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(54) Title: TABLET TYPE MILK INCLUDING ANTI-OXIDANT MATERIAL AND MANUFACTURING METHOD THEREOF

(57) Abstract: Disclosed herein are tablet milk comprising an anti-oxidant material and a method for producing the same. It is an object of the present invention to provide tablet milk comprising an anti-oxidant material and a method for preparing the same. The tablet milk of the present invention contains anti-oxidant materials as components, and it is thus possible to easily ingest functional components of the anti-oxidant materials while at the same time, taking the tablet milk. The tablet milk of the present invention further comprises functional components in addition to the anti-oxidant material and thereby it is possible to obtain tablet milk having superior functionality and sensory properties. The tablet milk of the present invention is in the form of a tablet and is therefore easily portable, storable and transportable. The tablet milk of the present invention can be stored at room temperature without a need of cold storage in comparison with conventional liquid milk, due to a tablet form thereof, and can provide improved storability by coating the surface of the tablet milk with a coating agent, as compared to a conventional liquid form of milk.

Description

TABLET TYPE MILK INCLUDING ANTI-OXIDANT MATERIAL AND MANUFACTURING METHOD THEREOF

Technical Field

- [1] The present invention relates to tablet milk comprising an anti-oxidant material and a method for preparing the same.

Background Art

- [2] Milk is a white opaque liquid which is secreted by a mammary gland of dairy cow and has unique flavor and sweet taste. Milk is a food product that has been consumed by humans since ancient times and contains a variety of well-balanced nutrients necessary for humans. Milk is particularly good for growth and development of children and juveniles undergoing a period of growth and a great deal of milk is therefore ingested by children and juveniles.
- [3] Milk has been developed in various forms of products. For example, consumption of processed milk is growing wherein fruity flavor or chocolate is added to conventional milk. Meanwhile, conventional liquid milk suffers from poor storability. In order to solve problems associated with short-period storability, a great deal of studies have been focused on powdered milk created by processing of liquid milk into the form of powder and such milk products in the form of powder are commercially available on the market.
- [4] One of the chemical factors causing deterioration of quality during food processing or storage is oxidation of lipid and addition of an anti-oxidant to foodstuffs has been widely used so as to prevent such lipid oxidation.
- [5] As the anti-oxidant, tocopherol is widely used but exhibits relatively low anti-oxidative effects. In addition, dibutylhydroxy toluene (BHT) or butylhydroxyanisol (BHA) exerts superior effects as the anti-oxidant, but is recently pointed out to have mutagenicity and toxicity. As such, there is a need for development of a natural anti-oxidant having higher safety and more potent efficacy.
- [6] Among natural materials, examples of substances known to have anti-oxidant properties include tocopherol, lignan derivatives, phenolic materials, flavone derivatives, maillard browning products, amino acids, peptides and aromatic amines.
- [7] The anti-oxidant potentiates vascular endothelial cells and prevents production of low density cholesterol, and therefore exerts superior prophylactic and therapeutic effects on circulatory system disorders such as hypertension, cardiac disease and cerebral apoplexy. In addition, via enhancing effects of immune functions, the anti-oxidant potentiates immunocytes such as natural killer cells or T-lymphocytes, thereby

resulting in elevated resistance against various diseases and increased natural healing power of the body.

[8] Further, the anti-oxidant blocks damage of ligament-constituting connective tissues such as collagen which may be caused by active oxygen species and therefore also functions to prevent onset of degenerative arthritis. It was already widely well-known in the related arts that substances having strong anti-oxidative action have high prophylactic effects on cancers.

[9] With increased health concerns in conjunction with recently known physiological actions of several kinds of tea and herbal medicine materials such as lowering of blood cholesterol level and anti-oxidation, consumption of tea such as green tea, black tea and the like are growing. In addition to provision of nutrients necessary for supporting life, tea and herbal medicine materials have aesthetic functions and further exert body-modulation functions such as control of biorhythms, prevention of and recovery from various diseases, anti-aging and the like, and can thus be effectively utilized in prevention and treatment of diseases such as arteriosclerosis, hypertension and cancers due to hypernutrition and imbalanced nutrition and for anti-aging.

[10] Meanwhile, dairy products mainly consist of liquid products such as milk and processed milk, but such liquid products should be kept in cold storage. Even though they are refrigerated, the liquid products have limited expiration dates and thereby sometimes cannot be used due to spoilage after a predetermined period of time has lapsed.

[11] Recently, increased preference of consumers is directed to convenience foods that can be easily and conveniently eaten. In addition, food products which are used for a long-term journey or mountain climbing and as military foods should have long-term storability, while milk suffers from difficulty in long-term storage due to a predetermined expiration date thereof.

[12] Further, milk should be kept in cold storage at a constant temperature even though it is consumed as between-meals refreshments by examinees, students, and children undergoing a period of growth due to contents of various nutritional elements.

[13] In order to solve the above-mentioned problems and disadvantages of conventional milk, the present invention provides tablet milk which is easily portable by provision of milk in the form of a tablet and is designed to contain above-mentioned functionality of an anti-oxidant by addition of an anti-oxidant material to the tablet milk, thereby improving functionality of milk. Further, the present invention enables improvement of storability of milk by coating the surface of the tablet milk with a coating agent, as compared to a conventional liquid form of milk.

[14]

Disclosure of Invention

Technical Problem

[15] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide tablet milk comprising an anti-oxidant material and a method for preparing the same.

[16] As the tablet milk in accordance with the present invention contains an anti-oxidant material as a component, it is possible to easily ingest functional components of the anti-oxidant material while at the same time, ingesting the tablet milk.

[17] The tablet milk in accordance with the present invention further comprises functional components in addition to the anti-oxidant material and therefore it is possible to obtain tablet milk having superior functionality and sensory properties.

[18] The tablet milk in accordance with the present invention is provided in the form of a tablet and is therefore easily portable, storable and transportable.

[19] The tablet milk in accordance with the present invention can be stored at room temperature without a need of cold storage in comparison with conventional liquid milk, due to a tablet form thereof, and can provide improved storability by coating the surface of the tablet milk with a coating agent, as compared to a conventional liquid form of milk.

[20]

Technical Solution

[21] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of tablet milk comprising an anti-oxidant material.

[22] As the anti-oxidant material that is contained in the tablet milk in accordance with the present invention, one or more materials selected from the group consisting of black soybean, green tea, broccoli, garlic, Siberian Ginseng (*Acanthopanax nticosus*), Japanese apricot, Korean blackberry (*Rubus coreanus* Miquel) and chitosan may be used.

[23] The tablet milk in accordance with the present invention may comprise 2 to 45% by weight of the anti-oxidant material. According to the results obtained by application of the anti-oxidant material in varying contents to the milk, a content of the anti-oxidant material in the tablet milk is preferably in a range of 2 to 45% by weight, in order to achieve objects of the present invention.

[24] As examples of preferred contents of the anti-oxidant material in the tablet milk, 5 to 15 % by weight of black soybean, 5 to 15% by weight of green tea, 2 to 5 % by weight of broccoli, 2 to 5 % by weight of garlic and 2 to 5 % by weight of Siberian Ginseng (*Acanthopanax nticosus*) may be used. Here, Japanese apricot, Korean

blackberry (*Rubus coreanus* Miquel) or chitosan may be used instead of black soybean.

- [25] The tablet milk in accordance with the present invention may further comprise a variety of functional components in order to improve sensory properties and functionality.
- [26] The tablet milk in accordance with the present invention may further comprise 1 to 10% by weight of one or more saccharides selected from the group consisting of lactose, oligosaccharide, sucrose, fructose and glucose, as the functional component.
- [27] The tablet milk in accordance with the present invention may further comprise 1 to 3% by weight of one or more vitamin components selected from the group consisting of vitamin D, vitamin B1, vitamin B2, vitamin B6, vitamin B12, vitamin B13, vitamin C, vitamin E, biotin, folic acid, choline, inositol, vitamin L and vitamin P, as the functional component.
- [28] The tablet milk in accordance with the present invention may further comprise 1 to 5% by weight of one or more vegetable components selected from the group consisting of eggplant, flowering fern, bracken, hot pepper, shepherd's purse, mung bean, carrot, wax gourd, butterbur, radish, gourd, Chinese cabbage, leek, lettuce, ginger, truffle, pine mushroom, spinach, cabbage, onion, cucumber, burdock, ginseng, perilla, bamboo shoot, bean sprout, tomato, green onion, parsley, shiitake mushroom, soybean, green pepper and pumpkin, as the functional component.
- [29] The tablet milk in accordance with the present invention may further comprise 0.5 to 2% by weight of chlorophyll, as the functional component.
- [30] According to the results obtained by application of a variety of functional components in order to improve sensory properties and functionality in the tablet milk in accordance with the present invention, it was possible to obtain the tablet milk satisfying the above-mentioned objects of the present invention by application of functional components selected from the above-exemplified components and within the above-mentioned ranges.
- [31] As a main material in addition to above-mentioned anti-oxidant materials and functional components, the tablet milk in accordance with the present invention may use the remainder of milk powder except for the contents of the anti-oxidant materials or the remainder of milk powder except for the contents of the anti-oxidant materials and functional materials.
- [32] The milk powder is a main material of the tablet milk in accordance with the present invention. For example, the conventional liquid form of milk may be processed into milk powder for this purpose or commercially available powdered milk may be used.
- [33] As an example of the milk powder, skimmed milk powder may be used.

- [34] Meanwhile, in the tablet milk in accordance with the present invention, the surface of the milk may be coated with a coating agent in order to improve preservability and storability.
- [35] As the coating agent for coating the surface of the tablet milk, there may be used any coating agent that is harmless to the body and therefore can be used in food industry and related fields, and is capable of improving preservability and storability of the tablet milk.
- [36] Examples of the coating agent that can be used for coating the tablet milk may include hydroxypropylmethylcellulose (HPMC) and shellac.
- [37] In accordance with another aspect of the present invention, there is provided a method for preparing tablet milk comprising an anti-oxidant material.
- [38] Herein, the method for preparing the tablet milk comprises mixing anti-oxidant material powder and milk powder and tableting the resulting mixture using a tableting machine, thereby obtaining a tableted product.
- [39] In preparation of the tablet milk in accordance with the present invention, a final milk product is formulated into a tablet form, and it is thus preferred to use materials of the tablet milk which were all powdered. Here, as components of the tablet milk, commercially available powdered materials may be used or raw materials may be directly processed into powder. For direct pulverization, solid materials may be processed into powder using a mill, whereas liquid materials may be processed into powder by spray drying. Pulverization of materials into powder in the present invention may be performed by those having ordinary skill in the art via appropriate selection of conventional methods well known in the related art, and therefore details thereof will be omitted hereinafter.
- [40] In preparation of the tablet milk in accordance with the present invention, one or more powder materials selected from the group consisting of black soybean, green tea, broccoli, garlic, Siberian Ginseng (*Acanthopanax nticosus*), Japanese apricot, Korean blackberry (*Rubus coreanus* Miquel) and chitosan powder may be used as the anti-oxidant material powder.
- [41] The tablet milk in accordance with the present invention may comprise 2 to 45% by weight of the anti-oxidant material powder. According to experiments by application of the anti-oxidant material powder in varying contents to the milk, a content of the anti-oxidant material powder in the tablet milk is preferably in a range of 2 to 45% by weight, in order to achieve the above-mentioned objects of the present invention.
- [42] As examples of preferred contents of the anti-oxidant material powder in the tablet milk, 5 to 15% by weight of black soybean powder, 5 to 15% by weight of green tea powder, 2 to 5% by weight of broccoli powder, 2 to 5% by weight of garlic powder

and 2 to 5% by weight of Siberian Ginseng (*Acanthopanax nicosus*) powder may be used. Here, Japanese apricot powder, Korean blackberry (*Rubus coreanus* Miquel) powder or chitosan powder may be used instead of black soybean powder.

[43] The tablet milk in accordance with the present invention may further comprise a variety of functional components in order to improve sensory properties and functionality.

[44] The tablet milk in accordance with the present invention may further comprise 1 to 10% by weight of one or more components selected from the group consisting of lactose, oligosaccharide, sucrose, fructose and glucose, as the functional component.

[45] The tablet milk in accordance with the present invention may further comprise 1 to 3% by weight of one or more vitamin components selected from the group consisting of vitamin D, vitamin B1, vitamin B2, vitamin B6, vitamin B12, vitamin B13, vitamin C, vitamin E, biotin, folic acid, choline, inositol, vitamin L and vitamin P, as the functional component.

[46] The tablet milk in accordance with the present invention may further comprise 1 to 5% by weight of one or more vegetable components selected from the group consisting of eggplant, flowering fern, bracken, hot pepper, shepherd's purse, mung bean, carrot, wax gourd, butterbur, radish, gourd, Chinese cabbage, leek, lettuce, ginger, truffle, pine mushroom, spinach, cabbage, onion, cucumber, burdock, ginseng, perilla, bamboo shoot, bean sprouts, tomato, green onion, parsley, shiitake mushroom, soybean, green pepper and pumpkin, as the functional component.

[47] The tablet milk in accordance with the present invention may further comprise 0.5 to 2% by weight of chlorophyll, as the functional component.

[48] According to the results obtained by application of a variety of functional components in order to improve sensory properties and functionality in the tablet milk in accordance with the present invention, it was possible to obtain the tablet milk satisfying the above-mentioned objects of the present invention by application of functional components selected from the above-exemplified components and within the above-mentioned ranges.

[49] Upon preparing the tablet milk in accordance with the present invention, in addition to above-mentioned anti-oxidant materials and functional components, the remainder of milk powder except for the contents of the anti-oxidant materials or the remainder of milk powder except for the contents of the anti-oxidant materials and functional materials may be used as a main material.

[50] As the main material of the tablet milk in accordance with the present invention, for example, conventional liquid milk may be processed into powder for use as the milk powder or commercially available powdered milk may be used for this purpose.

[51] As an example of the milk powder, skimmed milk powder may be used.

[52] Meanwhile, in the tablet milk in accordance with the present invention, the surface of the milk may be coated with a coating agent in order to improve preservability and storability.

[53] As the coating agent for coating the surface of the tablet milk, there may be used any coating agent that is harmless to the body and can thus be used in food-related fields, and is capable of improving preservability and storability.

[54] As a specific example of the coating agent for coating the tablet milk, hydroxypropylmethylcellulose (HPMC) or shellac may be used.

[55]

Advantageous Effects

[56] As can be seen from the results given in Table 1 below, almost all items of sensory evaluation such as color, taste, texture and general liking in a tablet milk prepared by the present invention have acquired a score level exceeding 5 points, which are threshold values of sensory properties, thus representing superior sensory properties.

[57] Further, as can be seen from Table 2 below, the tablet milk in accordance with the present invention exhibited sensory properties including taste and palatability equivalent or superior to conventional liquid milk.

[58] Since the tablet milk in accordance with the present invention is present in the form of a tablet, it is possible to conveniently ingest milk and it is also possible to easily supply various nutrients to people who have an unbalanced diet and patients suffering from diseases.

[59] Meanwhile, the tablet milk prepared by the present invention contains components of the anti-oxidant materials and thereby it is also possible to conveniently ingest nutritional components contained in anti-oxidant materials.

[60] Further, the tablet milk in accordance with the present invention can provide tablet milk having various functionality and sensory properties, depending upon species of added functional components.

[61] The tablet milk in accordance with the present invention provides convenient portability, storability and transportability due to its tablet form.

[62]

Best Mode for Carrying Out the Invention

[63] Hereinafter, a method for preparing tablet milk comprising an anti-oxidant material in accordance with the present invention will be described in more detail.

[64] First, components of the tablet milk which were previously mentioned are mixed.

[65] In the present invention, mixing of components of the tablet milk may be carried out at a temperature of 10 to 20°C for 20 to 60 min. Here, upon mixing, components of the tablet milk may be mixed at the same time, or the remaining components except for

milk powder which is a main material are first mixed and subsequently the milk powder may be mixed with the resulting mixture.

[66] Upon preparing the tablet milk in accordance with the present invention, the mixture in which components of the tablet milk were mixed is aged at a temperature of 5 to 15°C for 2 to 5 hours such that water balance of milk components is effected.

[67] Solid tablet milk can be prepared from the aged mixture using a tableting machine. As an example of the tablet milk in accordance with the present invention, it is possible to prepare tablet milk having a weight of 0.15 to 2 grams.

[68] In preparation of the tablet milk using a tableting machine, tableting may be carried out under suitable tableting conditions, i.e. at a pressure of 8 to 10 kg/cm² and an instantaneous temperature of 80 to 100°C. Meanwhile, tableting conditions for preparing the tablet milk in accordance with the present invention may be appropriately selected and performed by those skilled in the art, and therefore details thereof will be omitted hereinafter.

[69] The method may further comprise coating the surface of the tablet milk with a coating agent, in order to obtain surface-coated tablet milk. As the coating agent used for coating the surface of the tablet milk, it is possible to employ any coating agent that is harmless to the body and can be used in food-related fields as the coating agent. As the suitable example of the coating agent, hydroxypropylmethylcellulose (HPMC) or shellac can be coated on the surface of the tablet milk.

[70] Upon coating the surface of the tablet milk with the coating agent, the coating method may be appropriately selected and carried out by those skilled in the art, and therefore details thereof will be omitted hereinafter.

[71] Meanwhile, the surface-coated tablet milk may be dried in a dryer to a moisture content of less than 10% and more preferably a moisture content of 5 to 10%.

[72]

[73] EXAMPLES

[74]

[75] Now, the present invention will be described in more detail with reference to the following various examples. These examples are provided only for illustrating the present invention and should not be construed as limiting the scope and spirit of the present invention.

[76]

[77] Preparative Example 1: Preparation of anti-oxidant material

[78] (1) Black soybeans were baked at a temperature of 100°C for 2 min and were then processed into powder using a mill.

[79] (2) Broccoli, garlic and green tea leaves were water-washed, dehydrated and cut into a length of 3 0.5 cm. Thereafter, the cut materials were dried at 55°C for 24 hours

and pulverized using a mill.

[80] (3) Stems of Siberian Ginseng (*Acanthopanax nticosus*) were cut into a length of 1 0.5 cm and were placed in five-fold volume of water relative to the weight of Siberian Ginseng. The resulting mixture was heat-extracted at a temperature of 100°C for 2 hours and the resulting liquid was filtered through a filter paper. Thereafter, based on solid contents, Siberian Ginseng extract and dextrin in a ratio of 60%:40% were homogeneously mixed in a mixing tank at a temperature of 60°C and the resulting mixture was spray-dried in a spray dryer at an inlet temperature of 220°C and an outlet temperature of 120°C, thereby obtaining Siberian Ginseng powder.

[81]

[82] Example 1

[83] 6% by weight of black soybean powder, 12% by weight of green tea powder, 2.6% by weight of broccoli powder, 3% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were first mixed in a Hobart mixer at 15°C for 30 min and 65% by weight of skimmed milk powder was added thereto, followed by homogeneously mixing all raw materials.

[84] The resulting mixture was aged at 10°C for 3 hours and was tableted at a pressure of 8 kg/cm² and an instantaneous temperature of 80°C using a tableting machine, thereby preparing tablet milk, weighing 0.5 g per tablet.

[85] Then, a 3% hydroxypropylmethylcellulose (HPMC) solution was spray coated on the surface of the tablet milk, thereby preparing surface-coated tablet milk.

[86] As the anti-oxidant materials, i.e. black soybean powder, green tea powder, broccoli powder, garlic powder and Siberian Ginseng powder, respective powders obtained in Preparative Example 1 were used.

[87]

[88] Example 2

[89] Tablet milk was prepared in the same manner as Example 1, except for 65% by weight of skimmed milk powder, 9% by weight of black soybean powder, 9% by weight of green tea powder, 2.6% by weight of broccoli powder, 3% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were used.

[90]

[91] Example 3

[92] Tablet milk was prepared in the same manner as Example 1, except for 65% by

weight of skimmed milk powder, 12% by weight of black soybean powder, 6% by weight of green tea powder, 2.6% by weight of broccoli powder, 3% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were used.

[93]

[94] Example 4

[95] Tablet milk was prepared in the same manner as Example 1, except for 63% by weight of skimmed milk powder, 6% by weight of black soybean powder, 12% by weight of green tea powder, 3.6% by weight of broccoli powder, 4% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were used.

[96]

[97] Example 5

[98] Tablet milk was prepared in the same manner as Example 1, except for 63% by weight of skimmed milk powder, 9% by weight of black soybean powder, 9% by weight of green tea powder, 3.6% by weight of broccoli powder, 4% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were used.

[99]

[100] Example 6

[101] Tablet milk was prepared in the same manner as Example 1, except for 63% by weight of skimmed milk powder, 12% by weight of black soybean powder, 6% by weight of green tea powder, 3.6% by weight of broccoli powder, 4% by weight of garlic powder, 3% by weight of Siberian Ginseng powder, 2% by weight of carrot powder, 1.0% by weight of chlorophyll powder, 0.2% by weight of vitamin E, 0.2% by weight of vitamin C, 3% by weight of lactose and 2% by weight of crystalline oligosaccharide were used.

[102]

[103] Experimental Example 1

[104] For respective tablet milk prepared in Examples 1 through 6, sensory evaluation was made on sensory properties such as color, taste, texture and general liking. The results thus obtained are given in Table 1 below.

[105] Sensory evaluation was carried out using a 9 point rating scale by a panel of 20 people (10 males and 10 females) having sensory evaluation experiences of more than 3 years in food-related fields.

[106] Table 1

Sensory evaluation of tablet milk of Examples 1 to 6

Items	Color	Taste	Texture	General liking
Example 1	7.2	7.6	7.2	7.4
Example 2	6.7	7.3	7.0	7.2
Example 3	6.0	7.0	7.1	6.9
Example 4	7.4	7.4	7.3	7.3
Example 5	6.9	7.0	7.1	7.0
Example 6	6.3	6.8	7.2	6.7

[107]

[108] * 1: Very poor; 5: Threshold value of sensory properties; 9: Excellent

[109] * In sensory evaluation, a higher value means superior sensory properties for corresponding items.

[110]

[111] Experimental Example 2

[112] Using respective tablet milk prepared in Examples 1 through 6, and commercially available white liquid milk as a control group, sensory evaluation was made on sensory properties such as taste and general liking. The results thus obtained are given in Table 2 below.

[113] Sensory evaluation was carried out using a 9 point rating scale by a panel of 20 people (10 males and 10 females) having sensory evaluation experiences of more than 3 years in food-related fields.

[114] Table 2

Items	Taste	General liking
Example 1	7.6	7.4
Example 2	7.3	7.2
Example 3	7.0	6.9
Example 4	7.4	7.3
Example 5	7.0	7.0
Example 6	6.8	6.7
Control	6.4	6.5

[115]

[116] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

[117]

Claims

- [1] Tablet milk comprising an anti-oxidant material and having a surface coated with a coating agent.
- [2] The tablet milk according to claim 1, wherein the anti-oxidant material is contained in an amount of 2 to 45% by weight.
- [3] The tablet milk according to claim 1, wherein the anti-oxidant material is one or more materials selected from the group consisting of black soybean, green tea, broccoli, garlic, Siberian Ginseng (*Acanthopanax nticosus*), Japanese apricot, Korean blackberry (*Rubus coreanus* Miquel) and chitosan.
- [4] The tablet milk according to claim 1, wherein the milk further comprises 1 to 10% by weight of one or more saccharides selected from the group consisting of lactose, oligosaccharide, sucrose, fructose and glucose, as the functional component.
- [5] The tablet milk according to claim 1, wherein the milk further comprises 1 to 3% by weight of one or more vitamin components selected from the group consisting of vitamin D, vitamin B1, vitamin B2, vitamin B6, vitamin B12, vitamin B13, vitamin C, vitamin E, biotin, folic acid, choline, inositol, vitamin L and vitamin P, as the functional component.
- [6] The tablet milk according to claim 1, wherein the milk further comprises 1 to 5% by weight of one or more vegetable components selected from the group consisting of eggplant, flowering fern, bracken, hot pepper, shepherd's purse, mung bean, carrot, wax gourd, butterbur, radish, gourd, Chinese cabbage, leek, lettuce, ginger, truffle, pine mushroom, spinach, cabbage, onion, cucumber, burdock, ginseng, perilla, bamboo shoot, bean sprout, tomato, green onion, parsley, shiitake mushroom, soybean, green pepper and pumpkin, as the functional component.
- [7] The tablet milk according to claim 1, wherein the milk further comprises 0.5 to 2% by weight of chlorophyll, as the functional component.
- [8] The tablet milk according to claim 1, wherein the coating agent is hydroxypropylmethylcellulose (HPMC) or shellac.
- [9] A method for preparing tablet milk, comprising:
mixing anti-oxidant material powder and milk powder and tableting the resulting mixture using a tableting machine, thereby obtaining a tableted product; and coating the surface of the tableted product with a coating agent.
- [10] The method according to claim 9, wherein the anti-oxidant material powder is one or more powders selected from the group consisting of black soybean, green tea, broccoli, garlic, Siberian Ginseng (*Acanthopanax nticosus*), Japanese

- apricot, Korean blackberry (*Rubus coreanus* Miquel) and chitosan.
- [11] The method according to claim 9, wherein the anti-oxidant material powder is contained in an amount of 2 to 45% by weight.
- [12] The method according to claim 9, wherein 1 to 10% by weight of one or more saccharides selected from the group consisting of lactose, oligosaccharide, sucrose, fructose and glucose is further added, as the functional component.
- [13] The method according to claim 9, wherein 1 to 3% by weight of one or more vitamin components selected from the group consisting of vitamin D, vitamin B1, vitamin B2, vitamin B6, vitamin B12, vitamin B13, vitamin C, vitamin E, biotin, folic acid, choline, inositol, vitamin L and vitamin P is further added, as the functional component.
- [14] The method according to claim 9, wherein 1 to 5% by weight of one or more vegetable components selected from the group consisting of eggplant, flowering fern, bracken, hot pepper, shepherd's purse, mung bean, carrot, wax gourd, butterbur, radish, gourd, Chinese cabbage, leek, lettuce, ginger, truffle, pine mushroom, spinach, cabbage, onion, cucumber, burdock, ginseng, perilla, bamboo shoot, bean sprout, tomato, green onion, parsley, shiitake mushroom, soybean, green pepper and pumpkin is further added, as the functional component.
- [15] The method according to claim 9, wherein 0.5 to 2% by weight of chlorophyll is further added, as the functional component.
- [16] The method according to claim 9, wherein tableting of the anti-oxidant material powder and milk powder is carried out at a pressure of 8 to 10 kg/cm² and an instantaneous temperature of 80 to 100°C.
- [17] The method according to claim 9, wherein the coating agent is hydroxypropyl-methylcellulose (HPMC) or shellac.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/004642**A. CLASSIFICATION OF SUBJECT MATTER***A23C 9/00(2006.01)i, A23L 1/29(2006.01)i*

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)

A23C 9/00, A23C 11/00, A23L 1/00, A23D 7/00, A23P 1/02

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

Korean Patents and applications for inventions since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

USPTO, PAJ, Delphion, e-SPACENET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR2001-0075842A(KOZTEC KOREA Co. Ltd)Aug. 11. 2001 See the whole document	1, 9 (2, 4 -7, 11-15)
Y	WO98/18337A1(COMPAGNIE GERVAIS DANONE)May. 7.1998 See the whole document	1, 9
A	JP2-286067A(MEICHINYUKYOU KABUSIKI KAISHA)Nov. 26. 1990 See the whole document	1 - 17
A	KR2004-0069591A(Son, YoungSuk)Aug. 6. 2004 See the whole document	1 - 7, 9 -15
A	KR2003-0059985A(Binggrae. Co. Ltd)Jul. 12. 2003 See the whole document	1, 2, 6, 9, 14
A	KR2003-0050342A(Binggrae Co. Ltd)Jun. 25. 2003 See the whole document	1, 2, 4, 9, 11, 12
A	KR2004-0094700A(KAO KABUSIKI KAISHA)Aug. 18. 2004 See the whole document	1, 2, 9, 11

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"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

06 APRIL 2006 (06.04.2006)

Date of mailing of the international search report

10 APRIL 2006 (10.04.2006)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/004642

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

- 1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

- 2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

- 3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- 1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
- 2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
- 3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

- 4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/004642

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR2001-0075842A	11. 08. 2001	None	
JP2-286067A	26. 11. 1990	None	
W098/18337A1	07. 05. 1998	W09522906A EP135768A EP607471A EP256561A EP162644A EP440203A	31. 08. 1995 03. 04. 1985 27. 07. 1994 24. 02. 1988 27. 11. 1985 07. 08. 1991
KR2004-0069591A	06. 08. 2004	None	
KR2003-0059985A	12. 07. 2003	None	
KR2003-0050342A	25. 06. 2003	None	
KR2004-0094700A	18. 08. 2004	None	