



# Canned Black currants

## 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:

#### **Product group: Black currants**

Black currants are from the botanical species *Ribes nigrum* of the family *Saxifragaceae*. They also go by the name of Quinsy berries. Black currants are in clusters, with every single fruit attached to the main stem.

The fruit has a black skin, green flesh and the seed is enclosed in a fleshy pericarp. The strong flavour and high acidity of black currants make them unacceptable for fresh consumption, and they are mainly processed into canned, pulped or frozen fruit.

Production of berries is 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.

Berry fruits are highly perishable and have a short shelf life. Thus, edible quality is closely tied to freshness of the fruit. For this reason, care must be taken when harvesting, storing, and marketing all berry products.

#### **Product description: Canned black currants**

Canned black currants are prepared from fresh or frozen currants 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 black currants 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 black currants can be used as dessert fruit.

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"Canned blackcurrants are prepared from fresh berries and must comply with the specifications".

### Process description:

#### **Harvesting of currants**

The firm, ripe currants are picked by hand and placed in flat trays for transport to the processing site. In the past, machine-harvested currants could only be used for products where the integrity/shape of the fruit was not of prime importance.

The currants had to be processed as soon as possible after harvesting; otherwise enzyme damage and deterioration occurred. With the improved cultivars that ripen more uniformly, and the advanced technology of harvesters, mechanical harvesting has become a viable option for commercial producers.

### Cooling and cleaning of currants

The currants must be cooled to between 0 - 5 °C as soon as possible after harvest and kept in this temperature range until processing starts.

*Hydrocooling* is the most effective method to achieve rapid cooling. Hydrocooling uses cold water to cool, clean and transport the currants. The trays of freshly harvested currants are dumped gently into a tank containing cold, potable water (0 - 5 °C).

The water cushions the currants against possible mechanical damage. The currants flow via a trough or closed pipe to a vibrating, sloping riddle or screen where the currants are sprayed with potable water to complete the cooling and cleaning process. From here the clean currants are delivered to the sorting tables/belts via perforated racks/conveyors that also allow for draining of cleaning water. The cleaning water may be reused after filtration and treatment.

Although forced air-cooling can be used instead of hydrocooling, it requires additional cleaning (aspiration and screening) steps to remove foreign matter. The trays of currants 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 one hour of harvesting.

### Sorting and inspection of currants

This is done to select the best suitable raw materials for manufacturing. The clean currants are spread out on sorting tables and inspected for defects. Any damaged, spoilt or immature currants are removed manually.

### Freeze-storing of currants (optional)

Fresh black currants may be frozen and stored until needed for processing. The black currants are frozen in the storage containers (straight pack), with or without the addition of sugar. Straight-pack freezing is a slow process and causes the formation of large ice crystals that cause significant damage to the structure and texture of the fruit upon thawing.

### Thawing of frozen currants for further processing

The frozen black currants are taken from the freezer and can either be left to reach room temperature naturally

or be defrosted in a heat exchanger (sometimes equipped with a chopper) or in microwave equipment.

Currants that have been frozen are easier to process since partial destruction of the cell walls has already taken place

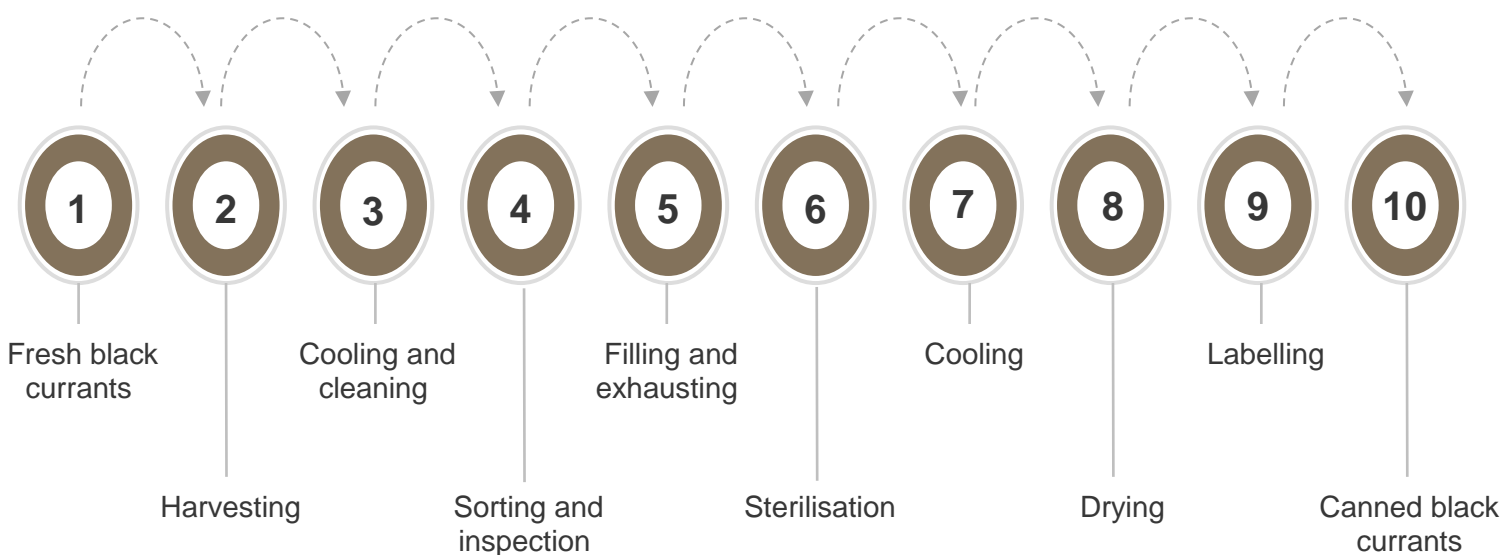
### Filling and exhausting of cans with black currants

The fresh or defrosted black currants 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.

The filled containers are exhausted with steam at 82 °C for 6 - 8 minutes to reach an internal temperature of 77 °C or higher. 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 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.

## 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.

If the exhaust is insufficient, the blackcurrants will collapse during sterilisation, with the result that the vacuum is not maintained, resulting in spoilage of the product.

### **Sterilisation of canned black currants**

Sterilisation refers to the complete destruction of all micro-organisms in food. Most food products are, however, only commercially sterile. This means that the 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.

The canned black currants require a heat sterilisation treatment to stabilise the product. Sterilisation is done in retorts.

Many different types of retorts are 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 therefore 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. 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.

Please also refer to the disclaimer on the last page.

### **Other processing options**

Listed below are other processing options for black currants not covered in this report, but available from Eskom.

**Frozen black currants - straight pack** Fresh black currants are frozen in the container (straight pack), with or without the addition of sugar. Unsweetened frozen black currants are used in the preparation of wine, juice, jellies and bakery fillings while the sweetened product is used as a

base ingredient for making pie toppings, syrup fillings and yoghurt flavouring. Straight pack freezing is an ideal method of storing fresh currants intended for pulping.

**Carbonated black currant juice:** The basic method of manufacture involves preparing the basic black currant juice to which sugar and other permitted ingredients are added to produce syrup which is then diluted with carbonated water.

## 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

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](mailto:advisoryservice@eskom.co.za).

## Literature and reference sources:

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