

HIGH CONCENTRATION COCONUT JUICE PRODUCT AND PROCESS FOR PREPARING SAME

The present invention relates to a high concentration coconut juice product and a process
5 for the preparation of same. In particular, the invention relates to a process for the
preparation of a high concentration coconut juice product from coconut meat which may
be used in a variety of food and beverages.

BACKGROUND TO THE INVENTION

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Coconut is a specialty product produced by many countries located around the tropical
belt. There are plentiful coconut supplies in many Asian countries, including the
Philippines, Malaysia, Indonesia, Vietnam, Thailand, India and China.

15 Coconut has become a very important agricultural product, the coconut meat of the fruit
being extracted and widely used in cooking and the food industries. Coconut fruit can be
harvested in two different stages depending on the application intended for the fruit.
Young coconut is generally harvested when the coconut husk is still green and is mainly
used as a beverage, the water of the fruit being very refreshing. Mature coconut, on the
20 other hand, is used for much wider applications. For instance, mature coconut meat may
be used for food applications. This is the white coloured layer between the water of the
fruit and the shell.

Coconut meat can be used to make coconut oil, coconut cream, desiccated coconut,
25 coconut powder and coconut juice, etc. Among these, desiccated coconut seems to be the
most popular product around the world. However, coconut cream and spray-dried coconut
powder are also becoming more popular as a cooking ingredient.

In the 1980's, a state owned company in China produced canned coconut juice made from
30 coconut meat. This product was commercialised with great success in the Chinese market
and is also chosen as a beverage for national banquets. Today, this product is still very

popular.

Unfortunately, to date, products made from coconut meat are generally subjected to very high heat processing. This results in a massive deterioration of coconut aroma and flavour.

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The invention aims at providing a process for the preparation of a high concentration coconut juice product which maintains to a substantial extent fresh coconut aroma and flavour. The high concentration coconut juice product can advantageously be easily transported from one place to another and may be exported to other countries. The product
10 can advantageously be used not only in the preparation of fresh coconut juice by dilution with water, but also in the preparation of toppings, such as ice cream toppings or fruit toppings, as well as in the production of desserts, such as honey dew sago and coconut green bean soup.

15 SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a process for the preparation of a high concentration coconut juice product including:

- (i) pressing coconut meat to extract crude coconut juice;
- 20 (ii) filtering and pasteurising the crude coconut juice to form a pasteurised extract;
- (iii) heating the pasteurised extract and blending the heated extract with an emulsifier and an amount of sugar to form an emulsified extract;
- (iv) de-aerating the emulsified extract; and
- 25 (v) pasteurising and homogenising the de-aerated extract to form said high concentration coconut juice product.

There is also provided a high concentration coconut juice product when prepared by the process described in the immediately preceding paragraph.

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The coconut meat provided in step (i) is preferably fresh mature coconut meat. The coconut is generally dehusked with a dehusking device, followed by a shelling process in which the hard coconut shell is removed. The shelled coconut is then cracked, water from inside the coconut drained and the coconut core is thrown away. The coconut meat which
5 remains is generally washed with clean water and any excess water drained prior to the extraction step (i). Still further, the coconut meat is preferably shredded coconut meat.

The coconut meat, preferably shredded, is pressed to extract crude coconut juice from the meat. This is achieved by pressing of the coconut meat, preferably in a screw press or a
10 hydraulic press.

Once pressed, the crude coconut juice is filtered, preferably using a 200 micron sieve followed by a 10 to 50 micron filter press.

15 With regard to the pasteurisation of step (ii), the crude coconut juice following filtration is preferably pasteurised by a heat exchanger or a device of a similar nature such as a steam kettle. Preferably, pasteurisation is carried out using a plate heat exchanger, tubular heat exchanger, steam injection or steam infusion. More particularly, pasteurisation of step (ii) is preferably carried out at a temperature of from 65 to 85°C for a period of between 1 and
20 30 minutes, more preferably at about 71°C to 75°C for about 3 minutes.

At the end of the filtering and pasteurising step (ii), the pasteurised extract is preferably cooled to about 4°C. The pasteurised extract preferably has a fat content of from 20% to 32% (W/W), more preferably about 26% (W/W).

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Following pasteurisation, the pasteurised extract is heated and then blended with an emulsifier and sugar to form an emulsified extract. Preferably, in step (iii) the pasteurised extract is heated to a temperature of from 30 to 72°C, more preferably from 45 to 50°C. This heating may be carried out by any suitable means, and is again preferably carried out
30 using a heat exchanger or a steam kettle. For example, heating may be carried out directly

using a plate heat exchanger or tubular heat exchanger, or indirectly by steam injection or steam infusion.

5 The emulsifier is added to the heated pasteurised extract in order to emulsify fat in the coconut juice. Preferably, the emulsifier is added using a high speed mixer in an amount of from 0.5% to 3% (W/W). The emulsifier used is not particularly limited, provided that emulsification of the fat in the pasteurised extract is achieved. Preferably, however, the emulsifier includes mono or di-glyceride, more preferably 2% (W/W) mono or di-glyceride.

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Following emulsification, sugar is added, preferably using a slightly lower speed than that used in the emulsification. In this regard, it is preferred that cane sugar crystal is added to the mixture, preferably at a ratio of coconut juice: sugar of from 1:1.13 to 1:1.25. The preferred ratio of coconut juice: sugar is 1:1.17.

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The ingredients are blended until all components are fully dissolved. This can be monitored using a 50 to 250 micron sieve. If on passing the sieve through the mixture, there is no residue in the sieve, all of the components can be considered to be fully dissolved.

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The resultant mixture is then deaerated, preferably using a vacuum at a vacuum pressure of from -0.1 to -0.99 bar (gauge) at an inlet temperature of from 30 to 72°C. More preferably, the vacuum pressure is about -0.9 bar (gauge) and the inlet temperature is about 45°C.

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The deaerated extract is then pasteurised and homogenised. Preferably, pasteurisation is carried out at a temperature of from 65 to 98°C for a period of from 1 second to 40 minutes, more preferably at about 85°C for about 30 minutes. Homogenisation of step (v) may be carried out in any suitable homogeniser. In one embodiment, homogenisation is carried out in a piston-type homogeniser, preferably at a pressure of from 30 to 350 bar. In 30 another embodiment, homogenisation is carried out in a 1-stage homogeniser at a pressure

of about 250 bar. In a further embodiment, homogenisation is carried out in a 2-stage homogeniser at a first stage pressure of from 50 to 350 bar and a second stage pressure of from 10 to 70 bar. In this embodiment, preferably the first stage pressure is about 250 bar and the second stage pressure is about 50 bar. In any event, it is preferred that
5 homogenisation is carried out at a temperature of from 45 to 90°C, more preferably about 75°C.

Following homogenisation, the high concentration coconut juice product may be cooled and packaged as desired. In one way, the product is cooled to a temperature of from 65 to
10 75°C, more preferably about 73°C, for hot-filling into containers. This preferably includes filling into clean and air tight containers. These may include cans, bottles (plastic or glass), drums or bags. Alternatively, the product is cooled to a temperature from 0°C to 64°C, preferably from 15°C to 30°C, for aseptic filling such as Tetra Brik^R aseptic. The finished product may be stored at ambient temperature, but is preferably stored at a
15 temperature between -18°C and ambient temperature. The normal shelf life at ambient temperature is anticipated to be up to about 12 months.

According to another aspect of the invention, there is provided a high concentration coconut juice product having a pH of about 6.2, a Brix value of about 69 and a density of
20 about 1.3.

There is further provided a food or beverage product which includes a high concentration coconut juice product as described in the immediately preceding paragraph or when prepared by the process of the invention.
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The food or beverage product may include any product and is not particularly limited. For example, the product may include coconut juice beverages, toppings, desserts, cocktails or bakery products.

30 In use, the high concentration coconut juice product may be diluted with either hot or cold water, for example in a ratio of 1 part high concentration coconut juice product to 6.5 parts

hot or cold water, to produce either hot or cold ready to drink coconut juice. The high concentration coconut juice product may be used directly as a topping, for example on ice cream, mixed fruit, cereal, pancakes or ice kajan. Generally, it is anticipated that from 1-5 teaspoons of the high concentration coconut juice product would be satisfactory as a
5 topping in these instances. It is further anticipated that the high concentration coconut juice product may be added, for example in an amount of 1 soup spoon, to a number of desserts such as green bean soup, red bean soup, black glutinous rice soup, sago honey dew, Guilinggao.

10 The high concentration coconut juice product provides advantages over conventional coconut cream in that it has a much fresher taste due to the low heat treatment involved in its production. Further, the high concentration coconut juice product has a longer shelf life after opening as compared to coconut cream products that can normally be kept for only 1 or 2 days after opening.

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Example 1

700 mature coconut fruits were first dehusked, shelled, cracked, drained and washed in order to extract the coconut meat. The clean fresh coconut meat was then shredded by a shredding machine before it was pressed by screw presser or a hydraulic presser in order to
20 obtain the coconut juice.

The crude coconut juice was then filtered by a 200-micron sieve and subsequently by a 50-micron filter press. The filtered coconut juice was then pasteurized at 73 degree C for 3 minutes before it was cooled down to about 4 degree C for buffer storage. The pasteurized
25 coconut juice should have about 26%(w/w) fat content.

180 kg of pasteurized coconut juice was then heated up to about 50 degree C and blended with 3.6 kg of emulsifier and 210 kg of sugar. The mixture was then deaerated in vacuum at -0.9 bar (gauge) at temperature of about 45 degree C followed by pasteurization at 85
30 degree C for 30 minutes before it was cooled to 73 degree C. The cooled mixture was then homogenized by a two-stage homogenizer at 250 bar in the first stage and at 50 bar in the

second stage. The homogenized mixture was then hot-filled at 73°C into the clean and airtight containers like bottles.

The high concentration coconut juice was then stored at + 4 degree C for distribution. 1
5 cup of high concentration coconut juice can be made to 7.5 cups of coconut juice.

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. It is to be understood that the invention includes all such variations and modifications which fall within its spirit
10 and scope. The invention also includes all the steps, features, compositions and compounds referred to or indicated in this specification, individually or collectively, and any and all combinations of any two or more of said steps or features.



CLAIMS:

1. A process for the preparation of a high concentration coconut juice product including:
 - (i) pressing coconut meat to extract crude coconut juice;
 - 5 (ii) filtering and pasteurising the crude coconut juice to form a pasteurised extract;
 - (iii) heating the pasteurised extract and blending the heated extract with an emulsifier and an amount of sugar to form an emulsified extract;
 - (iv) de-aerating the emulsified extract; and
 - 10 (v) pasteurising and homogenising the de-aerated extract to form said high concentration coconut juice product.
2. A process according to claim 1, wherein the coconut meat provided in step (i) is shredded coconut meat.
- 15 3. A process according to claim 1, wherein pressing step (i) is performed in a screw or hydraulic press.
4. A process according to claim 1, wherein said crude coconut juice is filtered in step
20 (ii) using a 200 micron sieve followed by a 10 to 50 micron filter press.
5. A process according to claim 1, wherein the pasteurisation of step (ii) is carried out using a plate heat exchanger, tubular heat exchanger, steam injection or steam infusion.
- 25 6. A process according to claim 1, wherein the pasteurisation of step (ii) is carried out at a temperature of from 65 to 85°C for a period of between 1 and 30 minutes, preferably at about 71°C to 75°C for about 3 minutes.
- 30 7. A process according to claim 1, wherein the pasteurised extract of step (ii) is cooled to about 4°C.

8. A process according to claim 1, wherein the pasteurised extract of step (ii) has a fat content of from 20% to 32%(w/w), preferably about 26%(w/w).
- 5 9. A process according to claim 1, wherein step (iii) includes heating the pasteurised extract to a temperature of from 30 to 72°C, preferably from 45 to 50°C.
10. A process according to claim 1, wherein the heating of step (iii) is carried out using a heat exchanger or a steam kettle.
- 10 11. A process according to claim 10, wherein the heating of step (iii) is carried out directly using a plate heat exchanger or tubular heat exchanger, or indirectly by steam injection or steam infusion.
- 15 12. A process according to claim 1, wherein the emulsifier of step (iii) is blended in an amount of from 0.5% to 3%(w/w).
13. A process according to claim 1, wherein the emulsifier includes mono- or di-glyceride, preferably 2% mono- or di-glyceride.
- 20 14. A process according to claim 1, wherein the sugar blended in step (iii) includes cane sugar crystals.
15. A process according to claim 1, wherein the sugar is added in an amount such that
25 the ratio of pasteurised extract: sugar is from 1:1.13 to 1:1.25, preferably 1:1.17.
16. A process according to claim 1, wherein all of the constituents of the emulsified extract of step (iii) are fully dissolved.





17. A process according to claim 1, wherein the de-aeration step (iv) is conducted by vacuum at a vacuum pressure of from -0.1 to -0.99 bar (gauge) and at an inlet temperature of from 30 to 72°C.
- 5 18. A process according to claim 17, wherein the vacuum pressure is about -0.9 bar (gauge) and the inlet temperature is about 45°C.
19. A process according to claim 1, wherein the de-aerated extract is pasteurised at a temperature of from 65 to 98°C for a period of from 1 second to 40 minutes,
10 preferably at about 85°C for about 30 minutes.
20. A process according to claim 1, wherein homogenisation in step (v) is carried out in a piston-type homogeniser at a pressure of from 30 to 350 bar.
- 15 21. A process according to claim 1, wherein homogenisation in step (v) is carried out in a one-stage homogeniser at a pressure of about 250 bar.
22. A process according to claim 1, wherein homogenisation in step (v) is carried out in a two-stage homogeniser at a first stage pressure of from 50 to 350 bar and a
20 second stage pressure of from 10 to 70 bar.
23. A process according to claim 22, wherein the first stage pressure is about 250 bar and the second stage pressure is about 50 bar.
- 25 24. A process according to claim 1, wherein homogenisation in step (v) is carried out at a temperature of from 45 to 90°C, preferably about 75°C.
25. A process according to claim 1, wherein following homogenisation the high concentration coconut juice product is cooled to a temperature of from 65 to 75°C,
30 preferably 73°C, for hot-filling. Alternatively, the high concentration coconut juice

product is cooled to a temperature of from 0°C to 64°C, preferably 15°C to 30°C, for aseptic filling.

- 5 26. High concentration coconut juice product when prepared by a process according to any one of the preceding claims.
27. A high concentration coconut juice product having a pH of about 6.2, a Brix value of about 69 and a density of about 1.3.
- 10 28. A food or beverage product which includes a high concentration coconut juice product according to claim 26 or 27.
- 15 29. A food or beverage product according to claim 28, said food or beverage product being selected from the group consisting of coconut juice beverages, toppings, desserts, cocktails and bakery products.

