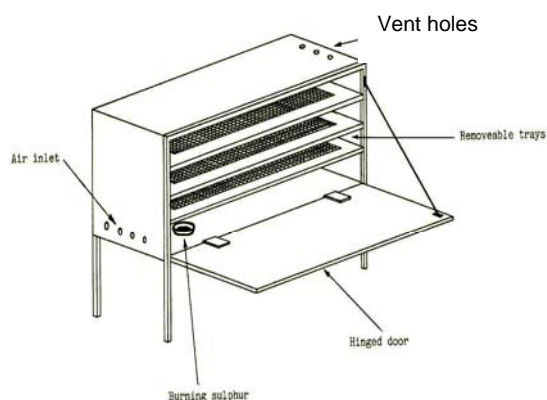


Figure 3: Traditional sulphuring

wet which increases the amount of drying needed and some soluble nutrients are lost.

There are strict limits regarding the amount of sulphur that can be added (or which is residual in the apricots after sulphuring). It is important not to exceed this limit as the apricots will have a sulphurous taste. The colour of dried apricots can be regulated without the addition of chemical preservatives by improving the drying conditions. The apricots need to be placed in a chamber in which sulphur (2-4g sulphur per kg apricots) is burnt for 2-3 hours. Figures 2 and 3 show traditional sulphuring chambers.

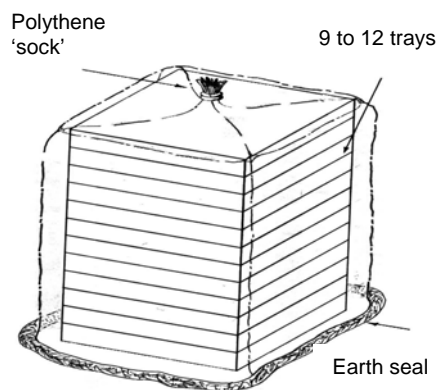


Figure 4: AKRSP sulphuring tent

Figure 4 shows a chamber used by the Aga Khan Rural Support Programme in North Pakistan. It is made from a wooden frame that can hold up to 12 wooden trays. Do not use a metal frame as the gas reacts with the metal. The whole frame is enclosed in a polythene cover, which must be anchored at the base with soil or earth to prevent the sulphur dioxide gas from escaping. Care needs to be taken during the sulphuring to prevent sulphur dioxide from escaping from the chamber as it will cause breathing difficulties if inhaled.

Sulphiting

Any of the following food grade chemical can be used to make a sulphite dip. These chemicals are available in pharmacies or in winemaking shops. The chemicals you can use are sodium or potassium sulphite, sodium or potassium bisulphite or sodium/potassium metabisulphite. Do not use bisulphate.

Prepare a solution using one of the following formulae:

Sodium bisulphite: 1 tablespoon per 4.5 litres of water

Sodium sulphite: 2 tablespoons per 4.5 litres water

Sodium metabisulphite: 4 tablespoons per 4.5 litres water

Soak the fruit for 5-15 minutes depending on the size. Drain, rinse lightly under tap water and spread on clean cloth or paper towels to remove the excess moisture and dry.

Syrup blanching

Syrup blanching produces a sweeter product. Prepare a sugar syrup by mixing 1 cup sugar, 1 cup white corn syrup (or liquid glucose or honey) and 2 cups water.

Bring the mixture to the boil. Add 750g of prepared fruit. Simmer for 10 minutes. Remove fruit from the heat and leave in the hot syrup 30-45 minutes. Drain the fruit and rinse it lightly with cold water before placing it on dryer trays. Allow the excess syrup to drain off before putting the fruit in the dryer.

Fruit juice dips

Soaking fruits in fruit juices that contain high levels of ascorbic acid will help keep the natural colour and prevent darkening. The fruit juices will also add their own flavour to the product. Soak the fruit pieces for 3-5 minutes in orange, grapefruit, lemon, lime or pineapple juice. Remove and drain well. Only use the juice twice before replacing.

Drying

Sun drying produces a dried apricot with a more desirable colour than artificial drying. However, the drying conditions must be carefully monitored to ensure that the dried apricots are of the highest quality possible. The drying apricots should be covered with a light muslin gauze or cheesecloth to prevent contamination by dust, dirt and insects. For the best quality dried apricots, the weather must be hot and dry, with a slight breeze to ensure that the apricots dry in the shortest time possible. If the weather is humid, cloudy or rainy, the drying process will be slowed down and the quality of the apricots reduced.

Using a solar dryer will speed up the drying time and reduce contamination from dirt and dust. If the harvest coincides with the rainy season, it may be necessary to use an artificial dryer.

The apricots should be placed in the dryer with their cups upwards and dried to a moisture content of 15% (wet basis). Make sure that the apricot halves are close together, but not touching, and that the pieces on a tray are all of the same size so they will all be dry at the same

time.

There can be several reasons for the spoilage of the fruit - the most likely one being that the drying process takes too long, which results in chemical reactions taking place within the cut fruit. It is important to ensure that good quality fruit is used that is not over-ripe. If the apricots pieces are very large, it may be beneficial to cut them into quarters or into thin slices to speed up the drying time.

Packaging

Once they are dried, the apricots should be allowed to cool to room temperature. They are packed in moisture proof polythene bags which should be heat sealed and labelled. The packaging must be thick enough to prevent it being damaged by the dried apricots. The use of a polythene sealing machine will produce a more attractive finished product.

Equipment suppliers

This is a selective list of suppliers of equipment 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

Dryers

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>

Bombay Engineering Works

1 Navyug Industrial Estate
185 Tokersey Jivraj Road
Opposite Swan Mill, Sewree (W)
Mumbai 400015
India
Tel: +91 22 24137094/24135959
Fax: +91 22 24135828
bomeng@vsnl.com
<http://www.bombayengg.com/contact.html>

Premium Engineers Pvt Ltd

Plot No 2009, Phase IV, GIDC
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Tel: +91 79 25830836
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Rank and Company

A-p6/3, Wazirpur Industrial Estate
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Industrias Technologicas Dinamicas SA

Av. Los Platinos 228
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Ashoka Industries

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Mitchell Dryers Ltd

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UK
 Tel: +44 1228 534433
 Fax: +44 1228 633555
webinfo@mitchell-dryers.co.uk

<http://www.mitchell-dryers.co.uk/>

Packaging and labelling machines

Acufil Machines
 India (See above)

Tel: +91 40 32504222
 Fax: +91 40 27742638
<http://www.orbitequipments.com>

Gardners Corporation
 158 Golf Links
 New Delhi 110003
 India
 Tel: +91 11 3344287/3363640
 Fax: +91 11 3717179

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

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

Rank and Company
 India (see above)

MMM Buxabhoj & Co
 140 Sarang Street
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 Fax: +91 22 2345 2532
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Banyong Engineering
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Narangs Corporation
 P-25 Connaught Place
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 Centre (LIDUTA)**
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Orbit Equipments Pvt Ltd
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 Bowenpally
 Secunderabad - 500011, Andhra Pradesh
 India

John Kojo Arthur
 University of Science and Technology
 Kumasi
 Ghana

Alvan Blanch
 UK (see above)

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Useful organisations and contacts

Agromisa
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Netherlands
Tel: +31 (0)317 412217
Fax: +31 (0)317 419178
E-mail: agromisa@agromisa.org
Web: <http://www.agromisa.org>
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 to support and strengthen self-reliance of the rural populations in the South.

NR International
Central Avenue
Chatham Maritime
Kent
ME4 4TB
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Tel: +44 1634 880088
Fax: +44 1634 880066/77
Email: info@nrint.co.uk
Website: <http://www.nrinternational.co.uk/>

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Near China Bridge (KKH) Danyore
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Pakistan
+92 5811 56265
+92 5811 58268
admin@mountainfruits.com
www.mountainfruits.com
Mountain Fruits Company is a subsidiary of AKRSP, producing dried apricots in the north of Pakistan.

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CV8 3LG
United Kingdom
Switchboard: +44 (0)24 7630 3517
Fax: +44 (0)24 7663 9229
E-mail: enquiry@gardenorganic.org.uk
Web: <http://www.gardenorganic.org.uk/>
Garden Organic used to be known as the Henry Doubleday Research Association (HDRA). It is the leading organisation for promoting, researching and demonstrating organic horticulture and agriculture in the UK. The International Research Department has been running an overseas programme focusing on sustainable agriculture for development.

Food and Agriculture Organization of the United Nations (FAO)
Viale delle Terme di Caracalla
00100 Rome
Italy
Fax: (+39) 06 570 53152
Email: FAO-HQ@fao.org
Web: <http://www.fao.org/>

Tropical Wholefoods
7 Stradella Rd
Herne Hill
London
SE24 9HN
Tel: 0207 737 0444
Fax: 0207 737 0466
Email: kate@fullwellmill.co.uk
www.tropicalwholefoods.com
Tropical Wholefoods are Fairtrade importers of tropical dried fruits and nuts. They have worked with small producers in Africa and Asia to improve the quality of dried products.

References and further reading

Practical Action Technical Briefs:

Drying of Foods

Drying Technology

Tray Dryer

Drying, Food Cycle Source Book 6 UNIFEM and Practical Action Publications 1995

Preservation of Fruit and Vegetables: Agrodok 3, Agromisa 1997

Try Drying It! Case Studies in the Dissemination of Tray Drying Technology, ITDG Publishing 1991

Producing Solar Dried Fruit and Vegetables for Micro and Small scale Rural Enterprise Development, A Series of Practical Guides' written by the Natural Resources Institute.

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Website: <http://practicalaction.org/practicalanswers/>

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