DESCRIPTION

TITLE OF INVENTION

COMPOSITION FOR INHIBITING ERYTHEMA FORMATION, METHOD OF USING SAME, METHOD FOR PREPARING SAME, METHOD FOR INHIBITING ERYTHEMA, AND LACTIC ACID BACTERIA FERMENTATION PRODUCT

TECHNICAL FIELD

[0001]

The present invention relates to a composition for inhibiting the formation of erythema, a method of using the composition, and a method for producing the same.
The present invention also relates to a method of inhibiting the formation of erythema.
Furthermore, the present invention also relates to lactic acid bacteria producing a substance.

BACKGROUND ART

[0002]

Unlike other organs, skin, which is the largest human organ, is constantly in contact with the external environment and can be affected by various external factors.
For this reason, abnormalities of various properties can occur on the skin. Examples of such an external factor include ultraviolet rays. In recent years, with the destruction of the ozone layer, the amount of ultraviolet rays falling on the ground surface is increasing. Thus, adverse effects on the skin due to excessive ultraviolet rays, such as inflammation of the skin, immunosuppression, oxidation, DNA damage, skin cancer, deterioration of skin barrier function, erythema formation, wrinkle formation, Promotion and the like are concerned.

[0003]

By the way, when exposed to a large amount of ultraviolet rays, erythema is formed on the skin after several hours elapse. Thus, in the past, the study of "inhibiting the formation of erythema by taking a beauty product containing the genus Lactobacillus" has been done (see, for example, International Publication No. 2006/095764).

Prior Art Document

Patent literature

[0004]

Patent Document 1: International Publication No. 2006/095764

Summary of the invention

Problem to be Solved by Invention

[0005]

An object of the present invention is to provide a composition for inhibiting the formation of erythema that sufficiently inhibits the formation of skin erythema.

Means for solving the problem

[0006]

The composition for inhibiting erythema production according to the first aspect of the present invention is a lactic acid bacterium fermentation product containing a polysaccharide (hereinafter referred to as "polysaccharide-containing lactic acid bacterium fermentation product") as an active ingredient. In other words, polysaccharide-containing lactic acid bacteria fermentation products are used as a composition for inhibiting erythema formation or as a portion of such a component. The term "composition" as used herein includes preparations of pharmaceuticals, supplements, food additives, and the like, foods or drinks (excluding animals and plants per se), and food or drink compositions (including processed food or drink) that animals (including humans) can ingest.

[0007]

As a result of intensive investigation by the inventors of the present invention, it has been clarified that the composition for inhibiting erythema formation according to the first aspect of the present invention sufficiently inhibits the formation of skin erythema.

[0008]

In addition, it is preferable that in the composition for inhibiting erythema formation, the polysaccharide-containing lactic acid bacteria fermentation product is produced by a combination of Lactobacillus delbrueckii subsp. Bulgaricus and Streptococcus thermophilus. Note that Lactobacillus delbrueckii subspecies bulgaricus is specifically at least one of Lactobacillus delbrueckii subspecies bulgaricus OLL1247 (Deposit number: NITE BP-01814) and Lactobacillus delbrueckii subspecies bulgaricus 2038 bacterium; Streptococcus thermophilus is specifically at least one of Streptococcus thermophilus OLS 3078 bacterium (Deposit number: NITE BP - 01697) and Streptococcus thermophilus 1131.

[0009]

In addition, the composition for inhibiting erythema formation preferably contains sphingolipid as an active ingredient.

[0010]

In addition, the composition for inhibiting erythema formation preferably further contains collagen peptide as an active ingredient.

[0011]

Incidentally, it is preferable that the composition for inhibiting erythema formation

reduces the erythema intensity of the skin of an intake person by one or more when ingested daily for 4 weeks or more. Note that when polysaccharide-containing lactic acid bacteria fermentation products and sphingolipids are added to the composition for inhibiting the formation of erythema as an active ingredient, its intake is 200 μg or more per day for polysaccharide and 4 mg or more per day for sphingolipid. In addition, when polysaccharide-containing lactic acid bacteria fermentation products, sphingolipids and collagen peptides are added to the composition for inhibiting erythema formation as an active ingredient, the intake is 200 μg or more per day for polysaccharide and 4 mg or more, 4 mg or more per day for sphingolipid, and 400 mg or more per day for collagen peptide.

[0012]

In addition, it is preferable that the composition for inhibiting erythema formation described above increases the minimum erythema amount of the skin of the intake person when ingested daily for 4 weeks or more. The minimum erythema amount is preferably increased by one or more, more preferably by two or more, even more preferably by three or more, still more preferably by four or more. Note that when polysaccharide-containing lactic acid bacteria fermentation products and sphingolipids are added to the composition for inhibiting the formation of erythema as an active ingredient, its intake is 200 μg or more per day for polysaccharide and 4 mg or more per day for sphingolipid. In addition, when polysaccharide-containing lactic acid bacteria fermentation products, sphingolipids and collagen peptides are added to the composition for inhibiting erythema formation as an active ingredient, the intake is 200 μg or more per day for polysaccharide, 4 mg or more per day for sphingolipid, and 400 mg or more per day for collagen peptide.

[0013]

In addition, it is preferable that ingesting the composition for inhibiting erythema formation daily for 4 weeks or more causes the pigmentation strength of the skin of an intake person to increase. The pigmentation strength is preferably increased by one or more, and more preferably by two or more. Note that when polysaccharide-containing lactic acid bacteria fermentation products and sphingolipids are added to the composition for inhibiting the formation of erythema as an active ingredient, its intake is 200 μg or more per day for polysaccharide and 4 mg or more per day for sphingolipid. In addition, when polysaccharide-containing lactic acid bacteria fermentation products, sphingolipids and collagen peptides are added to the composition for inhibiting erythema formation as an active ingredient, its intake is 200 μg or more per day for polysaccharide, 4 mg or more per day for sphingolipid, and 400 mg or more per day for collagen peptide.

[0014]

The method according to the second aspect of the present invention is a method of

using a lactic acid bacteria fermentation product containing polysaccharide as a composition for inhibiting erythema formation. In other words, it is to provide a lactic acid bacteria fermentation product containing polysaccharide for use as a composition for inhibiting erythema formation.

[0015]

A method for inhibiting erythema formation according to the third aspect of the present invention is a method for inhibiting erythema formation by orally ingesting a composition for inhibiting erythema formation as described above so that an ingestion amount of polysaccharide is 200 μg or more per day for at least 7 days. However, the act of treating humans is excluded. Note that an ingestion period is preferably one week or more, more preferably two weeks or more, still preferably three weeks or more, particularly preferably four weeks or more.

[0016]

In the method for producing a composition for inhibiting erythema formation according to the fourth aspect of the present invention, a composition for inhibiting erythema formation is produced by supplying milk raw material to lactic acid bacteria producing polysaccharide. In other words, here, the polysaccharide-containing lactic acid bacteria fermentation product is used to produce a composition for inhibiting the formation of erythema.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is a bar graph showing erythema scores of each sample according to Experimental Example 1.

FIG. 2 is a bar graph showing Δa * values of each sample according to Experimental Example 1.

FIG. 3 is a bar graph showing erythema scores of each sample according to Experimental Example 2.

FIG. 4 is a bar graph showing erythema scores of each sample according to Experimental Example 3.

DESCRIPTION OF EMBODIMENTS

[0018]

A composition for inhibiting the formation of erythema according to the embodiment of the present invention is an orally ingested composition for inhibiting the formation of erythema by sunburn (ultraviolet irradiation), which contains a polysaccharide-containing lactic acid bacteria fermentation product (hereinafter referred to as

"polysaccharide-containing lactic acid bacteria fermentation product") as an active ingredient. Note that it is preferable that the composition for inhibiting the formation of erythema contains sphingolipid, as an active ingredient, in addition to the polysaccharide-containing lactic acid bacteria fermentation product; it is more preferable that sphingolipid and collagen peptide are contained. Hereinafter, the active ingredients of the composition for inhibiting the formation of erythema will be described in detail; subsequently, the form of the composition for inhibiting the formation of erythema will be described, and then optional components in each form will be described in detail. Subsequently, the method of efficient ingestion of the composition for inhibiting the formation of erythema and its effect will be described in detail.

[0019]

(1) Polysaccharide-containing lactic acid bacteria fermentation product

In the embodiment of the present invention, the polysaccharide-containing lactic acid bacteria fermentation product contains a polysaccharide-containing lactic acid fermented product (hereinafter referred to as "polysaccharide-containing lactic acid bacteria fermented product"), a polysaccharide-containing lactic acid bacteria culture (hereinafter referred to as "polysaccharide-containing lactic acid bacteria culture"), metabolites of lactic acid bacteria containing polysaccharide, and the like.

[0020]

Note that the term "lactic acid bacteria" as used herein is a generic term for microorganisms that assimilate glucose to produce lactic acid of 50% or more in terms of sugar yield; it is a coccus or bacillus of gram-positive bacteria for physiological properties, has no mobility, has no sporulation ability, is negative for catalase and has other properties. Lactic acid bacteria have been eaten in various places throughout the world via fermented milk and the like, and it is ascertained that the microorganisms are highly safe. Up to now, lactic acid bacteria have been classified into eleven genuses: Lactococcus, Lactobacillus, Leuconostoc, Pediococcus, Streptococcus, Weissella, Tetragenococcus, Oenococcus, Enterococcus, Vagococcus and Carnobacterium. In the embodiment of the present invention, all of these lactic acid bacteria can be used; it is particularly preferable that among them, Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus are mixed to be used. Note that it is preferable that Lactobacillus delbrueckii subsp. bulgaricus mentioned here is at least one of Lactobacillus delbrueckii subsp. bulgaricus OLL1247 (Deposit number: NITE BP-01814) and Lactobacillus delbrueckii subsp. bulgaricus 2038; it is preferable that Streptococcus thermophilus is at least of Streptococcus thermophilus OLS3078 (Deposit number: NITE BP - 01697) and Streptococcus thermophilus 1131. Here, Lactobacillus delbrueckii subsp. bulgaricus OLL1247 was deposited on March 6, 2014 (the date of deposit) by NITE Patent Microorganisms Depositary, National Institute of Technology and Evaluation

(#122, 2-5-8 Kazusakamatari, Kisarazu-shi, Chiba prefecture, Japan) as a deposit number NITE BP-01814 under the Budapest Treaty. In addition, Streptococcus thermophilus OLS3078 was deposited on August 23, 2013 (the date of deposit) by NITE Patent Microorganisms Depositary, National Institute of Technology and Evaluation (#122, 2-5-8 Kazusakamatari, Kisarazu-shi, Chiba prefecture, Japan) as a deposit number NITE BP-01697 under the Budapest Treaty. In addition, Lactobacillus delbrueckii subsp. bulgaricus 2038 and Streptococcus thermophilus 1131 can be obtained by isolating from Bulgaria yoghurt LB81 (registered trademark) made by Meiji Co., Ltd.

[0021]

The "fermented lactic acid fermented product" mentioned here means the culture itself obtained by fermentation with lactic acid bacteria. The fermented lactic acid bacteria fermented product includes a fermented product of lactic acid bacteria and a treated product thereof, for example, a culture filtrate or a culture supernatant fluid obtained by filtering and centrifuging a culture (fermented product of lactic acid bacteria) or sterilizing it through membrane separation, a concentrate obtained by concentrating a culture filtrate, a culture supernatant fluid, a fermented product of lactic acid bacteria, or the like using evaporator, pasted products, diluted products, or dried matter (obtained by freezing, heating, depressurizing or the like). In preparing the processed product, one or more of the above-described process steps such as filtration, centrifugation, sterilization process such as membrane separation, precipitation, concentration, paste formation, dilution, drying and the like can be carried out solely or in combination. In addition, examples of the culture medium include skim milk medium and MRS medium to which yeast extract is added.

[0022]

It is particularly preferable that a lactic acid bacteria fermentation product is a milk fermented product or a milk culture of lactic acid bacteria. Examples of milk fermented products and milk cultures include fermented milk (yoghurt) and polysaccharide. Fermented milk (yoghurt) is a fermented food prepared by mixing lactic acid bacteria and yeast in milk and fermenting them, and is eaten widely due to its good taste and cosmetic and health advantages. Fermented milk (yoghurt) can preferably be its supernatant. Skim milk, culture medium of whey decomposed matter and the like as well as a thickener or a gelling agent of pectin, guar gum, xanthan gum, carrageenan, processed starch or the like are added to the fermented milk.

[0023]

of skin conditions (deterioration of the barrier function of the skin, drying of the skin, reduction of moisture content of the stratum corneum, atopic dermatitis and the like).

[0031]

In addition, this sphingomyelin is a substance composed of ceramide and phosphocholine, which is hydrolyzed to ceramide and phosphocholine with sphingomyelinase. In addition, ceramide is hydrolyzed to sphingoid bases and fatty acids with ceramidase. Most of the fatty acids are absorbed in the epithelial cells of the small intestine, whereas some of the sphingoid bases are resynthesized to sphingomyelin, ceramide or the like. Note that it is reported that sphingomyelin is degraded with intestinal bacteria.

[0032]

In general, examples of sphingomyelin, particularly molecular species contained in milk-derived sphingomyelin, include sphingomyelin molecular species in which phosphocholine or phosphoethanolamine is bonded to a ceramide structure in which "sphingosine or dihydrosphingosine having a carbon chain number within a range from 16 to 18 inclusive" is amide-bonded to "fatty acid having a carbon chain number within a range from 14 to 26 inclusive".

[0033]

It has been clarified that simultaneously ingesting fermented milk (yoghurt) with sphingomyelin can increase an amount of sphingomyelin absorbed into a living body; that is, it has been clarified that the absorption of sphingomyelin improves. It has been also clarified that absorption of ceramide improves at this time. Ingesting lactic acid bacteria fermentation product promotes absorption of sphingolipids. Furthermore, efficiently absorbing sphingolipids including sphingomyelin into a living body makes it possible to achieve various beneficial effects and advantages in addition to the effect of improving the barrier function of the skin.

[0034]

As described above, ceramide is a substance formed by combining sphingoid bases and fatty acid, and is hydrolyzed to sphingoid bases and fatty acid with ceramidase. Examples of molecular species contained in ceramide include a molecular species in which "sphingosine, dihydrosphingosine, sphingadienine, phytosphingosine or hydroxysphingenin having a carbon chain including number of carbons within a range from 16 to 18 inclusive" is amide-bonded to "fatty acid or hydroxy fatty acid having a carbon chain including number of carbons within a range from 14 to 26 inclusive.

[0035]

Glucosylceramide is a substance in which glucose is bonded to a ceramide composed of sphingoid bases and fatty acid, and is hydrolyzed to ceramide and glucose by a

fermentation products thereof, saccharides having functionalities such as oligosaccharides, existing functional materials such as royal jelly, glucosamine, astaxanthin, polyphenols, perfumes, pH-adjusting agents, diluting agents, acidulants, colorants, emulsifiers, preservatives and the like ,which are usually mixed with foods or drinks.

[0046]

<Efficient method of intake of a composition for inhibiting the formation of erythema and its effect>

It is preferable that the composition for inhibiting the formation of erythema according to the embodiment of the present invention is ingested orally for at least 7 days so that the intake amount of polysaccharide is 200 μg or more per day. Ingesting this composition for inhibiting the formation of erythema as described above decreases the erythema intensity by one or more and increases the minimum erythema amount and pigmentation intensity. Note that when polysaccharide-containing lactic acid bacteria fermentation products and sphingolipids are added to the composition for inhibiting the formation of erythema as an active ingredient, its intake is 200 μg or more per day for polysaccharide and 4 mg or more per day for sphingolipid. In addition, when polysaccharide-containing lactic acid bacteria fermentation products, sphingolipids and collagen peptides are added to the composition for inhibiting the formation of erythema as an active ingredient, the intake is 200 μg or more per day for polysaccharide, 4 mg or more per day for sphingolipids, and 400 mg or more per day for collagen peptide.

[0047]

Note that the intake of polysaccharide is not particularly limited as long as it does not harm the human body; however, it is preferably within a range from 200 μg per day to 60,000 μg per day inclusive, more preferably with in a range from 300 μg per day to 45000 μg per day inclusive, still more preferably within a range from 400 μg per day to 30000 μg per day inclusive, and in particular more preferably within a range from 500 μg per day to 15000 μg per day inclusive (note that a notation of “mass per day or more” is identical to a notation “mass or more per day”, and a notation of “mass per day or less” is identical to a notation “mass or less per day”) from the viewpoint of cost-effectiveness. In addition, an intake of sphingolipids and collagen peptides can be derived from the range definition of the content with respect to 100 pts.mass of the above-mentioned polysaccharide at a stage when the intake of the polysaccharide is determined; more specifically, the intake of sphingolipids is preferably within a range from 4 mg per day to 500 mg per day inclusive, more preferably within a range from 6 mg per day to 400 mg per day inclusive, still more preferably within a range from 8 mg per day to 300 mg per day inclusive, and in particular preferably within a range from 10 mg per day to 200 mg per day inclusive. The intake of collagen peptide is

CLAIMS

1. Use of (i) a lactic acid bacteria fermentation product containing polysaccharide produced by fermentation with a lactic acid bacteria and (ii) sphingomyelin for producing a fermented milk for inhibiting erythema formation and promoting absorption of sphingomyelin, wherein a content of sphingolipids in the fermented milk is in the range of 7 to 120,000 parts by mass per 100 parts of the polysaccharide.

2. The use according to claim 1, wherein the lactic acid bacteria fermentation product is produced with a combination of Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus.

3. The use according to claim 2, wherein
   the Lactobacillus delbrueckii subsp. bulgaricus is at least one of Lactobacillus delbrueckii subspecies bulgaricus OLL1247 (Deposit number: NITE BP-01814) and Lactobacillus delbrueckii subspecies bulgaricus 2038, and the Streptococcus thermophilus is at least one of Streptococcus thermophilus OLS3078 (Deposit number: NITE BP-01697) and Streptococcus thermophilus 1131.

4. The use according to any one of claims 1 to 3, further using ceramide.

5. The use according to any one of claims 1 to 4, further using collagen peptide.

6. The use according to any one of claims 1 to 5, the fermented milk reduces an erythema intensity measured based on a* value by 1 or more.

7. The use according to any one of claims 1 to 6, wherein the fermented milk increases a minimum erythema dose (MED).

8. The use according to any one of claims 1 to 7, wherein the fermented milk increases a pigmentation intensity measured based on L* value.

9. A method of using a fermented milk containing (i) a lactic acid bacteria fermentation product containing polysaccharide produced by fermentation with a lactic acid bacteria and (ii) sphingomyelin as a composition for inhibiting erythema formation caused by ultraviolet irradiation and promoting absorption of sphingomyelin in a subject, excluding any method of treatment by therapy, wherein a content of sphingolipids in the composition is in the range of 7 to 120,000 parts by mass per 100 parts of the polysaccharide, and wherein the composition provides 200 μg or more per day of the polysaccharide and 4 mg or more per day of the sphingolipids to the subject.

10. A method for producing a fermented milk for inhibiting erythema formation and promoting absorption of sphingomyelin, comprising:

fermenting milk raw material by lactic acid bacteria producing polysaccharide to obtain a fermented milk, and

adding sphingomyelin to the fermented milk, wherein a content of sphingolipids in the fermented milk is in the range of 7 to 120,000 parts by mass per 100 parts of the polysaccharide.