

Patent Literature 4: International Publication WO2005/003327

Patent Literature 5: JP Patent Publication No. 2000-279166 A

Patent Literature 6: International Publication WO2009/069704

Summary of Invention

Technical Problem

[0009]

The problem underlying the present invention is to provide a lactic acid bacterial fermentation promoting agent, that is suitable for use in food production.

Solution to Problem

[0010]

The present inventors conducted intensive studies to solve the above-mentioned problem, and have found that a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2 can effectively promote lactic acid bacterial fermentation, whereby the present disclosure was accomplished.

[0010a] In one aspect, the present disclosure refers to a fermentation promoting agent (excluding a fermentation promoting agent comprising an yeast extract) for a lactic acid bacterium, comprising a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2,

wherein the fermentation promoting agent is for use in a method for producing a fermented food, comprising culturing the lactic acid bacterium in/on a fermentation substrate to ferment the fermentation substrate for 3 to 7 hours,

wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus helveticus*, *Lactobacillus acidophilus*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*,

wherein said compound is selected from the group consisting of inosine, deoxyinosine, and inosinic acid, and salts thereof, and

wherein the fermentation substrate comprises milk or a milk-derived product, and the fermented food is a milk-fermented food.

[0010b] In another aspect, the present disclosure refers to a method for producing a fermented food, comprising fermenting a fermentation substrate by adding a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2 to the fermentation substrate (excluding adding an yeast extract to the fermentation substrate) and culturing a lactic acid bacterium in/on the fermentation substrate to ferment the fermentation substrate for 3 to 7 hours, thereby promoting lactic acid bacterial fermentation,

wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus helveticus*, *Lactobacillus acidophilus*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*,

wherein said compound is selected from the group consisting of inosine, deoxyinosine, and inosinic acid, and salts thereof, and

wherein the fermentation substrate comprises milk or a milk-derived product, and the fermented food is a milk-fermented food.

[0011]

More specifically, the present disclosure encompasses the followings.

[1] A fermentation promoting agent for a lactic acid bacterium, comprising a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2.

[2] The fermentation promoting agent according to [1], wherein said compound is a purine base which is adenine or hypoxanthine, a purine nucleoside or purine nucleotide comprising the base as a constituent, or a salt thereof.

[3] The fermentation promoting agent according to [1] or [2], wherein said compound is selected from the group consisting of adenine, hypoxanthine, adenosine, inosine, deoxyadenosine, deoxyinosine, adenylic acid, and inosinic acid, and salts thereof.

[4] The fermentation promoting agent according to any of [1] to [3], wherein the lactic acid bacterium is a *Streptococcus* bacterium.

[5] The fermentation promoting agent according to [4], wherein the *Streptococcus* bacterium is

[Figure 9] Figure 9 shows the results of testing the fermentation promoting effect on *S. thermophilus* of pyrimidine bases and derivatives thereof. Solid square, cytosine; open square, cytidine; solid triangle, uracil; open triangle, uridine; solid diamond, thymine; open diamond, thymidine; and open circle, control.

[Figure 10] Figure 10 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3059 strain.

[Figure 11] Figure 11 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3294 strain.

[Figure 12] Figure 12 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3289 strain.

[Figure 13] Figure 13 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3469 strain.

[Figure 14] Figure 14 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3058 strain.

[Figure 15] Figure 15 shows the fermentation promoting effect of inosinic acid on *S. thermophilus* OLS3290 strain.

[Figure 16] Figure 16 shows the fermentation promoting effect, with an acidity as the indicator, of sodium inosinate and a 1:1 mixture of sodium inosinate and sodium guanylate in the mixed fermentation of *S. thermophilus* and *L. bulgaricus* (Starter A). Solid square, sodium inosinate; solid triangle, 1:1 mixture of sodium inosinate and sodium guanylate; and open circle, control.

[Figure 17] Figure 17 shows the fermentation promoting effect, with an acidity as the indicator, of sodium inosinate and a 1:1 mixture of sodium inosinate and sodium guanylate in the mixed fermentation of *S. thermophilus* and *L. bulgaricus* (Starter B). Solid square, sodium inosinate; solid triangle, 1:1 mixture of sodium inosinate and sodium guanylate; and open circle, control.

[Figure 18] Figure 18 shows the fermentation promoting effect, with an L-lactic acid concentration as the indicator, of sodium inosinate and a 1:1 mixture of sodium inosinate and sodium guanylate in the mixed fermentation of *S. thermophilus* and *L. bulgaricus* (Starter A).

Claims

1. A fermentation promoting agent (excluding a fermentation promoting agent comprising an yeast extract) for a lactic acid bacterium, comprising a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2,

wherein the fermentation promoting agent is for use in a method for producing a fermented food, comprising culturing the lactic acid bacterium in/on a fermentation substrate to ferment the fermentation substrate for 3 to 7 hours,

wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus helveticus*, *Lactobacillus acidophilus*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*,

wherein said compound is selected from the group consisting of inosine, deoxyinosine, and inosinic acid, and salts thereof, and

wherein the fermentation substrate comprises milk or a milk-derived product, and the fermented food is a milk-fermented food.

2. The fermentation promoting agent according to claim 1, wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*.

3. The fermentation promoting agent according to claim 1 or 2, wherein the milk-fermented food is fermented milk.

4. The fermentation promoting agent according to any one of claims 1 to 3, wherein the method for producing a fermented food comprises mixed-culturing *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp. bulgaricus* in/on the fermentation substrate.

5. The fermentation promoting agent according to any one of claims 1 to 4, wherein said compound is sodium inosinate.

6. The fermentation promoting agent according to any one of claims 1 to 5, wherein said compound is used in an amount of 0.0001 to 10 wt% of the fermentation substrate.

7. The fermentation promoting agent according to any one of claims 1 to 5, wherein said compound is used in an amount of 0.0001 to 0.002 wt% of the fermentation substrate.

8. A method for producing a fermented food, comprising fermenting a fermentation substrate by adding a compound having a purine skeleton with a hydrogen atom attached to the carbon atom at position 2 to the fermentation substrate (excluding adding an yeast extract to the fermentation substrate) and culturing a lactic acid bacterium in/on the fermentation substrate to ferment the fermentation substrate for 3 to 7 hours, thereby promoting lactic acid bacterial fermentation,

wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus helveticus*, *Lactobacillus acidophilus*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*,

wherein said compound is selected from the group consisting of inosine, deoxyinosine, and inosinic acid, and salts thereof, and

wherein the fermentation substrate comprises milk or a milk-derived product, and the fermented food is a milk-fermented food.

9. The method according to claim 8, wherein the lactic acid bacterium is selected from the group consisting of *Streptococcus thermophilus*, *Lactobacillus delbrueckii*, *Lactobacillus johnsonii*, *Lactobacillus fermentum*, *Lactobacillus gasseri*, and *Leuconostoc lactis*.

10. The method according to claim 8 or 9, wherein the milk-fermented food is fermented milk.
11. The method according to any one of claims 8 to 10, wherein *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp. bulgaricus* are mixed-cultured in/on the fermentation substrate.
12. The method according to any one of claims 8 to 11, wherein said compound is sodium inosinate.
13. The method according to any one of claims 8 to 12, wherein said compound is added to the fermentation substrate in an amount of 0.0001 to 10 wt%.
14. The method according to any one of claims 8 to 12, wherein said compound is added to the fermentation substrate in an amount of 0.0001 to 0.002 wt%.