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(54) Title: A PROCESS FOR MANUFACTURING AND PACKAGING OF SUGAR CANE JUICE

(57) Abstract: The present invention provides a process for manufacturing and packaging for long life street alike sugarcane juice. The present invention more specifically provides a process for packaging sugarcane juice by maintaining its natural taste and colour in the packaged format. The present invention also provides a process for packaging sugarcane juice with increased shelf life.

A PROCESS FOR MANUFACTURING AND PACKAGING OF SUGAR CANE JUICE

The present application claims priority of Indian patent application no. 655/MUM/2015, "A PROCESS FOR MANUFACTURING AND PACKAGING OF SUGAR CANE JUICE", filed on 27 February 2015, the whole content of which is hereby incorporated for reference.

FIELD OF THE INVENTION

The present invention relates to a process for manufacturing and packaging for long life street alike sugarcane juice. The present invention more specifically relates to a process for packaging sugarcane juice by maintaining its natural taste and colour in the packaged format. The present invention also relates to a process for packaging sugarcane juice with increased shelf life.

BACKGROUND OF THE INVENTION

Generally in the beverages industries you will find packaging of natural fruit juices. There are many companies which are involved in the extraction, manufacturing and packaging of the natural fruit juices and supplying them to the markets.

It is well known in many countries to drink the juice of freshly crushed sugar cane. However, it has not been possible to commercialize long shelf life sugar cane juice because of very rapid discolouration of the juice from a light green or pale yellow colour to brown and development of jaggery taste. This is caused by enzymatic oxidation and also the reaction of amino acids and sugar within the juice, commonly known as the "Maillard" reaction. This non-enzymatic reaction produces the brown pigment, melanoidin, which discolours the cane juice from its original light green or pale yellow colour.

However, in many countries where people are habitual to drink the juice of freshly crushed sugar cane they will never prefer to drink the sugarcane juice which is brown in colour as it is psychologically unfit in their mind that if the available sugarcane juice is not in light green or pale yellow colour that means it is stale sugarcane juice.

Hence it is very difficult to package and supply sugarcane juice to the markets which is not in its natural taste and colour.

US6068869 discloses a method of providing a stabilized sugar cane juice product for use in soft drinks that includes providing cleaned sugar cane sticks and extracting cane juice from the sticks. Thereafter, the extracted cane juice is acidified immediately upon extraction by feeding it into a solution comprising ascorbic acid for preventing discoloration of the cane juice and also by feeding it simultaneously into an acidic solution of one of citric acid, malic acid, tartaric acid, phosphoric acid and a mixture thereof, for lowering the pH of the cane juice below a pH of 5. Furthermore, one of a sodium citrate solution, a potassium citrate solution, a sodium phosphate di-basic solution or a mixture thereof, is added to the cane juice for stabilizing it. The cane juice is then coagulated and flocculated to remove unwanted flocculants and aromas.

EP1571927B1 discloses a process for a process for preservation of flavored sugarcane juice, said process comprising:

a) soaking the canes in water containing 0.1% by wt. potassium metabisulphite and 0.01 % by wt. citric acid for a period of 2-4 hrs,

b) washing the soaked sugarcanes of step (a) and crushing the same to obtain sugarcane juice having 18-20° Brix, and filtering the sugarcane juice,

c) adjusting the total solid content of the filtered sugarcane juice of step (b) to 10-16° Brix by adding soft beverage water,

d) acidifying the sugarcane juice of step (c) by adding 0.1-0.3% by wt. citric acid and 0.01-0.03% by wt. sodium citrate,

e) adding to the acidified sugarcane juice of step (d) a flavor blend consisting of 0.05-0.20% by wt. of ginger oleoresin and/or 0.01-0.05% by wt. of essential oils of lime and lemon to obtain a flavored sugarcane juice,

f) blending the flavored sugarcane juice of step (e) and pasteurizing the same at 90-110°C for 30-180 sec to obtain the flavored sugarcane juice which may be filled in aseptic unit packs.

Both the above patents, do not provide a process for producing a stabilize sugar cane juice product which is in its natural taste and light green with added natural green

colour touch or pale yellow color. Moreover, the process disclosed in both the patents does not prevent oxidation of sugarcane juice. Moreover, the process disclosed in both the above patents does not take in account that the haze contains enzymes which blacken the product.

Hence it is an object of this invention to overcome the above problem associated with sugar cane juice and thereby enable the provision of a light green or pale yellow colour stabilized sugar cane juice product in commercially viable volumes and forms.

SUMMARY OF THE INVENTION

In one aspect, the present invention provides a process for the manufacturing and packaging of sugarcane juice comprising the steps of:

a) cutting the sugarcane in farm under controlled condition;
b) washing and cleaning the sugarcane with cold water and a sterilant;
c) extracting sugarcane juice by crushing the sugarcane of step (b) with a closed system extractor having an inert gas blanket, a chilling unit and a peristaltic pump;
d) adding an antioxidant to the sugarcane juice;
e) filtering and chilling the sugarcane immediately with an inert gas flushing;
f) pumping the sugarcane juice by using a positive displacement pump through a slot strainer in a mixing system tank or a jacketted process tank and transferring the juice to an intermediate storage tank 1 with inert gas flushing;
g) passing the sugarcane juice through a separator for separation of haze and impurities;
h) pasteurizing the sugarcane juice in an enzyme de-activation module;
i) transferring the sugarcane juice to a mixing system tank with inert gas flushing and standardizing the sugarcane juice by adding a pH modifier, juice, a stabilizing agent, a coloring agent and a flavoring agent;
j) transferring the sugarcane juice of step (i) to an intermediate storage tank 2;

k) de-aerating the sugarcane juice followed by homogenizing the sugarcane juice;

l) sterilizing the sugarcane juice with double stage homogenization and de-aeration;

m) storing the sugarcane juice in an aseptic storage tank with inert gas flushing; and

n) filling the sugarcane juice in an aseptic package.

OBJECTS OF THE INVENTION

Main object of the present invention is to develop a process for manufacturing and packaging sugar cane juice.

Another object of the present invention is to develop a process for packaging sugarcane juice by maintaining its natural taste and colour.

Another object of the present invention is to develop a process for packaging sugarcane juice with increased shelf life.

BRIEF DECSRIPTION OF THE DRAWING

Referring now to the drawing which is for the purpose of illustrating a preferred embodiment of the invention only, and not for the purpose of limiting the same:

Figure 1: shows the block diagram of a process for manufacturing and packaging of sugarcane juice.

DETAILED DESCRIPTION OF THE INVENTION

In describing the invention, the following terminology will be used in accordance with the definitions set forth below. Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although any methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, the preferred methods and materials are described herein. As used herein, each of the following terms has the meaning associated with it in this

section. Specific and preferred values listed below for individual process parameters, substituents, and ranges are for illustration only; they do not exclude other defined values or other values falling within the preferred defined ranges. All publications mentioned herein are incorporated by reference to disclose and describe the methods and/or materials in connection with which the publications are cited.

As used herein, the singular forms "a," "an," and "the" include plural reference unless the context clearly dictates otherwise.

The terms “preferred” and “preferably” refer to embodiments of the invention that may afford certain benefits, under certain circumstances. However, other embodiments may also be preferred, under the same or other circumstances. Furthermore, the recitation of one or more preferred embodiments does not imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the invention.

When the term “about” is used in describing a value or an endpoint of a range, the disclosure should be understood to include both the specific value or end-point referred to.

As used herein, the terms “comprises”, “comprising”, “includes”, “including”, “containing”, “characterized by”, “having” or any other variation thereof, are intended to cover a non-exclusive inclusion.

The present invention provides a process for the manufacturing and packaging of sugarcane juice comprising the following steps:

a) cutting the sugarcane in farm under controlled condition;
b) washing and cleaning the sugarcane with cold water and a sterilant;
c) extracting sugarcane juice by crushing the sugarcane of step (b) with a closed system extractor having an inert gas blanket, a chilling unit and a peristaltic pump;
d) adding an antioxidant to the sugarcane juice;
e) filtering and chilling the sugarcane immediately with an inert gas flushing;

f) pumping the sugarcane juice by using a positive displacement pump through a slot strainer in a mixing system tank or a jacketted process tank and transferring the juice to an intermediate storage tank 1 with inert gas flushing;

g) passing the sugarcane juice through a separator for separation of haze and impurities;

h) pasteurizing the sugarcane juice in an enzyme de-activation module;

i) transferring the sugarcane juice to a mixing system tank with inert gas flushing and standardizing the sugarcane juice by adding a pH modifier, juice, a stabilizing agent, a coloring agent and a flavoring agent;

j) transferring the sugarcane juice of step (i) to an intermediate storage tank 2;

k) de-aerating the sugarcane juice followed by homogenizing the sugarcane juice;

l) sterilizing the sugarcane juice with double stage homogenization and de-aeration;

m) storing the sugarcane juice in an aseptic storage tank with inert gas flushing; and

n) filling the sugarcane juice in an aseptic package.

As mentioned above, the process of the present invention involves the first step of harvesting the sugarcane under controlled condition. Sugarcanes are harvested using a harvesting machine. Sugarcanes are cut in the farm under dark conditions avoiding any exposure to sunlight. Sugarcanes are manually cut, starting late evening to prevent direct exposure to sunlight. Temperature is less than 30-35°C. At any time from farm to the extraction plant, the cut sugarcane should not be exposed to the sunlight.

Sugarcanes used in the present invention are procured from Agricultural farms of Pune, Maharashtra, India and are preferably 8-12 months old. A preferred breed of sugarcane is sugarcane breed no. 86032.

The harvested sugarcanes are then subjected to a sterilization step of washing and cleaning the sugarcanes to lower the load of microorganisms, wherein the sugarcanes

are washed with cold water and a sterilant at a concentration of 100 ppm. Suitable sterilant which may be used is hydrogen peroxide. The sugarcanes may also be optionally cleaned manually.

After sterilizing the sugarcanes, these are passed on to a closed system extractor having an inert gas blanket, a chilling unit and a peristaltic pump to extract the sugarcane juice followed by addition of an antioxidant to the extracted sugarcane juice in the collection can. The antioxidant prevents the discoloration of the sugarcane juice. A suitable antioxidant may be ascorbic acid and is used in an amount of 0.02%. Extractor is a prototype, pilot, specially designed with tube instant chiller, peristaltic pump under nitrogen flushing: Two extractors are in place with 150Lt/hr capacity each. First extractor is Chinese make, comprising of 4 rollers with double pass and gear system for sugarcane juice extraction under nitrogen flushing. Second extractor is also 4 rollers with single pass and pulley system under nitrogen flushing. Both the extractors are simultaneously in parallel operated. Extracted sugarcane juice is filtered through nylon cloth filters and collected in small tank of 50Lt. Juice is pumped by peristaltic pump through instant chiller comprising of tube chiller. Inside the tube of instant chiller is juice and these tubes are immersed in chilled water having a temperature of 4-6°C inside the tank.

The sugarcane juice is then filtered and chilled immediately in a bulk chiller with an inert gas flushing. The sugarcane juice is filtered using a muslin cloth filter followed by chilling at 4-10°C for 2-3 hours. Other filters which may be used are nylon filters, SS slot filters with mesh size of 110microns.

Nitrogen gas is used as a suitable inert gas and the inert gas flushing throughout the present invention is done at a pressure of 0.1-1 bar. The extractor used in the present invention and the inert gas flushing throughout the process of the present invention prevents oxidation of the sugarcane juice.

The chilled sugarcane juice is then pumped using positive displacement pumps through a slot strainer in a Mixing system tank or a Jacketted Process tank for fine filtration of sugarcane juice and later transferred to an intermediate storage tank 1 with inert gas flushing. The slot strainer employed in the present invention has a mesh size of 100-110 micron.

The positive displacement pump also helps to avoid mixing of air in the sugarcane juice.

For the removal of haze and other impurities, the sugarcane juice is passed through a separator. An exemplary separator used in the present invention is a tripurpose hermetic centrifuge and the separation is carried out at 50-60°C.

The separated sugarcane juice is subjected to pasteurization in an enzymatic de-activation module for deactivation of polyphenol oxidase (PPO) enzyme. In an embodiment of the present invention, the sugarcane juice is pasteurized at 75-80°C for 15-120 seconds. Enzyme deactivation module/Pasteurization module: It's comprises of heating and cooling regenerative heat exchanger system having different time/temperature combinations. The capacity of Enzyme deactivation unit is 2000Lt/hr. This is for Polyphenol oxidase enzyme and the Peroxidase enzyme needs temperature between 75-80°C for 15-20 seconds for de-activation.

The pasteurized sugarcane juice is then transferred to a mixing system tank with inert gas flushing followed by standardizing the sugarcane juice by addition of a pH modifier, juice, a stabilizing agent, a coloring agent and a flavoring agent to make the batch. Exemplary mixing tank is an almix tank.

A suitable pH modifier is citric acid; suitable juice is lemon juice; suitable stabilizing agent may be Cp Kelco HF-B, Kelcogel LT100 or Bev 150 Danisco; suitable coloring agent may be Chr Hansen-C-10,000 P-WS-AP-Chlorophyll or Tartrazine yellow and suitable flavoring agent may be ginger, lemon, red apple, sugarcane green apple, sugarcane grassy note or mint. Juice, coloring agent and flavoring agent are added of the sugarcane juice to imitate the taste and color of the street alike sugarcane juice. In an embodiment of the present invention, citric acid and lemon juice are used to drop the pH from 5.2-5.4 to 3.8-4.0 unit.

The above prepared sugarcane juice is then transferred to an intermediate storage tank 2 at 12-15°C. Both the intermediate storage tanks 1 and 2 used in the present invention are buffer tanks. Buffer tanks are only for storage of juice at 10-15

°C if in case sterilization or filler goes under temporary short stop conditions.

In order to prevent oxidative browning of the sugarcane juice and to remove the dissolve oxygen, the sugarcane juice is de-aerated at 60-70°C followed by homogenization at 200-250/100-50 bar. Homogenization of the sugarcane juice is done to take care of proper mixing of the stabilizer and other ingredients added to make the batch.

After homogenization, the sugarcane juice is sterilized with double stage homogenization and de-aeration. Sterilization is carried out by ultra-high temperature (UHT) at 92-95°C for 15-30 seconds. Sterilized sugarcane juice is further stored in an aseptic storage tank with inert gas flushing. Exemplary aseptic storage tank is a steritank.

The sugarcane is finally filled in an aseptic package and kept at ambient temperature for indoor storage. Exemplary aseptic package is a carton package such as TetraPak Aseptic Packages such as but not limited to TBA200S or Tetra Brik Aseptic Slim.

The present invention also extends to the sugarcane juice prepared by the afore-mentioned process. The sugarcane juice has a brix of 14-16.2° and a pH of 3.8-4 and a shelf life of four months.

The following examples are provided to better illustrate the present invention and are not to be interpreted in any way as limiting the scope of the invention. All specific materials and methods described below, in whole or in part, fall within the scope of the invention. These specific compositions, materials, and methods are not intended to limit the invention, but merely to illustrate specific embodiments falling within the scope of the invention. One skilled in the art may develop equivalent materials, and methods without the exercise of inventive capacity and without departing from the scope of the invention. It will be understood that many variations can be made in the procedures herein described while still remaining within the bounds of the invention. It is the intention of the inventors that such variations are included within the scope of the invention.

EXAMPLES:

EXAMPLE 1:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud.

Step 4: Crushing of the canes by using open crusher (100Lt/hr).

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 15°C in product cooling tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank.

Step 8: Batch making by addition of stabilizers, acid, colors (Formulation in SG-01 Code).

Step 9: UHT at 98°C for 30sec with double stage homogenization and de-aerator.

Step10: Product stored in Aseptic Storage Tank to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 11: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 2:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud.

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 15°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank

Step 8: Batch making by addition of stabilizers, acid, colors (Formulation in SG-02 Code).

Step 9: UHT at 100°C for 30sec with double stage homogenization and de-aerator.

Step 10: Product stored in Aseptic Storage Tank , to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 11: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 3:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank

Step 8: Batch making by addition of stabilizers, acid, colors (Formulation in SC-01 Code).

Step 9: UHT at 100°C for 15sec with double stage homogenization and de-aerator.

Step 10: Product stored in Aseptic Storage Tank , to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 11: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 4:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud.

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pasteurize the product at 75°C/120sec.

Step 9: Batch making by addition of stabilizers, acid, colors (Formulation in SC-02 Code).

Step 10: UHT at 95°C for 15sec with double stage homogenization and de-aerator.

Step 11: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 12: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 5:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-03 Code).

Step 11: UHT at 95°C for 15sec with double stage homogenization and de-aerator.

Step 12: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 13: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 6:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec Enzyme De-activation Module.

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-04 Code).

Step 11: UHT at 98°C for 15sec with double stage homogenization and de-aerator.

Step 12: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 13: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 7:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module.

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-05 Code).

Step 11: UHT at 95°C for 8sec with double stage homogenization and de-aerator.

Step 12: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 13: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 8:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module.

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-06 Code).

Step 11: UHT at 98°C for 16sec with double stage homogenization and de-aerator.

Step 12: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 13: Fill the product in 200ml Tetra Brik Aseptic.

EXAMPLE 9:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module.

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-07 Code).

Step 11: UHT at 94°C for 30sec with double stage homogenization and de-aerator.

Step 12: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 13: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 10:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module.

Step 10: Batch making by addition of stabilizers, acid, colors (Formulation in SC-08 Code).

Step 11: UHT at 92°C for 30sec with double stage homogenization and de-aerator.

Step 12: Product stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product..

Step 13: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 11:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Almix tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-09 Code).

Step 12: UHT at 95°C for 8sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 12:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 80°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-10 Code).

Step 12: UHT at 90°C for 16sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 13:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 80°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-11 Code).

Step 12: UHT at 92°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 14:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using open crusher (100Lt/hr)

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 80°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-12P Code).

Step 12: UHT at 92°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 15:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 80°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-13P Code).

Step 12: UHT at 91°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is sent to Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 16:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 80°C/120sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-14LPA Code).

Step 12: UHT at 88°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 17:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/60sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-15LP Code).

Step 12: UHT at 90°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 18:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/30sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-16LP Code).

Step 12: UHT at 90°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is sent to Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 19:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/30sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-17LAG Code).

Step 12: UHT at 90°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 20:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/30sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-18LP Code).

Step 12: UHT at 90°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

EXAMPLE 21:

Step 1: Sugarcane (Breed No 86032) cutting in the farm in the evening with no exposure to sunlight.

Step 2: Washing of the canes in cold water with 100 ppm of H_2O_2.

Step 3: Cleaning of the canes manually for effective removal of the adhered soil/mud..

Step 4: Crushing of the canes by using specially designed crusher (closed system) with nitrogen blanketing with annexed chilling unit with a peristaltic pump.

Step 5: Addition of ascorbic acid in the collection can.

Step 6: Chill the product to 9°C Product Cooling Tank.

Step 7: Pump the product by using PD pump through slot strainer of 110 micron size in Mixing System Tank/Jacketted Process Tank with Nitrogen flushing.

Step 8: Pass the product through tripurpose separator at 50°C for separation of haze.

Step 9: Pasteurize the product at 75°C/15sec in Enzyme De-activation Module.

Step 10: Transfer the product to Mixing System Tank.

Step 11: Batch making by addition of stabilizers, acid, colors (Formulation in SC-19P Code).

Step 12: UHT at 90°C for 15sec with double stage homogenization and de-aerator.

Step 13: Product is stored in Aseptic Storage Tank with Nitrogen flushing to avoid multiple re-circulation of the product i.e. repeated heat exposure to the product.

Step 14: Fill the product in 200ml Tetra Brik Aseptic Slim.

Table 1:

Ingredients	SG-01 (KG)	SG-02 (KG)	SC-01 (KG)	SC-02 (KG)	SC-03 (KG)	SC-04 (KG)	SC-05 (KG)	SC-06 (KG)	SC-07 (KG)	SC-08 (KG)	SC-09 (KG)	SC-10 (KG)	SC-11 (KG)	SC-12 (KG)	SC-13P (KG)	SC-14 (KG)	SC-15PL (KG)	SC-16 (KG)	SC-17LAG (KG)	SC-18LP (KG)	SC-19P (KG)
Sugarcane Juice (86032)	500	500	542	500	575 (17.85 oB)	500 (18.89 oB)	575 (17.8 oB)	500 (18.9 oB)	550 (17.7 oB)	550 (17 oB)	550 (18 oB)	545 (18 oB)	700 (18.68 oB)	700 (18.68 oB)	700 (18.8 oB)	410 (18.6 oB)	400 (21.56 oB)	530 (21.56 oB)	525 (16.5 oB)	520 (15.25 oB)	500 (16.74 oB)
Ascorbic acid	0.122	0.122	0.13	0.122	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.186	0.186	0.182	0.12	0.12	0.12	0.12	0.12	0.12
Salt	0.1525	0.1525	0.1625	0.1525	0.15	0.1525	0.15	0.1525	0.15	0.1525	0.1525	0.1525	0.2325	0.2325	0.2325	0.15	0.15	0.15	0.15	0.145	0.25
Stabilizer (Cpkelco HF-B Lot No 0J9023a)	0.122	0.122	0.13	0.122	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Stabilizer (kelcogel LT100)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15	0.15	NA	NA	NA
Stabilizer (Bev 150 Danisco)	NA	NA	NA	NA	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.395	1.395	1.395	0.9	NA	NA	0.9	0.85	0.9
LJC (45oBrix Doehler)	2.8975	2.8975	3.0875	2.8975	3	3.11	3	3.11	3	3.11	3.11	3.11	4.65	4.65	4.65	3.012	3	2.7	3	2.85	3
Ginger Ale (Doehler 25.13.68)	0.051	0.051	0.0175	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ginger flavor VKL (FL00545)	NA	NA	NA	NA	0.51	0.549	0.51	0.549	0.42	0.45	0.45	0.45	0.7905	0.7905	0.7905	0.51	0.51	0.51	0.477	0.445	0.469
Color (Chr Hansen-C-10,000 P-WS-AP)	0.0366	0.0366	0.039	0.0366	0.036	0.039	0.036	0.039	0.041	0.0413	0.0413	0.0413	0.0728	0.0728	0.0728	0.0461	0.0462	0.044	0.0463	0.0483	0.0455
Pudina flavor VKL (FL00512)	NA	NA	NA	NA	0.004	NA	0.004	NA	0.004	0.005	0.005	0.005	NA	0.00603	0.00603	0.0068	0.0461	0.0461	NA	0.0461	0.0228
Grassy Note FL0999	NA	NA	NA	NA	NA	NA	NA	NA	0.003	0.0041	0.0041	0.0041	0.00558	0.00558	0.00558	0.0036	0.056	0.07	0.03049	NA	0.0599
Lemon Fresh FL01136	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06	0.042	0.042	0.082	0.0766	0.123
Red Apple VKL F40001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.03	NA	NA	NA	NA	NA
Sugarcane Green	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.51	NA	NA

Apple (VKL)																				
Tartrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.31 (0.01% soln)	NA	NA	0.0018	0.0018
Water	107	107	94.38	107	25	105	25	105	50	45	50	50	220	220	220	190	180	86.17	81	45	105
Total	610	610	600	610	600	610	600	610	625	620	610	610	925	925	920	610	620	620	610	570	610

Table 2:

Ingredients	SG-01 (KG)	SG-02 (KG)	SC-01 (KG)	SC-02 (KG)	SC-03 (KG)	SC-04 (KG)	SC-05 (KG)	SC-06 (KG)	SC-07 (KG)	SC-08 (KG)	SC-09 (KG)	SC-10 (KG)	SC-11 (KG)	SC-12 (KG)	SC-13P (KG)	SC-14 (KG)	SC-15PL (KG)	SC-16 (KG)	SC-17LAG (KG)	SC-18LP (KG)	SC-19P (KG)
Sugarcane Cutting in Farm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Washing and cleaning of canes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Addition of H2O2 (ppm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Extraction of Juice	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Addition of Ascorbic Acid	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Filter through muslin cloth	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Bulk Chiller (oC)	15	15	15	15	9	9	9	9	8	8	8	8	9	9	9	9	9	9	9	9	9
Nitrogen Flushing	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Transfer to Mixing System Tank/Jacketted Process Tank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Use PD pump	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Use slot strainer	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron	110 micron
Chilling Temp	15	15	15	15	9	9	9	9	8	8	8	8	9	9	9	9	9	9	9	9	9

(oC)																					
Nitrogen Flushing	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Separation (Temp)	No	No	No	No	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Enzyme Deactivation Module (oC/Sec)	No	No	No	75oc/ 120s	75oc/ 120s	75oc/ 120s	75oc/ 120s	75oc/ 120s	75oc/ 120s	75oc/ 120s	75oc/ 120s	80oc/ 120s	80oc/ 120s	80oc/ 120s	80oc/ 120s	80oc/ 120s	75oc/ 60s	75oc/ 30s	75oc/ 30s	75oc/ 30s	75oc/ 15s
Transfer in Mixing System Tank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nitrogen Flushing	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Batch Making	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
De-aeration(oC)	Yes	Yes	51.5	63.5	58.1	61.3	53.2	84.4	48.7	54.1	63.7	80.3	53.4	66.7	64.4	69.4	65.6	76.7	76.7	76.7	76.6
Homogenization (Bar)	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50	250/50
Upstream	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UHT (oC/Sec)	98oC/ 30s	100oc/ 30s	100oc/ 15s	95oc/ 15s	98oc/ 15s	95oc/ 15s	95oc/ 8s	97oc/ 16s	94oc/ 30s	92oc/ 30s	95oc /8s	90oc/ 16s	92oC/ 15s	92oC /15s	91oc/ 15s	88oc/ 15s	90oC/ 15s	90oC/ 15s	90oC/ 15s	90oC/ 15s	90oC/ 15s
Mixing System Tank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nitrogen Flushing	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Filling in TBA200	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3:

Ingredients	SG-01	SG-02	SC-01	SC-02	SC-03	SC-04	SC-05	SC-06	SC-07	SC-08	SC-09	SC-10	SC-11	SC-12	SC-13P	SC-14	SC-15PL	SC-16	SC-17LAG	SC-18LP	SC-19P
Before Processing																					
Brix	22	22	22	22	17.85	18.89	15.4	15.3	15.28	15.27	15.2	15.22	14.15	14.01	14.3	14.15	14.15	14.3	14.15	14	14.1
pH	3.98	3.98	3.95	3.98	5.4	5.4	3.9	3.9	3.8	3.8	3.8	3.9	3.9	3.9	3.95	3.9	3.9	3.85	4	3.95	4
After Processing																					
Brix	16.1	16.1	16	16.1	15.5	15.5	15.4	15.3	15.1	15.11	15.1	15.1	14	14	14.15	14	14	14.27	14.13	14.1	14.05
pH	3.95	3.95	3.95	3.95	3.9	3.8	3.9	3.9	3.8	3.83	3.82	3.9	3.9	3.9	3.93	3.9	3.9	3.9	4	3.9	4
Microbiology																					
Total Plate Count	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0
Yeast & Mould	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1

CLAIMS

1) A process for the manufacturing and packaging of sugarcane juice comprising the steps of:
   a) cutting the sugarcane in farm under controlled condition;
   b) washing and cleaning the sugarcane with cold water and a sterilant;
   c) extracting sugarcane juice by crushing the sugarcane of step (b) with a closed system extractor having an inert gas blanket, a chilling unit and a peristaltic pump;
   d) adding an antioxidant to the sugarcane juice;
   e) filtering and chilling the sugarcane immediately with inert gas flushing;
   f) pumping the sugarcane juice by using a positive displacement pump through a slot strainer a mixing system tank or a jacketted process tank and transferring the juice to an intermediate storage tank 1 with inert gas flushing;
   g) passing the sugarcane juice through a separator for separation of haze and impurities;
   h) pasteurizing the sugarcane juice in an enzyme de-activation module;
   i) transferring the sugarcane juice to a mixing system tank with inert gas flushing and standardizing the sugarcane juice by adding a pH modifier, juice, a stabilizing agent, a coloring agent and a flavoring agent;
   j) transferring the sugarcane juice of step (i) to an intermediate storage tank 2;
   k) de-aerating the sugarcane juice followed by homogenizing the sugarcane juice;
   l) sterilizing the sugarcane juice with double stage homogenization and de-aeration;
   m) storing the sugarcane juice in an aseptic storage tank with inert gas flushing;
   n) filling the sugarcane juice in an aseptic package.

2) The process as claimed in claim 1, wherein the sugarcane is 8-12 months old sugarcane and the sugarcane is cut under dark condition.

3) The process as claimed in claim 1, wherein the sterilant has a concentration of 100 ppm.

4) The process as claimed in claim 3, wherein the sterilant is hydrogen peroxide.

5) The process as claimed in claim 1, wherein the inert gas is nitrogen and the inert gas flushing is done at a pressure of 0.1-1 bar.

6) The process as claimed in claim 1, wherein the antioxidant is ascorbic acid and is used in an amount of 0.02%.

7) The process as claimed in claim 1, wherein the sugarcane juice at step (e) is filtered by using a muslin cloth filter, nylon filter and SS filter.

8) The process as claimed in claim 1, wherein the sugarcane juice at step (e) is chilled at 4-10°C for 2-3 hours.

9) The process as claimed in claim 1, wherein the slot strainer has a mesh size of 100-110 micron.

10) The process as claimed in claim 1, wherein the separator of step (g) is a tripurpose hermetic centrifuge and the separation is carried out at 50-60°C.

11) The process as claimed in claim 1, wherein the sugarcane juice is pasteurized at 75-80°C for 15-120 seconds.

12) The process as claimed in claim 1, wherein the pH modifier is citric acid; juice is lemon juice; the stabilizing agent is Cp Kelco HF-B, Kelcogel LT100 or Bev 150 Danisco; the coloring agent is Chr Hansen-C-10,000 P-WS-AP-Chlorophyll or Tartrazine yellow; the flavoring agent is ginger, lemon, red apple, sugarcane green apple, sugarcane grassy note or mint.

13) The process as claimed in claim 1, wherein the sugarcane juice is transferred to the intermediate storage tank 2 at 10-15°C.

14) The process as claimed in claim 1, wherein the sugarcane juice of step (k) is de-aerated at 60-70°C and homogenized at 200-250/100-50 bar.

15) The process as claimed in claim 1, wherein the sugarcane juice is sterilized at step (l) by ultra-high temperature at 92-95°C for 15-30 seconds.

16) The process as claimed in claim 1, wherein the aseptic package is a carton package.

17) Sugarcane juice as prepared by the process as claimed in claim 1.

18) Sugarcane juice as claimed in claim 17, wherein the sugarcane juice has a brix of 14-16.2° and a pH of 3.8-4.

19) Sugarcane juice as claimed in claim 17, wherein the sugarcane juice has a shelf life of four months.

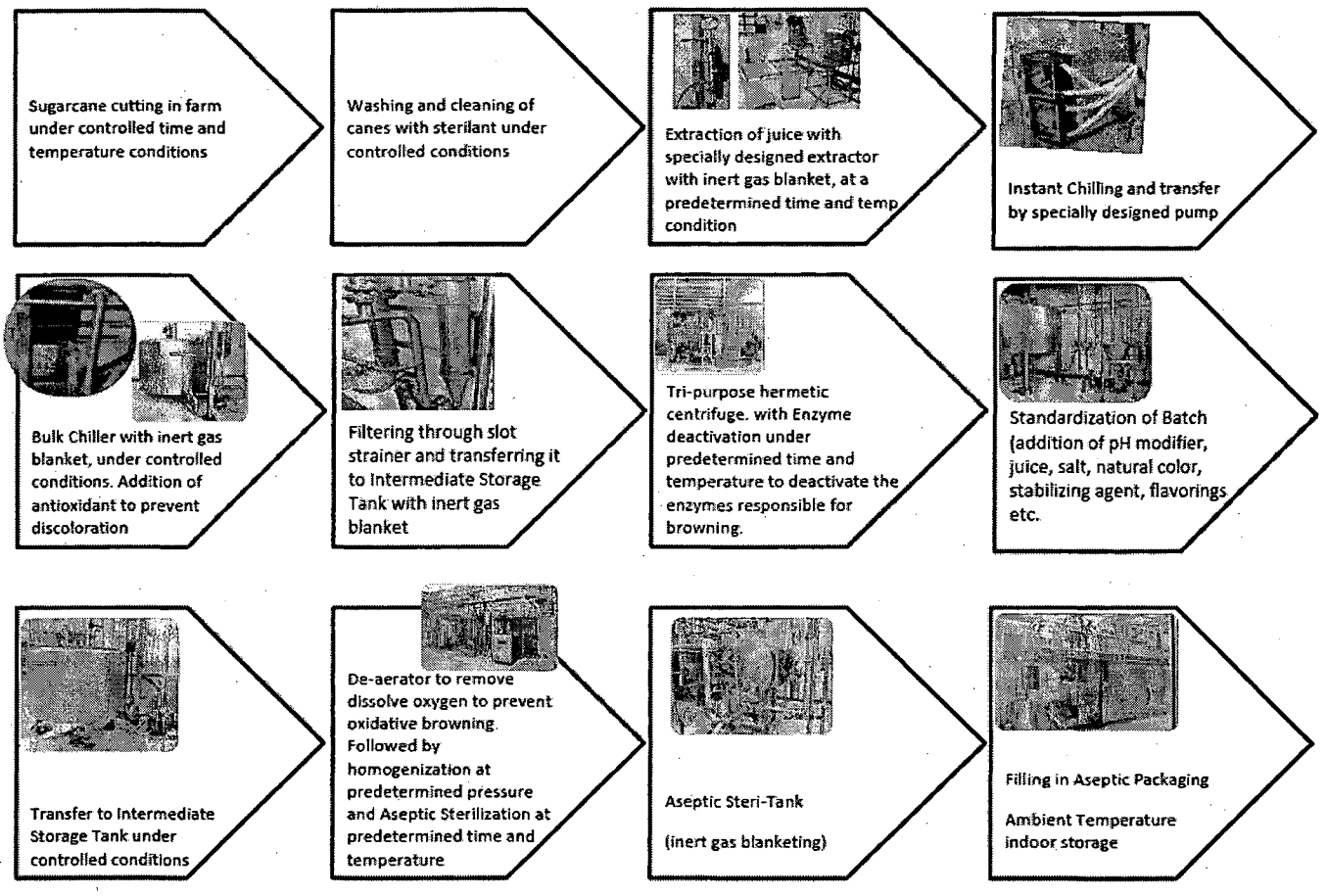
Sugarcane cutting in farm under controlled time and temperature conditions
Washing and cleaning of canes with sterilant under controlled conditions
Extraction of juice with specially designed extractor with inert gas blanket, at a predetermined time and temp condition
Instant Chilling and transfer by specially designed pump
Bulk Chiller with inert gas blanket, under controlled conditions. Addition of antioxidant to prevent discoloration
Filtering through slot strainer and transferring it to Intermediate Storage Tank with inert gas blanket
Tri-purpose hermetic centrifuge. with Enzyme deactivation under predetermined time and temperature to deactivate the enzymes responsible for browning.
Standardization of Batch (addition of pH modifier, juice, salt, natural color, stabilizing agent, flavorings etc.
Transfer to Intermediate Storage Tank under controlled conditions
De-aerator to remove dissolve oxygen to prevent oxidative browning. Followed by homogenization at predetermined pressure and Aseptic Sterilization at predetermined time and temperature
Aseptic Steri-Tank
(inert gas blanketing)
Filling in Aseptic Packaging
Ambient Temperature indoor storage

Figure-01

INTERNATIONAL SEARCH REPORT

International application No
PCT/IN2016/000054

A. CLASSIFICATION OF SUBJECT MATTER
INV. A23L2/02 A23L2/04 A23L2/46 A23L2/56 A23L2/58
A23L2/68 A23L2/52 A23L2/72 A23L2/76
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, BIOSIS, FSTA, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 068 869 A (BENT GINSLOV OTTO PETER [ZA]) 30 May 2000 (2000-05-30) cited in the application column 2, line 56 - column 4, line 61	1-19
Y	US 2009/214743 A1 (SHIN JIN-E [US] ET AL) 27 August 2009 (2009-08-27) paragraph [0019] - paragraph [0033]	1-19
Y	US 2012/251665 A1 (LARSEN KIM DORRELL [US] ET AL) 4 October 2012 (2012-10-04) paragraph [0050] - paragraph [0059]; claims 18-20; figures 2,3	1-19
A	US 2003/185959 A1 (SINGH IBOYAIMA [IN] ET AL) 2 October 2003 (2003-10-02) claims 1-8; examples 1-3	1-19

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
6 July 2016	14/07/2016

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IN2016/000054

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 1 144 062 A (FU YOULIN [CN]) 5 March 1997 (1997-03-05) page 3, last paragraph; claim 1 -----	1-19

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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