



Glazed cherries

Agricultural processing brochure

Brochure content:

- Introduction
- Process description
- Other processing options
- Energy Advisory Services
- References

South African farmers facing current economic realities are searching for new options to maintain or expand their businesses. One of the many opportunities to grow markets, turnover and profits is by adding value to farm produce. Options need to be selected carefully based on sound information and knowledge of the opportunities presenting themselves, taking into account the strengths and weaknesses of individual farms.



Introduction:

Product group: **Cherries**

Cherries are the fruit of trees of the genus *Prunus* and are native to Europe, Asia, and North America, and more than 1 000 varieties are grown in the United States alone. Cherries are globular smooth-skinned fruits with a single pit or stone, and they range from 6 – 25 mm in diameter. Most cultivated cherries are bright red when ripe. Distinction should be made between *sweet cherries* and *sour cherries*.

Sweet cherries are commonly sold fresh or canned: Sweet cherry trees are grown in areas with mild

weather. Most sweet cherry trees must be cross-pollinated with other varieties in order to bear fruit abundantly. Sweet cherries can be divided into two distinctive groups based on fruit characteristics:

- Heart-type cherries : heart shaped with relatively soft flesh, early ripening
- Bigarreau type: firmer, crisp-fleshed fruit, mid- to late season ripening. Fruit flesh colour ranges from red to yellow and the skin colour ranges from dark red (nearly black) to light (yellow-white).

Sour cherries are commonly processed for pie fillings, jams and jellies. Sour cherry trees are generally hardier compared to sweet cherries and are self-fertile. Sour cherries are soft, juicy and have an oval shape, with flesh and juice colours ranging from dark red to almost colourless.

Product description - Glazed cherries

Glazed cherries are **sweet cherries** infused with sugar syrup. They are used in baking, ice cream, desserts and decoration of baked goods.

Process description:

Harvesting of cherries

Cherries are picked manually or mechanically when the cherries reach the soft ripe stage since flavour and aroma development is of prime importance to the end product. This requires a harvesting method that inflicts minimum damage to the product. The cherries may be picked by hand and placed in flat trays for transport and/or further processing.

However, with improved cultivars that ripen more uniformly and advanced technology of harvesters; mechanical harvesting has become a more viable option for large producers and processors. Cherries were among the first types of fruits to be harvested mechanically.

It is advisable to harvest cherries in the early morning to eliminate or at least reduce the need for additional

cooling. The time between harvesting and processing should be kept to a minimum, and the harvested product needs to be handled with great care at all stages prior to processing.

Cooling and cleaning of cherries

The cherries must be cooled to between 0 - 5°C as soon as possible after harvesting and kept at this temperature range until processing starts. Hydro-cooling is the most effective method to achieve rapid cooling. Water has the advantage of acting as cooling, cleaning and transportation medium.

The trays of cherries are dumped gently into a tank containing cold, potable water (between 0 - 5°C). The water acts as a cushion against any possible mechanical damage, while cooling down and cleaning the cherries. The cherries are transported in water via a trough or closed pipe to a vibrating, sloping riddle or screen. Here the cherries are sprayed with potable

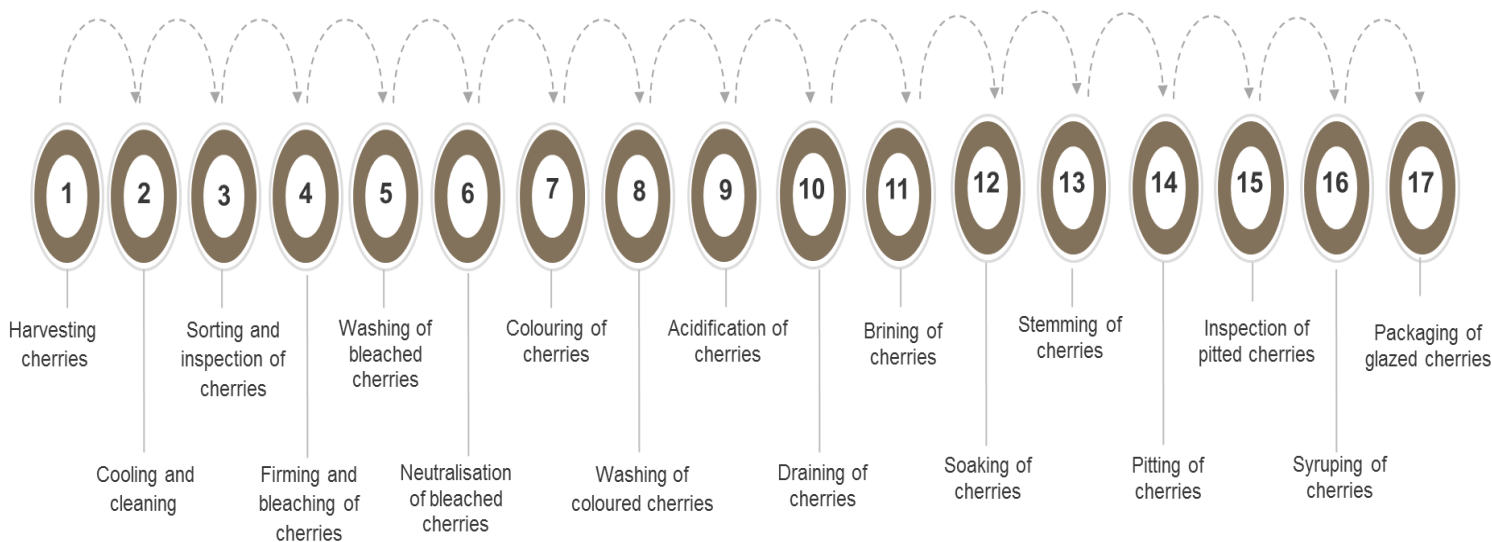
water to complete the cooling and cleaning process. The clean cherries are then delivered to the sorting tables/belts via perforated racks/conveyors to allow for draining of cooling water. The cooling water may be recirculated after filtration and treatment.

Although forced air-cooling can be used instead of hydro-cooling, it requires additional cleaning (aspiration and screening) steps to remove foreign matter. The trays of cherries are placed in a chamber where chilled air is drawn into the cold room through the trays. The temperature of the fruit must decrease to between 2 - 4°C within 1 hour of harvesting.

Sorting and inspection of cherries

This is done to select the best suitable raw materials for manufacturing the value-added end product. The clean cherries are spread out on sorting tables and

Process overview



Fast facts

The cherries are **firmed** by soaking them in a:

0.4%

to

0.6%

calcium chloride solution at 100°C for 21 - 26 minutes.

inspected for defects. Any damaged, spoilt, immature or severely misshaped cherries are removed manually.

Firming and bleaching of cherries

The cherries are given a firming treatment to ensure that they maintain their original shape. The cherries are firmed by soaking them in a 0.4 – 0.6% calcium chloride solution at 100°C for 21 - 26 minutes.

The cherries are then bleached. Sodium sulphite (0.3 – 0.5%) and potassium beta- bisulphite (0.2 – 0.4 %) are added to the soaking solution to ensure complete bleaching of the cherries.

Washing of bleached cherries

The firmed and bleached cherries are washed with potable water to remove excess chemical residue on the fruit.

The washed cherries are allowed to drain.

Neutralisation of bleached cherries

The cherries are neutralised by soaking the cherries in a 0.4 – 0.6% sodium bicarbonate solution until a pH of 4.5 - 5 is reached.

Colouring of cherries

The bleached cherries are coloured by soaking them in a 0.05% erythrosine dye solution for approximately 12 hours until the required level of colouring has penetrated the cherries as permitted by the Regulations concerning food colouring.

Washing of coloured cherries

The coloured cherries are washed with potable water to remove any residual colorant from the surfaces

of the cherries.

Acidification of cherries

The pH of the cherries is reduced to between 3.0 – 3.7 by adding citric acid to the washing water. This fixes the colour of the cherries.

Draining of cherries

The washed and acidified cherries are then allowed to drain.

Brining of cherries

A brining solution with a level of 0.7 - 1% sulphur dioxide is prepared by using a sulphur dioxide gas. Alternatively a sodium bisulphite solution can be used, also with a 0.7 - 1% sulphur dioxide level.

The cherries are then left in the brine solution for a period of 4 - 6 weeks to

ensure preservation of the cherries. The cherries can be stored in brine with an addition of 0.4 – 0.5% lime to the brine until it is required for canning.

Soaking of cherries

The excess sulphur dioxide must be leached from the cherries by soaking the cherries in cold potable water for 12 - 36 hours. The water must be changed every 4 - 6 hours to ensure sufficient washing of the cherries.

Stemming of cherries

Stemming can be performed manually where labour is available, provided the cherries are handled very carefully so as not to bruise the fruit in the process. Mechanical stemming is performed by passing the cherries through a rotary stemmer, which consists of parallel-

inclined rollers revolving against each other. This pulls the stalks from the fruit without crushing the fruit.

Soaking and firming of cherries (optional)

The cherries are soaked in potable ice water to produce a firmer cherry and to ease pitting. The correct soaking time is determined according to the ripeness, colour and firmness of each batch. Excessive soaking results in leaching of the cherry colour, acidity and other soluble solids.

Pitting of cherries

Pitting is the removal of the pit/stone with as little damage as possible to the structure of the fruit.

The cherries are pitted (destoned) using a mechanical pitter with a punching action or a pin-like probe that passes through the centre of each cherry.

Inspection of pitted cherries

The cherries are inspected to detect and remove any cherries that were unsuccessfully pitted or severely damaged in the process.

Syruping of cherries

The cherries are placed in a saturated sugar solution until the final sugar solution of the cherries reaches 47 - 49%.

The cherries are then drained. The cherries are held for 2 - 14 days to allow for the equilibration of the sugar concentration throughout the fruit. This takes place in a closed

container to prevent contamination of the product.

Packaging of glazed cherries

The cherries are packed into glass jars, plastic jars or carton boxes lined with plastic sheets. The high sugar content preserves the product and no further processing is needed.

Labelling of fruit preserves

The product should be labelled with the necessary information as prescribed by law.

Labelling

Labelling in South Africa is controlled by legislation. Anyone who wants to use the information provided in this document must familiarise him/herself with all the applicable laws that apply to the producing, processing, manufacturing and storage of the products referred to in this document.

Fast facts

Final sugar solution of the cherries reaches:

47 to 49%



Other processing options

Listed below are other processing options for cherries not covered in this report, but available from Eskom:

- **Canned cocktail cherries** are coloured cherries that are canned in sugar syrup along with other fruit pieces and used for cocktails
- **Canned maraschino cherries** are sweet cherries preserved in almond-flavoured syrup. The cherries are used in cocktails and derive their name from the Italian (Dalmatian) sweet-sour liqueur originally prepared for bitter cherries.
- **Canned sour cherries:** Sour cherries are canned in water or sugar syrup and used for pie fillings.
- **Canned sweet cherries:** Sweet

cherries are canned in water or sugar syrup and used as dessert fruit or in baked products.

- **Carbonated cherry juice:** The basic method of manufacture involves preparing the basic cherry juice to which sugar and other permitted ingredients are added to produce a syrup which is then diluted with carbonated water.
- **Cherry jam** is produced from fresh or frozen cherries harvested at full maturity. Jam is a product which consists of whole fruit; pieces of fruit, fruit pulp or fruit puree of one or more types of fruit with fruit juice or concentrated fruit juice as an optional ingredient, and may contain permitted food additives and sweeteners.
- **Cherry juice** may be manufactured from fresh or frozen cherries. A

wide range of juice and related products can be manufactured. The juice is usually clarified.

- **Dried cherries** have a chewy texture (similar to raisins) and strong cherry flavour. They are used in pastry, confectionery, ice cream, sweets, fruit salads, cheese and yoghurt.
- **Individually quick-frozen cherries:** Fresh cherries are frozen rapidly to produce a product that maintains its individual identity and gives the perception of "fresh fruit". This makes it ideal for inclusion into bakery products as well as fillings. Frozen cherries can also be incorporated into a mixture of other IQF berries or currants. The IQF method is used since it preserves the cell structure, texture, colour, flavour and aroma of the cherries best.

Energy Advisory Services

Eskom's role is to aid the client with basic information in the decision making process. Thereafter the Eskom Advisor will fulfil the role of energy advisor as part of the team that the farmer selects.

Optimise your energy use

Eskom's Energy Advisors, in regions across South Africa, offer advice to business customers on how to optimise their energy use by:

- Understanding their energy needs
- Understanding their electrical systems and processes
- Investigating the latest technology and process developments, including electric infrared heating and drying systems
- Analysing how to reduce energy investment costs
- Optimising energy use patterns in order to grow businesses and industries

Call 08600 37566, leave your name and number and request that an Energy Advisor in your region contacts you. Alternatively, e-mail an enquiry to advisoryservice@eskom.co.za

Alternative funding

Five alternative funding product offerings are available to help reduce your investment costs for new agro-processing or agro-beneficiation business or expand/improve an existing agro-processing or beneficiation business.

For more info visit:

<http://www.eskom.co.za/sites/idm/Business/Pages/Alternativefunding.aspx>



Literature and reference sources:

- Arthley, D. & Ashurts, P.R. (eds) 1996. Fruit Processing. London:
- Bianco, L.D. 1997. The 1997/8 lifestyle food index. Cape Town : Demeter Publications.
- Salunke, D K, Bolin, H R & Reddy, N R. 1991. Storage, Processing, and Nutritional Quality of Fruits and Vegetables, 2nd ed. Volume II : Processed Fruits and Vegetables. Boca Raton: CRC Press
- Somogyi, L P , Ramaswamy, H S & Hui, Y H. 1996. Processing fruits: Science and Technology: Vol 1 & 2. Lancaster : Technomic Publishing Co
- South Africa - Agricultural Products Standards Act (No 119 of 1990) and regulations. Pretoria: Government Printers
- South African - Foodstuffs, Cosmetics and Disinfectant Act (no 54 of 1972) and regulations. Johannesburg: Lex Patria
- Webster, A.D & Looney, N.E. 1996. Cherries : Crop physiology, production and uses. Wallingford: CAB International.
- Woodroof, J.G. & Luh, B.S. 1986. Commercial fruit processing. 2nd ed. Connecticut: AVI Publishing co.
- Google free images: Product and other photos were sourced from Google images using a filter: Free to modify, share and use commercially

Disclaimer: The reader's attention is drawn to this notice which contains a limitation of risk or liability of Eskom, and constitutes an assumption of risk or liability by the reader or an indemnification of Eskom. The reader acknowledges that he/she has made him/herself aware of this disclaimer and is aware that the disclaimer limits the liability of Eskom. The aim of this document is solely to provide the reader with some basic information on agro processing in order to understand the extent of the operations involved. The reader should familiarise him/herself with all applicable laws that apply to the product growing, storage, processing and manufacturing. This information concentrates on the sequence and steps involved in the processing of the selected product and explain the reason and necessity of each step. It is not a complete reference document on which calculation and design shall be based, nor was it ever intended to be.

While Eskom has made every attempt to ensure that the information contained in this brochure has been obtained from reliable sources, Eskom does not accept any responsibility or liability for the accuracy, content, completeness, legality, or reliability of the information contained in this brochure, and the readers or users are required to also make their own independent enquiry, before relying upon same. All information in this brochure is provided "as is" with no warranties, promises and/or representations of any kind, expressed or implied, as to the nature, standard, accuracy or otherwise of the information provided in this brochure nor to the suitability or otherwise of the information for a purpose. Computer generated images; walkthroughs and render images used in this brochure are the artist's impression and are an indicative of the actual designs. The imagery used in the brochure may not represent actuals.

Eskom shall not be liable to the reader for any loss or damage of whatever nature (direct, indirect, consequential, or other) incurred by the reader as a result of any action or omission related to the information provided in this brochure. The reader shall indemnify Eskom against any claim or action instituted by a third party as a consequence of the actions taken in relation to the contents of the brochure, emanating from any area of law.

For more information on Eskom's solutions and services visit the website - www.eskom.co.za/idm