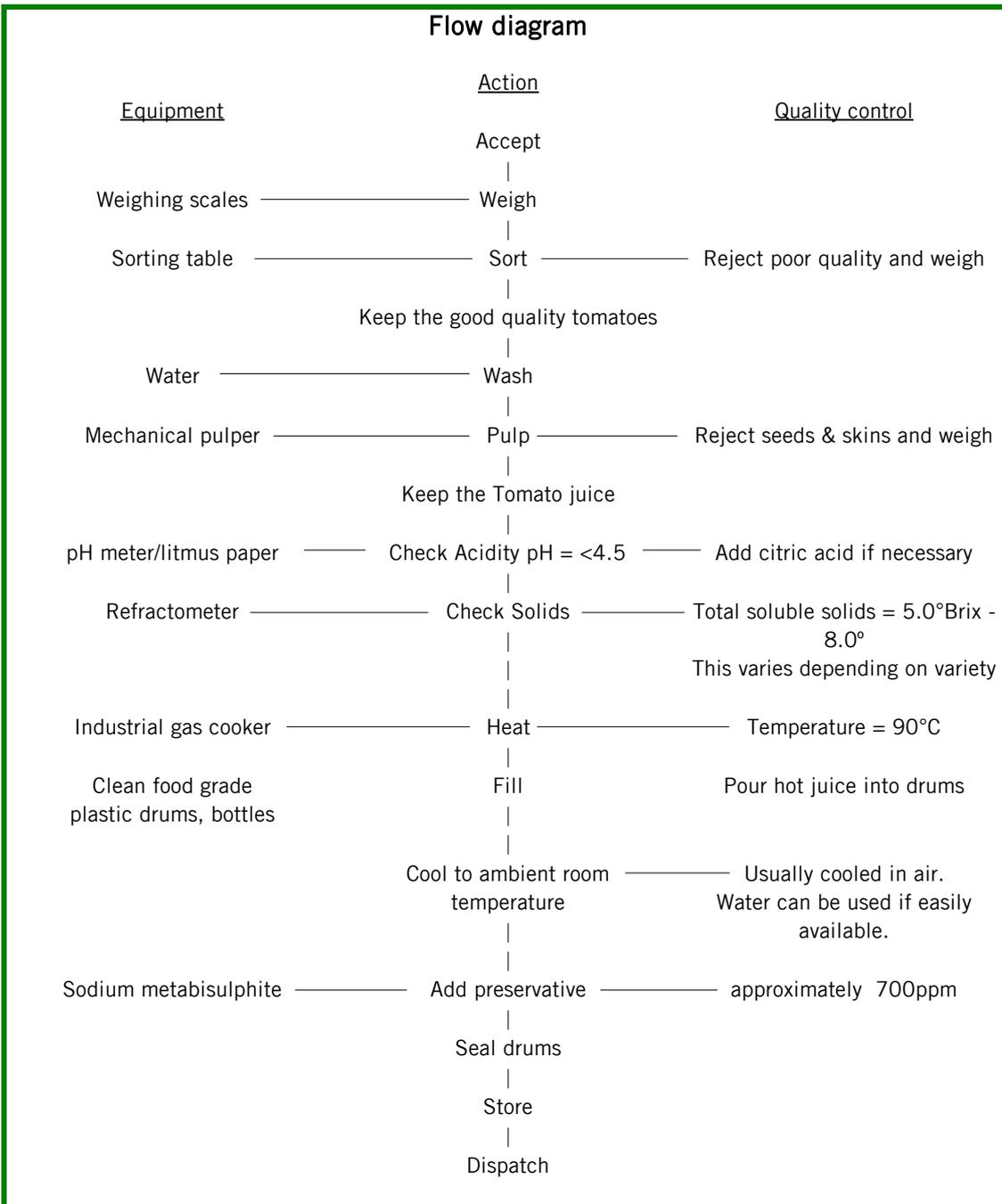




# SEMI-PROCESSING OF TOMATOES

Semi-processing of tomatoes refers to the production of a partially processed stable tomato pulp which can be stored for further processing later in the season, or sold onto processors for further processing into a number of tomato-based products. The technical brief on tomato processing includes ideas and recipes for the use of tomato pulp.

## Flow diagram



technical brief

The advantages of semi-processing tomatoes are as follows:

- The pulp can be produced when there is a glut of tomatoes and processed later in the season, thus spreading the processing season throughout the year
- If tomato pulp is sold on for further processing, it cuts out the need for packaging materials such as glass bottles and jars and for bottling equipment.

The details in this technical brief are based on the experience of a farmers group in Sri Lanka who process the tomato pulp and sell it on to a processor for further processing (contact Practical Action Sri Lanka for further details). The procedure can be varied to suit local conditions, but the quality control points must be adhered to to ensure a high quality product.

## Quality Assurance guidance notes

### Acceptance

Farmers deliver the tomatoes to the processing unit between 3.00 and 5.00pm on a daily basis. Processing takes place up to about 12.00 midnight everyday during the season. If there are messages that need to be conveyed (minimum, maximum of supply, changes in working hours etc.) to the farmers (suppliers) these messages are put up on a notice board at the delivery point, so that the person who delivers tomatoes can take the message back. Farmers are not allowed inside the processing area.

The farmers are asked to supply fully ripe tomatoes which cannot be sold as fresh tomatoes. Tomatoes of any shape, size and variety and without split skins are accepted. Bruised tomatoes are accepted provided that the skin is fully intact. The farmers, who are members of the society, have been given thorough instructions and they have agreed upon the quality of the raw material. Farmers understand that bringing unsuitable fruit will increase the production cost. They bring the tomatoes packed in boxes.

### Weighing

The tomatoes are accepted through a half door, weighed and a receipt given to the farmer which indicates the weight of the tomatoes (minus the individual rejects of the previous day). The farmers have requested that the seeds extracted from a previous days production are returned to them for preservation for use in next season.

### Sorting

Sorting is done by putting tomatoes onto a sorting table which has a slight gradient at one end. The good quality tomatoes gently roll into a basin of water and the rejected tomatoes (spoilt, damaged with broken skins) are collected and weighed. Each delivery is sorted separately to identify accepts/rejects for each farmer.

### Washing

The good quality tomatoes are thoroughly washed in clean water to ensure they are free of soil and other foreign matter.

### Pulping

The clean tomatoes are fed into an electrically driven mechanical pulper with a 1-1.5 HP motor. This separates the juice from seeds and skins. The tomatoes are rubbed against a perforated drum by two brushes which are fixed to the central shaft driven directly by the motor. The juice passes through the perforated drum into the outer stationary drum and is collected through an outlet. The remaining seeds and skins are pushed out through an outlet connected to the inner perforated drum.

### Acidity

The acidity of the juice is checked to ensure that it is below pH 4.5. If it is higher than pH 4.5, citric acid is added until the desired acidity is achieved.

**Solids**

The total soluble solids content (TSS) of the juice is measured. It should be a minimum of 5°Brix and is usually about 6-7°Brix. If it is lower than 5°Brix, the juice can be mixed with juice recovered from tomato which has a higher Brix value. It should be noted that the refractometer should only be used with juice at ambient temperature. Juice at high temperatures will give an incorrect reading.

**Heating**

The juice is heated in a large stainless steel pan to 90°C, for about 45 minutes, using an industrial gas stove.

**Filling**

The hot juice is poured into clean, food grade, plastic drums. Just before use the drums should be thoroughly washed with clean water. It is recommended to use boiling water or, ideally, 35% hydrogen peroxide solution for the final rinse. Cleaned, empty drums should be stored upside down on racks.

**Preservative**

Preservative (700ppm) of either sodium or potassium metabisulphite is added to the drum of pulp and the drum is quickly sealed. The metabisulphite is mixed by shaking the barrels after sealing.

**Sealing**

The drums should be sealed as quickly as possible to minimise the loss of the preservative. As the juice cools down, if there is a good seal, a slight vacuum will be formed. This helps with preservation of the pulp.

**Storage**

The sealed drums must be carefully moved and stored in a clean space at ambient temperature (25-30°C). Care should be taken not to damage the seal while moving the drums. If the seal is broken the levels of sulphur dioxide will start to decrease and there will be no vacuum. This will cause the juice to ferment and be unacceptable for the consumer and for further processing.

**Dispatch**

The price per litre of tomato juice is negotiated with the buyers. The drums are transported in a lorry from the processing unit. Members are paid for the supply of tomatoes. The profits left after covering the costs are divided according to the quantity of tomatoes supplied by each member. These are then deposited into individual bank accounts at the Regional Rural Bank in Matale.

**References and further reading**

- [Tomato Processing](#), Practical Action Technical Brief
- *How to grow tomato and peppers*: Agrodok 17: M. Amati et al, Agromisa, 1989
- [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
- *Tomato and Fruit Processing, Preserving and Packaging: An example of a village Factory*, G. Klein, CIEPAC/TOOL, 1993.

## Equipment suppliers

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

### 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

### Gardners Corporation

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

### Kaps Engineers 831, G.I.D.C.

Makarpura  
Vadodara - 390 010  
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Tel: +91 265 644692/ 640785/ 644407  
Fax: +91 265 643178/ 642185

### Shiva Engineers

Patel Avenue, Plot No: 165, Flat No:1, Right  
Bhusari, Colony, Near Kothrud Depot, Paud  
Road  
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### Robot Coupe

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BP 134  
71303 Montceau-les-Mines  
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### Eastend Engineering Company

173/1 Gopal Lal Thakur Road  
Calcutta 700 035  
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Tel: +91 33 2577 3416/6324  
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### Geeta Food Engineering

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### Narangs Corporation

P-25 Connaught Place  
New Delhi 110 001  
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Fax: +91 11 2374 6705

### Able Manufacturers

12-2-799/2, g - 2, Jandar Nagar,  
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<http://www.indiamart.com/ablemanufacturers/>

### Mark Industries (Pvt) Ltd

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**Lehman Hardware and Appliances Inc.**  
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 Tel enquiries: +1 888 438 5346  
 E-mail: [info@lehmans.com](mailto:info@lehmans.com)  
 Website: <http://www.lehmans.com>

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 Fax: +44 1666 577339  
 E-mail: [info@alvanblanch.co.uk](mailto:info@alvanblanch.co.uk)  
 Website: <http://www.alvanblanch.co.uk>

## Refractometers and pH meters

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 Bishop Meadow Road  
 Loughborough  
 LE11 5RG  
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 Fax: +44 1509 231893  
 Email: [fisher@fisher.co.uk](mailto:fisher@fisher.co.uk)  
 Web: [www.fisher.co.uk](http://www.fisher.co.uk)

**Gardners Corporation**  
 India (see above)

E-mail: [servifabri@gmail.com](mailto:servifabri@gmail.com)  
 Website: <http://servifabri.blogspot.com/>

**Bajaj Process Pack Maschinen (PVT) Ltd.**  
 7/20-7/27, Jai Lakshmi Industrial Estate,  
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 Website: <http://www.bajajmachines.com/>

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