

PATENT SPECIFICATION

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(54) A FRUIT JUICE COMPOSITION AND A MILK DRINK CONTAINING IT

(71) I, KAZUHIRO NISHIYAMA, of 14-7, Kamikotoen-1, Nishimomiya City, Hyogo Prefecture, Japan, a Japanese Subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention is concerned with a milk drink containing fruit juice in which fresh milk and a fruit juice composition are stably and completely mixed together. The present invention is also concerned with a novel fruit juice composition.

It is known that fresh cow's milk has a pH of about 6.6 and that when its pH value is brought to around the isoelectric point (pH 4.6) of protein, the milk coagulates. Since a fruit juice, such as orange juice, apple juice or peach juice, has a pH value on the acid side of the isoelectric point of protein, a fresh milk drink containing a fruit juice cannot be prepared by directly mixing fresh milk and a fruit juice. It is also known that propylene-glycol alginate, alginic acid and sodium carboxymethyl cellulose can generally be used as stabilisers to prevent the coagulation of milk protein. However, a suitable milk drink with fruit juice cannot be obtained merely by the addition of such stabilisers. Furthermore, to prevent the coagulation of milk protein, the pH of a milk drink containing fruit juice must be adjusted to a pH slightly on the alkaline side of the isoelectric point of the milk protein but a milk drink containing fruit juice cannot be obtained by simple adjustment of the pH. For example, in the case of the final product adjusted to pH 4.4, some coagulation of the protein will be observed by carrying out a boiling test on the product if the amount of added stabiliser is insufficient. In addition, it does not always follow that all known stabilisers can be used for a milk drink. Increasing the amount of added stabiliser widens the possible pH range and prevents coagulation of the milk protein even, for example, at pH 4.8. However, an indiscriminate addition

of stabilisers to a milk product is undesirable due to the problem of the precipitation of casein or other difficulties.

According to the present invention, there is provided a fruit juice composition comprising 4.2—6.0 w/v % of sodium carboxymethyl cellulose, 10—50 w/v % of a fruit juice and 3.1—5.0 w/v % of citric, lactic, malic or tartaric acid in an aqueous medium.

The present invention also provides a milk drink comprising, by volume, 3—5 parts milk, 6.5—4.5 parts syrup and 0.5 parts of the above fruit juice composition, this milk drink having a pH of 3.6—4.5.

The fruit juice composition used in the milk drink according to the present invention can also contain colouring agents, flavourings and/or fruit essences. If necessary, food preservatives may also be added, although such preservatives can be omitted if the milk drink is kept in a cool place.

The fruit juice to be used according to the present invention can be, for example, orange juice, apple juice, peach juice, strawberry juice or grapefruit juice. The fruit juices may be used as such or in concentrated form, for example, concentrated to one third or one fifth of the initial volume.

A sodium carboxymethyl-cellulose appropriate for the particular purpose of the present invention should be selected. For example, a sodium carboxymethyl-cellulose containing not more than 7.2% water, having a viscosity of 30 to 40 CPS, a pH of about 7.0, a transparency of at least 250 mm. and a degree of etherification of more than 0.790 can be used.

Flavourings which can be used in the fruit juice composition according to the present invention include α -amino acids, for example, sodium glutamate, *L*-alanine and glycine; 5'-ribonucleotide; inosinic acid; sodium succinate; and other aromas and essences suitable for foodstuffs. As colouring agents, there can be used, for example, sunset yellow FCF, tartrazine, new coccone and brilliant blue FCF. Furthermore, fruit juice essences, for example,

apple, orange, peach, strawberry, lemon, grape, melon, pineapple or banana essence, may be added to the milk drink.

5 The fruit juice composition can be prepared by dissolving the sodium carboxymethyl cellulose in an appropriate amount of sterilised water by stirring thoroughly and heating, for example, at 75—80° C. When most of the sodium carboxymethyl cellulose has dissolved
10 in the water, a fruit juice is added thereto. After a complete solution has been obtained, it is cooled and at least one of the above-mentioned acids, preferably in solution, is added gradually, with vigorous stirring, to the
15 solution and the mixture is heated to about 75—85° C. Colouring agents and/or flavourings can then be added to the solution.

The fruit juice-containing milk drink according to the present invention should have a pH of 3.6—4.5. For this purpose, the drink is prepared by mixing fresh milk, syrup and the fruit juice composition in the volume ratio of 3.0—5.0:6.5—4.5:0.5. The syrup may be prepared from sterilised water and a sugar or
25 artificial sweetening agent by conventional methods. The milk drink is prepared by first mixing fresh milk with the syrup to give a mixture to which the fruit juice is then added and, if necessary, water to give the desired
30 final volume. If water is added, then this is taken into account as being part of the volume of the syrup.

According to the present invention, fresh cow's milk is preferably employed but other
35 types of milk may also be used, such as re-constituted milk.

The fruit juice composition of the present invention is stable and may be stored for long periods of time without adding any preservative,
40 preferably in a cool place. The milk drink

containing the fruit juice in accordance with the present invention is also stable and may be stored for a long time in a cool place. It is also very palatable, even after such storage.

The following Examples illustrate the fruit juice composition and the milk drink with fruit juice of the present invention:— 45

Example 1.

To 70 litres water, sterilised at 80° C., were added, with vigorous stirring, 4.4 kg. sodium carboxymethyl cellulose (7.0% of water content, pH 6.8, 40 CPS, 250 mm in transparency, 0.792 degree of etherification) and, after dispersion and dissolution had commenced, 30.5 kg. apple juice were added, the temperature being kept at 75—80° C. Stirring and maintenance of the temperature were continued in order completely to dissolve the sodium carboxymethyl cellulose in the water. The mixture was then cooled as quickly as possible and allowed to stand overnight in a cool place. To this mixture was added, with vigorous stirring, a solution of 4.6 kg. citric acid in 2 litres water, followed by 110 g. sodium glutamate. The mixture was then heated to 85° C. and stirred for 30 minutes. To the mixture were added 12.1 g. sunset yellow FCF, 24.1 g. new coccine and 2.86 kg. strawberry essence at 75° C. The solution was made up to 100 litres by the addition of sterilised water. The solution was then passed through a homogeniser and filtered. 50
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Example 2.

In a manner similar to that described in Example 1, there were prepared further fruit juice compositions from the components set out in the following Table I:— 75

TABLE I

	I	II	III	IV
	(g)	(g)	(g)	(g)
sodium carboxymethyl cellulose	4,400	4,700	4,400	4,400
apple juice	—	40,500	40,500	20,250
peach juice	23,400	—	—	—
orange juice	—	—	—	20,250
sodium glutamate	—	110	—	—
glycine	55.6	—	—	—
5'-ribonucleotide	—	5.56	—	11.12
Tartrazine	4.0	24	35.8	7.9
Sunset yellow FCF	2.8	25.3	1,100	60.5
new cocchine	1.7	—	—	—
citric acid	3,100	4,400	4,730	4,560
lactic acid	220	—	—	—
malic acid	—	330	—	—
peach essence	1,400	—	—	—
apple essence	—	1,210	1,210	—
orange essence	—	—	—	1,100

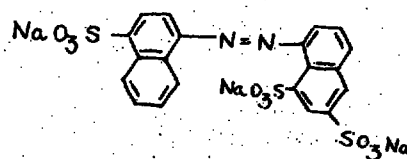
The total volume of each composition was 100 litres, the balance being water.

Example 3.

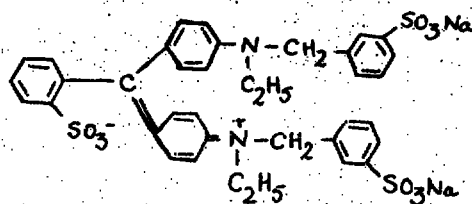
200 g. sugar were dissolved in 400 ml. water, sterilised at 80° C. and cooled to 15° C. To this was added, while stirring, 540 g. of fresh cooled milk. To this mixture was gradually added, while stirring, 100 g. of the apple juice composition described in Example 1. After mixing, the total volume of the milk drink was made up to 1800 ml. by the addition of sterilised water. The milk drink contains the volume ratio of apple juice composition: fresh milk:syrup of 0.5:3:6.5 and has a pH of about 4.4.

In similar manner, a milk drink containing apple juice was made by using the same components and volumes, except that 720 ml. of fresh milk was used. This milk drink has a pH of about 4.5.

The colouring agent new cocchine referred to hereinbefore has the formula:—



and brilliant blue FCF has the formula:—



I make no claim to the use of the present invention which is contrary to the Colouring Matter in Food Regulations, 1966 (S.I. 1203).



* C L M S *

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WHAT I CLAIM IS:—

1. A fruit juice composition comprising 4.2—6.0 w/v % of sodium carboxymethyl cellulose, 10—50 w/v % of a fruit juice and 3.1—5.0 w/v % of citric, lactic, malic or tartaric acid in an aqueous medium.
2. A fruit juice composition according to claim 1, wherein the fruit juice is apple juice, orange juice, peach juice or strawberry juice.
3. A fruit juice composition according to claim 1 or 2, wherein a fruit essence and/or a colouring agent and/or a flavouring is additionally present.
4. A fruit juice composition according to any of the preceding claims, wherein a food preservative is present.
5. A fruit juice composition according to any of the preceding claims, wherein the sodium carboxymethyl cellulose used contains not more than 7.2% water, has a viscosity of 30 to 40 CPS, a pH of about 7.0, a transparency of at least 250 mm. and a degree of etherification of more than 0.79.
6. A fruit juice composition according to claim 1, substantially as hereinbefore described and exemplified.
7. A milk drink comprising, by volume, 3—5 parts milk, 6.5—4.5 parts syrup and 0.5 parts of a fruit juice composition according to any of claims 1 to 6, said milk drink having a pH of 3.6—4.5.
8. A milk drink according to claim 7, wherein the milk used is fresh cow's milk or a reconstituted milk.
9. A milk drink according to claim 7, substantially as hereinbefore described and exemplified.

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