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Canned Blackberries

Agricultural Processing Brochure

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

Introduction:

Programme group: Blackberries

The blackberry is a trailing bramble, usually spiny, of the genus *Rubus* of the *Rosaceae* (rose) family. Blackberries occur throughout the world, but commercial production is largely limited to the United States. Production of berries of all types is, however, increasing in South Africa. This is largely due to the release of commercial cultivars that have become accessible to South African growers and the expanding export market.

The berry is a simple fruit, which is fleshy and succulent when mature and contains immersed seeds. Berry fruits are highly perishable and have a short shelf life. The edible quality is closely tied to the freshness of the fruit. For this reason, care must be taken in harvesting, storage, and marketing of fresh berries.

Blackberries are best suited for processing into frozen or canned products. It is not viable to produce juice from the blackberry, as the seeds cause problems during processing and are difficult to remove.

Product description: Canned blackberries

Canned blackberries are prepared from fresh berries and must comply with the specifications as set out in the: Regulations relating to the grading, packing and marking of canned fruit intended for sale in the Republic of South Africa - R1079/1976. The blackberries may either be packed in water or sugar syrup. The water packed product can be used as fruit fillings and toppings. The sugar syrup packed blackberries can be used as dessert fruit.



“Canned blackberries are prepared from fresh berries and must comply with the specifications”.



Process description:

Harvesting of blackberries

The firm, ripe blackberries are picked by hand and placed in flat trays for transport and/or further processing. In the past, machine harvested berries could only be used for processed products, where the integrity/shape of the fruit was not of prime importance. The berries had to be processed as soon as possible after harvesting to prevent enzyme damage and deterioration. With the improved cultivars that ripen more uniformly and the advanced technology in harvesters, mechanical harvesting has become a viable option for large producers/processors.

Inspection and sorting of blackberries

Separation involves dividing food into various fractions based on a difference in characteristics. The berries are hand-sorted to remove culls, overripe or otherwise defective fruit. Any foreign materials such as sticks, stones and leaves are also removed with the help of screens or

sorting tables.

Washing of blackberries

The berries are washed under gentle sprays of water to remove dust and adhering dirt and foreign matter. Washing has the additional benefit of cooling the berries.

Grading of blackberries

Blackberries are graded by machine into different size grades.

Filling and exhausting of cans with blackberries

Exhausting involves the partial or complete removal of the remaining air or oxygen in the headspace of a can to prevent corrosion of the tinplate and spoilage of the product.

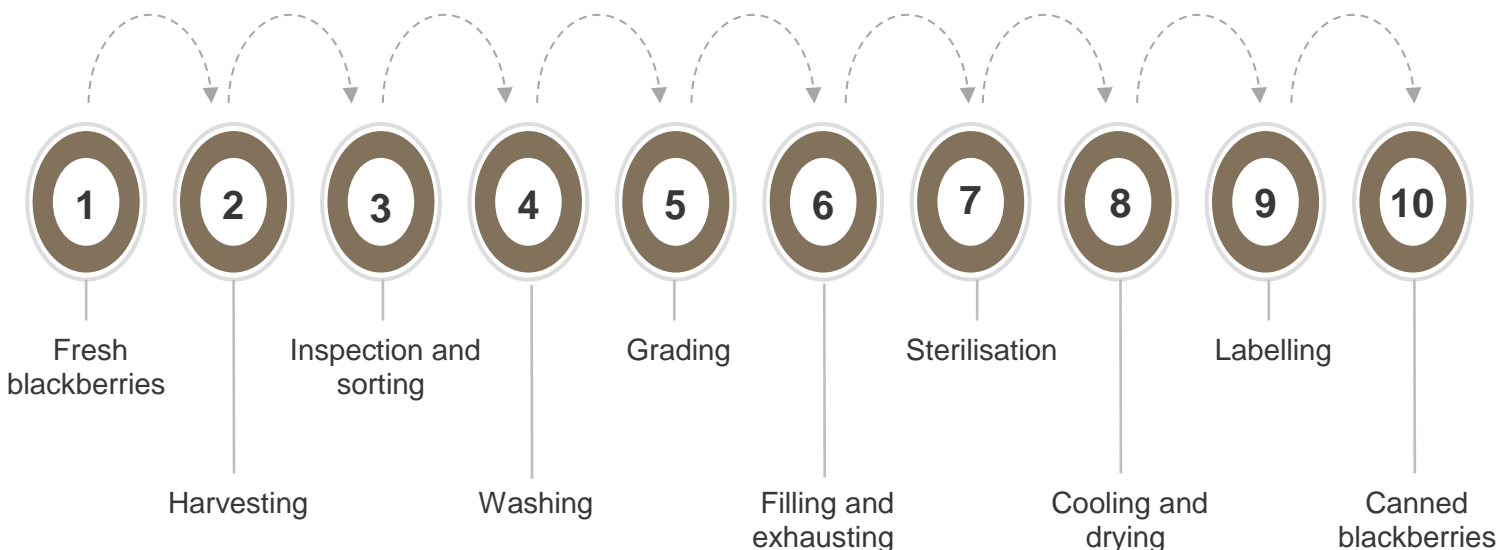
The blackberries are packed into suitable tin cans. Hot potable water or sugar syrup (88 - 96 °C) is added. The syrup concentration may vary from 20 to 40 °Brix. Canned blackberries should be clinched before exhausting because blackberries float, thus the top berries will become soft and break up during processing.

The filled containers are exhausted with steam at 82 °C for 6 - 8 minutes to reach an internal temperature of 77 °C or higher. The steam reduces the oxygen in the headspace that may cause some undesirable changes in the product (discoloration). The containers are sealed at 77 °C. Upon cooling, the steam forms a partial vacuum in the headspace. If the exhaust is insufficient, the blackberries will collapse during sterilisation, with the result that the vacuum is not maintained, resulting in spoilage of the product.

Sterilisation of canned blackberries

Sterilisation refers to the complete destruction of all micro-organisms in food. Most food products are, however, only commercially sterile. This means that the degree of sterilisation only destroys pathogenic and toxin-forming organisms as well as all other types of organisms which, if present, could grow on the product and produce spoilage under normal handling and storage conditions.

Process overview



Fast facts

Time and temperature combinations:

100°C

The period of **7 – 8 minutes** at 100°C is common for cans with dimensions of **81 x 111mm** to achieve an 85°C internal temperature.

85°C

TAKE NOTE: It is strongly recommended that each processor adapts the processing time and temperature to his own unique circumstances as prescribed by a heat processing specialist.

The canned blackberries require a heat sterilisation treatment to stabilise the product. Sterilisation is done in retorts. A great variety of retorts is available, ranging from still and agitated batch retorts to continuous retorts or hydrostatic cookers. The choice of retort influences the time of exposure needed to stabilise the product.

The still retort is loaded, closed and steam is pumped into the closed vessel. The time/temperature combination depends on the type, the size and dimensions of the container, but should be sufficient to ensure an internal temperature of 85°C. The period of 7 - 8 minutes at 100 °C is common for cans with dimensions of 81 x 111 mm.

Agitated batch and continuous retorts have more efficient heat

transfer mechanisms and thus require much reduced processing times.

Cooling and drying of cans

The cans must be water-cooled as soon as commercial sterility of the product has been reached to prevent over-cooking of the product. This could spoil the appearance, flavour and texture of the product. Cold potable water mist spray is used to cool the cans to 37 °C. Casing and stacking of cans at temperatures substantially above 37 °C may result in quality deterioration known as "stack-burning". This involves too slow cooling and spoilage by thermophilic bacteria.

The cooled cans are air-dried by fans before being labelled and placed in storage.

Labelling of canned fruit products

Care must be taken to ensure compliance with the regulations with regard to composition and correct description of the contents according to regulations relating to the grading, packing and marking of canned fruit intended for sale in the Republic of South Africa.

Legislation involving fruit products

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.

Other processing options

Below are other processing options not covered in this report:

Frozen blackberries: Fresh blackberries are frozen in the container (straight pack), with or without the addition of sugar. Unsweetened frozen blackberries are used in the preparation of wine and bakery fillings while the sweetened product is used as a base ingredient for making pie toppings, syrup fillings, soups and yoghurt flavouring.

Individual quick frozen (IQF) blackberries are frozen before being packaged in the retail container. The berries maintain their individual identity and give the perception of "fresh fruit". This makes them ideal for use in muffins and other bakery products as well as fillings. Frozen blackberries can also be incorporated into a mixture of other IQF berries.

The IQF method is best for the preservation of the cell structure, texture, colour, flavour and aroma of the berries.

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>



Energy Advisory Services

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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 **advisoryservices@eskom.co.za**.

Literature and reference sources:

- Arthley, D. & Ashurts, P.R. (eds) 1996. Fruit Processing. London: Blackie Academic & Professional.
- Falconer, S. 2003. SA farmers capitalise on "berried" treasure. Farmer's Weekly, 28 March 2003.
- Fellows, P. 1988. Food Processing Technology: Principles and Practice. Chichester: Ellis Horwood, Ltd.
- South Africa - Agricultural Products Standards Act (No 119 of 1990) and regulations. Pretoria: Government Printers Energy
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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.

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