Canned Strawberries

Agricultural Processing Brochure

Brochure content:

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: Strawberries

The strawberry is a very popular member of the berry family, not only as a fresh fruit but also because of its versatility in processing. Processing options include canning, freezing, drying and pulping.

Product description: Canned strawberries

Canned strawberries 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 strawberries 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 strawberries can be used as dessert fruit.

Harvesting of strawberries

The strawberries are picked manually at the soft-ripe stage when the required ripeness is achieved. The fruit is then placed in flat trays for transport to the processing site. Strawberries may be picked without the stems and caps to minimise trimming requirements. Picked strawberries must be cooled as soon as possible after harvesting and processed within 2 - 4 hours to ensure the best quality product.

The product must be transported and handled carefully to ensure minimal damage. Bruises may result in soft spots, poor flavour development and sites/places for insect infestation or enzymatic reactions

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

Process description:

Cooling and cleaning of strawberries

The strawberries must be cooled to between 2 - 4 °C as soon as possible after harvesting and kept at within this temperature range. 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 strawberries are dumped gently into a tank containing cold, potable water (0- 5 °C). The water acts as a cushion against any possible mechanical damage, while cooling and cleaning the strawberries. The strawberries are transported by the water via a trough or closed pipe from the tank to a vibrating, sloping riddle or screen on which it is sprayed with potable water to complete the cooling and cleaning process. From here the clean strawberries are delivered to the sorting tables/belts via perforated racks/conveyors that also allow draining of cleaning water. The cleaning 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 berries 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 trimming of strawberries

This is done to select the best suitable raw materials for manufacturing the value-added end product. The clean, cool strawberries are spread on flat tables or conveyor belts for sorting and trimming. All green stems and caps are removed while minor blemishes may be cut away. Culls and green berries are removed along with any mouldy or soft fruit. The sorters must take great care not to handle the strawberries unnecessarily, as this could bruise the berries

Filling and exhausting of cans with strawberries

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.

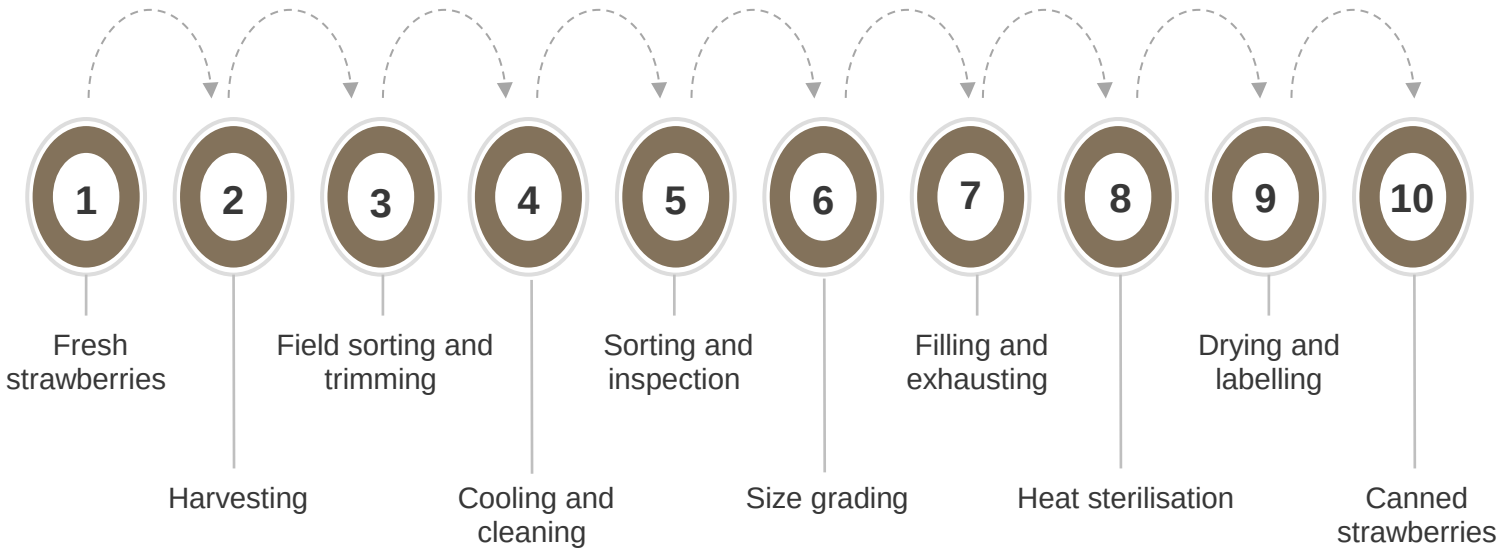
The strawberries are packed into suitable tin cans. Hot potable water or sugar syrup (88- 96 °C) is added. Canned strawberries should be clinched prior to exhausting because strawberries float, thus the top

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 such as 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 strawberries will collapse during sterilisation, resulting in spoilage of the product.

Sterilisation of canned strawberries

Sterilisation refers to the complete destruction of all microorganisms 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



Please note the **Disclaimer** on page 4

Fast facts

Time and temperature combinations:

82°C

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

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

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, which 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 termophilic 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

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

Dried strawberries: they have moisture content of between 2 - 8 %, have an intense flavour and work well in dry baking mixes. The dried strawberries have a cooked flavour and a brown colour.

Frozen strawberries: those that are frozen in the container are called straight pack frozen strawberries. This product is used for fillings, toppings, syrups and soups. Yoghurt manufacturers can also use this as a fruit flavourant.

Strawberry concentrate is basically puree that has been concentrated. The strawberries are pulped, depectinised, and concentrated to produce a product that can be used in confectionery products, beverages, sauces, flavourings and fillings and in fruit juices after dilution. The product is preserved through concentration and freezing.

Individually quick frozen strawberries (IQF) are whole fruit, which maintain their individual identity, and are just right for integration into muffins and other bakery products. The quality of the end product is evaluated according to the percentage drip after thawing, maintenance of shape, colour and taste.

Strawberry and other berry juices on small scale: Berry juice is the liquid derived from crushed berry fruits such as grapes, currants, strawberries, gooseberries etc. The juice is pure and contains no additives. It relies on pasteurisation and packaging for its preservation. The storage life is several weeks, depending of the storage conditions and pH of the product. The juice should be consumed immediately after opening.

Strawberry jam is produced from fresh or frozen strawberries that were 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.

Strawberry jelly is produced by concentrating and gellating unsweetened strawberry juice or strawberry syrup. Jelly consists of either the juice or aqueous extracts of one or more types of fruit or of the juice and aqueous extracts of one or more types of fruit which has been clarified by filtration or other means, and may contain permitted food additives and sweeteners.

Strawberry juice may be manufactured from fresh or frozen strawberries. A wide range of juice and related products can be manufactured. Both clarified and cloudy strawberry juice can be manufactured. This report will deal with the clarified product. Pure fruit juice contains no additives, but several other related ready-to-drink products can also be manufactured.

Strawberry nectar is a cloudy strawberry juice that contains added sugar, stabilisers and acidulates, and other optional ingredients such as preservatives. Strawberry nectar can be manufactured from fresh strawberries of good quality or from frozen strawberry puree or from aseptically bulk stored strawberry puree

Alternative funding

The Agro Processing Support Scheme Grant (APSS) is available when you start a 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/Documents/AltfundingAPSS.rev520180628.pdf.

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

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.

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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:

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