

METHOD OF MAKING A NATURAL  
COCONUT JUICE BEVERAGE

5        This invention relates to a method of making  
a natural fruit beverage, especially to a method  
of producing a milk-like coconut juice beverage  
from the flesh of coconut containing high protein  
and fat.

10       The conventional method of producing fruit  
beverage comprises crushing and pressing the flesh  
of the fruit, adding water, sucrose and additives,  
and then sterilizing, thus producing a desirable  
beverage. This method, however, is only suitable  
when utilizing normal melons and other similar fruits  
as raw material; the method is not quite ideal however  
15       when dealing with coconut containing high protein  
and fat. Thus the conventional method does not  
preserve the natural aroma or nutrients contained  
in the coconut flesh, and during the process the  
natural occurring protein or fat is not dissolved  
20       in the water. Consequently, separation of oil and  
water and protein coagulum occurs and is apparent  
in the beverage.

25       In order fully to capitalize on coconut resources,  
some countries, such as the Phillippines, Singapore,  
India and Indonesia, are actively engaged in coconut  
beverage research. Some producers press coconut

juice by using its white flesh, add aromatics, additives and other fruit juice to make some mixed fruit juice beverage. Producers in some other countries make concentrated coconut juice diluted with water before drinking. All  
5 these methods have not fundamentally solved the key technical problems of natural formation of active components in the coconut juice, nor protein coagulum as well as creaming of fat globules. Therefore, the beverage produced does not preserve the natural aroma or nutrients in  
10 the original coconut flesh.

In view of the above defects in the conventional process, it is an object of the present invention to provide a method of producing a milk-like natural coconut juice, which maintains the physical stable state of  
15 homogeneity, does not coagulate or cream at normal temperature and low temperature during the producing process of the semi-finished product and within the shelf-life of the finished product and in which no other aromatics are added in addition to the coconut's natural aroma  
20 and nutrients.

According to the present invention there is provided a method of producing a natural beverage of coconut juice, comprising selecting a ripe coconut, stripping the husk, removing the hard shell and disposing of black  
25 skin of the coconut flesh, crushing the flesh into granules of about 5-6 mm in size, grinding the flesh with addition

of hot water at a temperature within the range 50-80°C, centrifuging the ground flesh in liquid to obtain a fresh coconut juice, adding hot water at a temperature of 60-80°C said coconut juice with the proportion of water to juice being 1:1, preparing an emulsifier liquid in a proportion of 4-5 times by volume in water by means of a high-speed mixer with a mixing speed of 2800 rpm at a temperature of 60-70°C for 3-5 minutes, preparing a stabliser liquid in a proportion of 45 times by volume in water by means of a high-speed mixer with mixing speed of 2800 rpm at room temperature for about 3-5 minutes, adding the prepared emulifsfier liquid and the stabliser liquid sequentially into the coconut juice in a mixing tank for mixing at a temperature of 60-70°C for about 3-5 minutes, wherein the coconut juice has a content of emulsifier and stabliser respectively and in an amount of 0.2-0.3% and 0.3-0.5% by weight based on the total weight of the coconut juice, colloid milling the mixed and emulsified coconut juice, blending the milled juice with sucrose liquid and cooking to produce a milled and blended mixture, homogenising said milled and blended mixture and storing the homogenised mixture in either rigid or soft containers which are then pasteurised at high temperature or flash sterilised at high temperature and asceptically packed, respectively.

Preferred embodiments of the invention will now be described.

There is not natural or artificial aromative added to the milk-like natural coconut juice.

5 The ripe coconuts are first treated in the conventional way by stripping the husk, removing the hard shell and disposing of black skin so as to produce the white flesh of fresh coconuts. The flesh is then crushed (or pulped), normally to granules of about 5-6 mm<sup>3</sup> in size. Hot water (50-80°C) is added and the mixture ground to a pulp, whereafter by centrifuge action fresh original  
10 coconut is produced. The yield is about 50-60%.

The active tissues or components in fresh coconut juice are liable to appear in the natural state. Therefore, the juice has to be treated in time. Hot water with a temperature of 60-80°C according  
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to certain proportion (e.g. 1:1) is added to fresh, original coconut juice within half an hour, and then the coconut juice is collected in a clean mixing tank.

5           An emulsifier and a certain proportion of water (e.g. 4-5 times) are put into a high-speed mixer for preparing emulsifier liquid at a temperature of 60-70°C with a mixing speed of 2800 rpm for about 3-5 minutes.

10           Similarly a stabilizer and a certain proportion of water (e.g. 4-5 times) are put into another high-speed mixer for preparing stabilizer liquid with mixing speed at 2800 rpm at the normal temperature for about 3-5 minutes.

15           After preparing the emulsifier liquid and stabilizer liquid, they are sequentially put into the mixing tank containing fresh coconut juice, mixing 3-5 minutes respectively at a temperature of 60-70°C for mixing and emulsifying treatment. At this time,  
20           the amount of the emulsifier and stabilizer added is 0.2-0.3% and 0.3- 0.5% of the total amount respectively.

          The emulsified juice is then pumped into a colloid mill, and milled in a three stage circulation according to the various grain size, producing fat  
25           globules in the juice which are crushed by using whirl force shear at the temperature of 60-70°C.

The liquid of emulsified juice after colloid milling is passed to a blending kettle, where sucrose liquid is added for blending and cooking. When the total amount reaches a certain amount, refractive index of the tested Brix is required at about 10°.

After blending, the emulsified liquid of coconut juice is pumped to an homogenizer. The fat globules in the liquid juice is again crushed to globules less than 5 $\mu$  in diameter at the temperature of 80-90°C and at a high pressure of 180-200 kg/cm<sup>2</sup>.

The obtained coconut juice at this time appears homogeneous and of a milky colour, no fat globules are rising or creaming, and there is no protein coagulum sedimentation. According to market demands, two kinds of processes of rigid container packaging and soft carton packaging are adopted. For finished products packaged in rigid containers, the coconut juice is first evacuated at 600-650 mmHg, raising the temperature to 121-125°C within 10 minutes, holding at that temperature for 10-12 minutes, then lowering the temperature for 10 minutes, finally to 100°C, and cooling it to 38-40°C in time. For soft carton packaging of the finished product, the juice is under flash sterilization within 4 seconds, then aseptically packed. During the whole process, no aromatics or other fruit juices are added.

The milk-like coconut juice produced by using the technique of this invention is stable while stored at ambient temperature and low temperature. No coagulum sedimentation, no freely moving fatty oils are found in the juice produced. The special coconut aroma or natural nutrients are not destroyed.

Examples of the process according to the present invention are as follows:

EXAMPLE 1

50 kg white flesh of choice coconut was rinsed with running water, crushed and pulped. 30 kg hot water at a temperature of 60°C was added for grinding the pulp. The juice was extracted by centrifuge. An equal amount of hot water at 70° was added to the mixing tank containing the juice and mixed for 3 minutes. An emulsifier and five times the amount of water at a temperature of 70°C were added to a high speed mixer at the speed of 2800 rpm and mixed for about 5 minutes. A stabilizer and five times the amount of water at the temperature of 30°C were added to another high speed mixer at the speed of 2800 rpm and mixed for about 3 minutes. At this time, an emulsifier liquid was poured into the mixing tank containing the juice at a temperature of 65°C and mixed for 3 minutes. During this procedure the emulsifier content was 0.25% of the total amount and stabilizer content 0.45% of the total amount

of the juice. Thereafter, the emulsified liquid of coconut juice was pumped to a colloid mill for milling treatment at a temperature of 68°C for 3 minutes. Prepared sucrose liquid was added to the colloid juice until the total amount reached 300 kg and the tested Brix was 9.5° of refractive index. Then, the juice was pumped to an homogenizer and homogenized for 5 seconds at a temperature of 80°C and at a pressure of 180 kg/cm<sup>2</sup>. Finally, the finished juice was produced. Empty cans were sprayed by hot steam for 2 minutes. Hot juice at the temperature of 85°C was filled in the cans or bottles. After sealing the cans were sterilized a high temperature, then cooled, cleaned, oiled and sent to storage.

#### EXAMPLE II

The physical stable state of natural coconut juice beverage during storage is as follows:

|    | Temperature | time    | stable state                                                          |
|----|-------------|---------|-----------------------------------------------------------------------|
|    | (°C)        | (month) |                                                                       |
| 20 | Room Temp   | 1-6     | Homogeneous and milky colour, no creaming, no coagulum sedimentation. |
|    | 20-30       |         |                                                                       |
| 25 | 20-30       | 7       | idem                                                                  |
|    | 20-30       | 8       | idem                                                                  |
|    | 20-30       | 9       | No creaming, but there was trace floc.                                |

| Temperature<br>(°C) | time<br>(month) | stable state |
|---------------------|-----------------|--------------|
|---------------------|-----------------|--------------|

|       |    |                                                                                                   |
|-------|----|---------------------------------------------------------------------------------------------------|
| 20-30 | 10 | No evident creaming, but there was trace fat rising and a small amount of coagulum sedimentation. |
|-------|----|---------------------------------------------------------------------------------------------------|

|                 |     |                                                         |
|-----------------|-----|---------------------------------------------------------|
| Low temp<br>1-5 | 1-8 | Homogeneous and milky colour, no creaming, no coagulum. |
|-----------------|-----|---------------------------------------------------------|

|     |      |                      |
|-----|------|----------------------|
| 1-5 | 9-10 | No evident creaming. |
|-----|------|----------------------|

|     |       |                                                                                                                  |
|-----|-------|------------------------------------------------------------------------------------------------------------------|
| 1-5 | 10-12 | Evident creaming, trace coagulum sedimentation, but dissolved when heating, recovered to original uniform state. |
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### EXAMPLE III

Main ingredients and content or natural coconut juice

| Item         | Content<br>(g/100g) | Item          | Content<br>(mg/100g) |
|--------------|---------------------|---------------|----------------------|
| Water        | 89.7                | Vitamin E     | Not detected         |
| Protein      | 0.65                | Phenylalanine | 13.9                 |
| Fat          | 1.60                | Lysine        | 0.6                  |
| Carbohydrate | 9.04                | Threonine     | 10.5                 |

|    | Item       | Content      | Item          | Content      |
|----|------------|--------------|---------------|--------------|
|    |            | (g/100g)     |               | (mg/100g)    |
| 5  | Diet fibre | Not detected | Methionine    | 5.9          |
|    | Ash        | 0.05         | Leucine       | 28           |
|    |            | Content      |               |              |
|    |            | (mg/100g)    | Isoleucine    | 14.4         |
|    | Ca         | 6.25         | Valine        | 25.8         |
| 10 | P          | 7.4          | Aspartic Acid | 23.7         |
|    | Fe         | 0.18         | Serine        | 13.5         |
|    | Cu         | 0.02         | Glutamic Acid | 51.5         |
|    | Zn         | 0.07         | Proline       | 58.4         |
|    | Mn         | 0.04         | Glycine       | 1.0          |
| 15 | Mg         | 2.42         | Alanine       | 13.2         |
|    | Vitamin A  | Not Detected | Cystine       | 3.9          |
|    | Carotene   | Not Detected | Tyrosine      | 10.3         |
|    | Thiamine   | 0.001        | Histidine     | 7.5          |
|    | Riboflavin | 0.0030       | Arginine      | 17.6         |
|    | Niacin     | 0.05         | Vitamin C     | Not detected |

CLAIMS

1. A method of producing a natural beverage of coconut juice, comprising:
  - a) selecting a ripe coconut, stripping the husk, removing the hard shell and disposing of black skin of the coconut flesh;
  - b) crushing the flesh into granules of about 5-6 mm in size;
  - c) grinding the flesh with addition of hot water at a temperature within the range 50-80°C;
  - d) centrifuging the ground flesh in liquid to obtain a fresh coconut juice;
  - e) adding hot water at a temperature of 60-80°C said coconut juice with the proportion of water to juice being 1:1;
  - f) preparing an emulsifier liquid in a proportion of 4-5 times by volume in water by means of a high-speed mixer with a mixing speed of 2800 rpm at a temperature of 60-70°C for 3-5 minutes;
  - g) preparing a stabiliser liquid in a proportion of 4-5 times by volume in water by means of a high-speed mixer with mixing speed of 2800 rpm at room temperature for about 3-5 minutes;
  - h) adding the prepared emulsifier liquid and the stabiliser liquid sequentially into the coconut juice in a mixing tank for mixing at a temperature of 60-70°C for about



3-5 minutes, wherein the coconut juice has a content of emulsifier and stabliser respectively and in an amount of 0.2-0.3% and 0.3-0.5% by weight based on the total weight of the coconut juice;

- 5 i) colloid milling the mixed and emulsified coconut juice;
- j) blending the milled juice with sucrose liquid and cooking to produce a milled and blended mixture;
- k) homogenising said milled and blended mixture; and,
- 10 l) storing the homogenised mixture in either rigid or soft containers which are then pasteurised at high temperature or flash sterilised at high temperature and asceptically packed, respectively.
- 15 2. A method as claimed in claim 1, wherein said emulsified juice is pumped into a colloid mill for a 3-stage colloid milling at a temperature of 60-70°C.
3. A method as claimed in claim 1 or 2, wherein sucrose
- 20 liquid is added into the milled juice until the juice possesses 10 Brix of sucrose.
4. A method as claimed in claim 1, wherein fat granules in said emulsified juice are again crushed to granules
- 25 less than 5 $\mu$  in diameter at the temperature of 80-90°C and at a pressure of 17.65-19.61 MPa.



5. A method as claimed in claim 1, wherein rigid containers are filled with the finished product at 79993.2-86659.3 Pa, raising the temperature to 121-125°C within 10 minutes, holding at that temperature for 10-12 minutes, then  
5 lowering the temperature for 10 minutes, finally to 100 C, and cooling it to 38-40°C.
6. A method as claimed in claim 1, wherein for soft-packaged coconut juice, the juice is under a four second  
10 flash sterilisation at a temperature of 137°C.
7. A method as claimed in any preceeding claim wherein no aromatics or other fruit juice are blended in during the production process of said beverage.
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8. A method of producing a natural coconut juice substantially as hereinbefore described.
9. A coconut juice beverage produced by any preceding  
20 claim consisting of 8-10 weight percent of fresh coconut juice, 0.2-0.3 weight percent of emulsifier, 0.3-0.5 weight percent of stabliser of the total amount of the juice, the balance being water.
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