

nucleosides into purine bases. Patent Literatures 4 and 5, for example, disclose that lactic acid bacteria have an ability to degrade purines. These conventional microorganisms and fermented products having the effect of reducing the serum uric acid level have been believed to suppress purine absorption or promote purine excretion, by promoting the conversion of purine nucleosides into purine bases in the intestinal tract, that is, converting the purine nucleosides, which are readily absorbed from the intestinal tract, into the purine bases, which are poorly absorbed from the intestinal tract. However, few reports are available on human test results, and no efficient method of acquiring lactic acid bacteria having the effect of reducing the serum uric acid level is known.

Citation List

Patent Literature

[0004]

Patent Literature 1: JP Patent Publication (Kokai) No. 2008-005834 A

Patent Literature 2: International Publication No. WO 2011/102310

Patent Literature 3: International Publication No. WO 2004/112809

Patent Literature 4: International Publication No. WO 2008/129802

Patent Literature 5: JP Patent Publication (Kokai) No. 2013-048636 A

Summary

Technical Problem

[0005]

An object of the present invention is to provide lactic acid bacteria suppressing purine absorption and use thereof.

Solution to Problem

[0006]

In order to solve the above-described problem, as a result of their extensive research, the present inventors found that certain bacterial species of the genus *Lactobacillus* have a

high ability to convert purine bases into purine nucleotides, and completed the present invention.

[0007]

That is, the present invention includes the following. In one aspect, the present invention refers to method of screening for lactic acid bacteria having an enhanced ability to convert a purine base into a purine nucleotide, comprising: culturing lactic acid bacteria in a solution containing adenine, 5-phospho-D-ribose-1-diphosphate, and Mg^{2+} , comparing the resulting activity of converting adenine to adenylic acid as an index of the ability with that of *Lactobacillus gasseri* ATCC 33323 strain, selecting lactic acid bacteria having an enhanced ability to convert adenine into adenylic acid compared to *Lactobacillus gasseri* ATCC 33323 strain, measuring 5'-nucleotidase activity of the selected lactic acid bacteria and selecting lactic acid bacteria having a reduced 5'-nucleotidase activity compared to *Lactobacillus gasseri* ATCC 33323 strain. In another aspect, the present invention refers to the use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in converting a purine base into a purine nucleotide *in vitro*. In still another aspect, the present invention refers to the use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in imparting an activity of converting a purine base into a purine nucleotide in an intestinal tract to a food or beverage product. In another aspect, the present invention refers to the use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in the manufacture of a pharmaceutical preparation for promoting conversion of a purine base into a purine nucleotide in an intestinal tract. In another aspect, the present invention refers to a method of producing a purine nucleotide from a purine base, comprising reacting a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) with the purine base in the presence of 5-phospho-D-ribose-1-diphosphate and Mg^{2+} . In yet another aspect, the present invention refers to a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, for use in promoting

conversion of a purine base into a purine nucleotide in an intestinal tract. Also described herein is the following:

[1] A method of screening for lactic acid bacteria having an enhanced ability to convert a purine base into a purine nucleotide, comprising culturing lactic acid bacteria in a solution containing adenine, 5-phospho-D-ribose-1-diphosphate, and Mg^{2+} , and comparing the resulting activity of converting adenine to adenylic acid as an index of the ability with that of *Lactobacillus gasseri* ATCC 33323 strain.

[2] The method according to [1] above, further comprising measuring 5'-nucleotidase activity, and selecting lactic acid bacteria having a reduced 5'-nucleotidase activity compared to *Lactobacillus gasseri* ATCC 33323 strain.

[3] The method according to [1] or [2] above, wherein the lactic acid bacteria are *Lactobacillus* bacteria.

[4] The method according to any of [1] to [3] above, wherein the solution is a buffer solution.

[0008]

[5] A conversion agent for converting a purine base into a purine nucleotide, comprising the lactic acid bacteria obtainable by the method according to any of [1] to [4] above as an active component.

[6] The conversion agent according to [5] above, which is for use in converting adenine to adenylic acid, or converting guanine to guanylic acid.

[7] The conversion agent according to [5] or [6] above, wherein the lactic acid bacteria are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224).

[0009]

[8] A food or beverage product or a pharmaceutical preparation comprising the conversion agent according to any of [5] to [7] above.

[9] The food or beverage product or the pharmaceutical preparation according to [8] above, which is for use in reducing a serum uric acid level.

Claims

[Claim 1]

A method of screening for lactic acid bacteria having an enhanced ability to convert a purine base into a purine nucleotide, comprising:

culturing lactic acid bacteria in a solution containing adenine, 5-phospho-D-ribose-1-diphosphate, and Mg^{2+} , comparing the resulting activity of converting adenine to adenylic acid as an index of the ability with that of *Lactobacillus gasseri* ATCC 33323 strain, selecting lactic acid bacteria having an enhanced ability to convert adenine into adenylic acid compared to *Lactobacillus gasseri* ATCC 33323 strain, measuring 5'-nucleotidase activity of the selected lactic acid bacteria and selecting lactic acid bacteria having a reduced 5'-nucleotidase activity compared to *Lactobacillus gasseri* ATCC 33323 strain.

[Claim 2]

The method according to claim 1, wherein the lactic acid bacteria are *Lactobacillus* bacteria.

[Claim 3]

The method according to claim 1 or 2, wherein the solution is a buffer solution.

[Claim 4]

Use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in converting a purine base into a purine nucleotide *in vitro*.

[Claim 5]

The use according to claim 4, which is for converting adenine to adenylic acid, or converting guanine to guanylic acid.

[Claim 6]

Use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in imparting an activity of converting a purine base into a purine nucleotide in an intestinal tract to a food or beverage product.

[Claim 7]

The use according to claim 6, wherein the activity is an activity of converting adenine to adenylic acid, or converting guanine to guanylic acid.

[Claim 8]

Use of a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, in the manufacture of a pharmaceutical preparation for promoting conversion of a purine base into a purine nucleotide in an intestinal tract.

[Claim 9]

The use according to claim 8, wherein said pharmaceutical preparation is for promoting conversion of adenine to adenylic acid and promoting conversion of guanine to guanylic acid in an intestinal tract.

[Claim 10]

The use according to claim 8 or 9, wherein said pharmaceutical preparation is for promoting conversion of a purine base into a purine nucleotide in an intestinal tract by administration to a human subject having a serum uric acid level of 6 to 8 mg/dL.

[Claim 11]

The use according to any one of claims 8 to 10, wherein said pharmaceutical preparation comprises 1×10^8 to 10^{10} cfu of the lactic acid bacteria per dose.

[Claim 12]

A method of producing a purine nucleotide from a purine base, comprising reacting a composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) with the purine base in the presence of 5-phospho-D-ribose-1-diphosphate and Mg^{2+} .

[Claim 13]

The method according to claim 12, which is for producing adenylic acid from adenine, or for producing guanylic acid from guanine.

[Claim 14]

A composition comprising lactic acid bacteria which are *Lactobacillus gasseri* OLL2959 strain (Accession No: NITE BP-224) as an active component, for use in promoting conversion of a purine base into a purine nucleotide in an intestinal tract.

[Claim 15]

The composition according to claim 14, wherein said composition is for promoting conversion of adenine to adenylic acid and promoting conversion of guanine to guanylic acid in an intestinal tract.

[Claim 16]

The composition according to claim 14 or 15, wherein said composition is for promoting conversion of a purine base into a purine nucleotide in an intestinal tract by administration to a human subject having a serum uric acid level of 6 to 8 mg/dL.

[Claim 17]

The composition according to any one of claims 14 to 16, wherein said composition comprises 1×10^8 to 10^{10} cfu of the lactic acid bacteria per dose.

LACTIC ACID BACTERIA SUPPRESSING PURINE ABSORPTION AND USE THEREOF

Abstract

Lactic acid bacteria for suppressing purine absorption and use thereof are provided. The present invention relates to a method of screening for lactic acid bacteria having an enhanced ability to convert a purine base into a purine nucleotide, comprising culturing lactic acid bacteria in a solution comprising adenine, 5-phospho-D-ribose-1-diphosphate, and Mg^{2+} , and comparing the resulting activity of converting adenine to adenylic acid as an index of the ability with that of *Lactobacillus gasseri* ATCC 33323 strain; and a conversion agent for converting a purine base into a purine nucleotide, comprising lactic acid bacteria obtainable according to the method as an active component, and use thereof.