

AGENT FOR STIMULATING GROWTH AND/OR IMPROVING VIABILITY
OF LACTIC ACID BACTERIUM OF GENUS *LACTOBACILLUS*

BACKGROUND OF THE INVENTION

5 [Reference to Related Application]

[0001]

The present invention is based on the preceding patent application, Japanese Patent Application No. 2009-203157 (Filing date: September 2, 2009) and claims the benefit of the priority thereof, the
10 entire disclosure of which is incorporated herein by reference.

[Field of the Invention]

[0002]

The present invention relates to an agent for stimulating growth and/or Improving viability of a lactic acid bacterium of genus
15 *Lactobacillus* comprising a κ -caseinoglycomacropeptide-containing material as an active ingredient.

[Background Art]

[0003]

Useful microorganisms that may give a beneficial effect to a
20 host such as those that improve the bacterial flora in the gastrointestinal tract are called probiotics and attracting attention. One of such useful microorganisms is lactic acid bacteria. Functional studies of lactic acid bacteria have recently been conducted intensively, and the development of commercial products having novel functions utilizing these lactic acid bacteria has progressed. Examples of such
25 lactic acid bacteria include lactic acid bacteria of genus *Lactobacillus*.

[0004]

Various food forms exist for oral ingestion of lactic acid bacteria. Fermented foods represented by fermented milk has a low pH
30 environment, which is often unsuitable for growth and survival of lactic acid bacteria. Stimulation of growth and improvement of viability of a lactic acid bacterium in foods contribute largely to preventive medicine, when the lactic acid bacterium has functionality as probiotics as described above.

35 [0005]

Several methods have been proposed for stimulating growth

and improving viability of lactic acid bacteria in foods. The reference document (R.I. Dave and N.P. Shah, "Ingredient Supplementation Effects on Viability of Probiotic Bacteria in Yogurt", J. Dairy Sci 81, 2804-2816 (1998)) reports that the maintenance of the number of bacterial cells during storage of yogurts containing *Bifidobacterium* or *Lactobacillus acidophilus* was improved by adding cysteine, whey powder, WPC, hydrated casein, or tryptophan.

[0006]

The reference document (Rajiv I. Dave and Negendra P. Shah, "Effectiveness of Ascorbic Acid as an Oxygen Scavenger in Improving Viability of Probiotic Bacteria in Yoghurts Made with Commercial Starter Cultures", Int. Dairy Journal 7, 435-443 (1997)) reports that changes in the number of bacterial cells of a probiotic bacterium (*Lactobacillus acidophilus*) was improved by adding ascorbic acid as an active oxygen scavenger.

[0007]

Japanese Patent No. 3447358 discloses, on the other hand, as an "agent for improving viability of a lactic acid bacterium", a product containing a certain amount of a lipid obtained by subjecting milk or milk material (for example, butter serum and butter milk) to a certain treatment. Specifically, it is disclosed that this agent for improvement is used by adding it to a medium for a lactic acid bacterium.

[0008]

Japanese Patent Laid-Open Publication No. 2007-097447 discloses a method for improving viability of *Bifidobacterium* characterized in that a culture of a propionic acid bacterium and/or a bacterium producing a naphthoquinone ring-containing compound, a solvent extract and/or a processed product thereof is used. Specifically, it is disclosed that a propionic acid bacterium produces a substance that stimulates the growth of *Bifidobacterium*.

[0009]

In prior art, improvement of the viability of microorganisms has been attempted by adding milk protein, an active oxygen scavenger, or the like. These substances, however, largely affect flavor and physical properties of yogurts and their use has been thus limited. Especially for an active oxygen scavengers that is an antioxidant, since

it exerts its effect by autoxidation, sustainability of its effect could be expected only when it is used in a considerable amount. Moreover, since milk or milk material requires particular processing, preparation requires much labor, leading to an increase in cost.

5 [0010]

Although κ -caseinoglycomacropeptide has already been known to have an effect of stimulating growth of *Bifidobacterium*, its mechanism of action has not yet been clarified. Besides, it has been completely unknown heretofore, as far as the present inventors know,
10 that κ -caseinoglycomacropeptide has effects of stimulating growth and improving viability of lactic acid bacteria.

SUMMARY OF THE INVENTION

[0011]

15 The present inventors have now investigated through experiments a method for stimulating growth and improving viability of a lactic acid bacterium of genus *Lactobacillus* contained in a food composition without affecting the flavor and physical properties of the food composition containing the lactic acid bacterium. As a result, the
20 present inventors have successfully stimulated growth and improved the viability of a lactic acid bacterium of genus *Lactobacillus* contained in a food composition without affecting the flavor and physical properties of the food composition containing the lactic acid bacterium by using a raw material derived from milk, namely
25 κ -caseinoglycomacropeptide. They have also found that, in this case, the sustainability of the effect is high and excellent and the quality of the food composition can be maintained during its storage. The present invention is based on these findings.

[0012]

30 The sustainability of the effect was poor with the conventional agents for improving viability such as antioxidants, since the agents exert their effect through autoxidation. These agents also had unfavorable influence on flavor and physical properties. The present invention provides a method from a novel point of view, which is
35 completely different from the methods of the prior art for improving viability and activity of lactic acid bacteria by adding antioxidants or

the like.

[0013]

Accordingly, an object of the present invention is to provide an agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* that stimulates growth and improves viability of a lactic acid bacterium of genus *Lactobacillus* contained in a food composition without affecting the flavor and physical properties of the food composition and that is excellent in sustainability of the effect and can contribute to the maintenance of quality during storage of the food.

[0014]

In other words, according to the present invention, the following inventions are provided:

[1] An agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* comprising κ -caseinoglycomacropeptide as an active ingredient;

[2] The agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* described in the above item [1], wherein the lactic acid bacterium of genus *Lactobacillus* is *Lactobacillus gasseri* species;

[3] The agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* described in the above item [1] or [2], wherein the lactic acid bacterium of genus *Lactobacillus* is at least one selected from *Lactobacillus gasseri* OLL2716 strain and *Lactobacillus gasseri* OLL2959 strain;

[4] A method for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* in a composition containing a lactic acid bacterium of genus *Lactobacillus*, wherein the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* described in any one of the above items [1] to [3] is added to the composition containing a lactic acid bacterium of genus *Lactobacillus*;

[5] The method described in the above item [4], comprising adding the agent for stimulating growth and/or the agent for improving viability of a lactic acid bacterium to the composition containing a lactic acid bacterium prior to fermentation of the composition containing a

lactic acid bacterium;

[6] A food composition comprising the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* described in any one of the above items [1] to [3] and a

5 lactic acid bacterium of genus *Lactobacillus*;

[7] Use of κ -caseinoglycomacropeptide for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* in a composition containing a lactic acid bacterium of genus *Lactobacillus*.

10 [0015]

According to the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention, the use of κ -caseinoglycomacropeptide can stimulate growth and/or improve viability of a lactic acid bacterium of

15 genus *Lactobacillus* in a composition containing a lactic acid bacterium of genus *Lactobacillus*, such as foods and food compositions. Further, according to the present invention, the use of κ -caseinoglycomacropeptide can stimulate growth and/or improve viability of a lactic acid bacterium of genus *Lactobacillus* in a fermented

20 food in a low pH environment represented by fermented milk, etc., and further can stimulate growth and/or improve viability of a lactic acid bacterium of genus *Lactobacillus* after ingestion into a living body.

[0016]

Furthermore, according to the present invention, the use of

25 κ -caseinoglycomacropeptide can stimulate growth and/or improve viability of a lactic acid bacterium of genus *Lactobacillus* contained in a food or a food composition without affecting the flavor and physical properties thereof. Especially, the present invention can stimulate growth and/or improve viability of a lactic acid bacterium of the

30 *Lactobacillus gasseri* species whose superior efficacy has been recently clarified. According to the present invention, high functionality as a probiotic given to foods and food compositions can therefore be maintained even after storage over a long period of time, without impairing the flavor and physical properties that the foods or the food

35 compositions intrinsically have.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a graph showing the survival rate (a viable cell count after storage for the days of storage / a viable cell count at the start of storage (%)) of *Lactobacillus gasseri* OLL2716 strain in Experimental Example 1.

Figure 2 is a graph showing the survival rate (a viable cell count after storage for the days of storage / a viable cell count at the start of storage (%)) of *Lactobacillus gasseri* OLL2959 strain in Experimental Example 2.

Figure 3 is a graph showing the cell counts (cfu/g) of *Lactobacillus gasseri* OLL2716 strain in Experimental Example 3.

DETAILED DESCRIPTION OF THE INVENTION

[0018]

An agent for stimulating growth and/or improving viability of a lactic acid bacterium

The agent for stimulating growth and/or improving viability of a lactic acid bacterium according to the present invention contains κ -caseinoglycomacropeptide as an active ingredient. In other words, the present invention stimulates growth and/or improves viability of probiotic bacteria such as a lactic acid bacterium of genus *Lactobacillus* contained in yoghurt or the like by using κ -caseinoglycomacropeptide.

The expression "an agent for stimulating growth and/or improving viability of a lactic acid bacterium" herein is used as meanings including, in addition to an agent having both functions of stimulating growth and improving viability of a lactic acid bacterium, an agent exhibiting either one function of stimulating growth of a lactic acid bacterium and improving viability of a lactic acid bacterium. However, "an agent for stimulating growth and/or improving viability of a lactic acid bacterium" as the expression encompassing these meanings can be expressed interchangeably as an agent for stimulating growth and improving viability of a lactic acid bacterium, a composition for stimulating growth and improving viability of a lactic acid bacterium, or an additive for stimulating growth and improving viability of a lactic acid bacterium.

[0019]

The expression "stimulating growth" of a lactic acid bacterium means to stimulate growth of the lactic acid bacterium by acting on a lactic acid bacterium so that the bacterial cell count can be increased when the lactic acid bacterium is in an environment suitable for growth or maintenance of the lactic acid bacterium. In the present invention, preferably, it means that the growth of a lactic acid bacterium is stimulated in a composition containing the lactic acid bacterium in the predetermined storage environment.

[0020]

The expression "improving viability" of a lactic acid bacterium used herein means, by acting on a lactic acid bacterium to suppress the death of the lactic acid bacterium, to maintain and increase the number of residual viable cells of the lactic acid bacterium when the lactic acid bacterium is in an environment suitable for growth or maintenance of the lactic acid bacterium. In the present invention, preferably, it means that the number of residual viable cells of a lactic acid bacterium is improved in a composition containing the lactic acid bacterium in the predetermined storage environment.

[0021]

κ -Caseinoglycomacropeptide (CGMP) used herein is a fragment of κ -casein, one of milk proteins, and a C-terminal peptide containing a glycopeptide of κ -casein. κ -Caseinoglycomacropeptide is generally a part of casein micelle and positioned in the outer periphery of the micelle. κ -Caseinoglycomacropeptide is generally available in the form of a κ -caseinoglycomacropeptide-containing material.

The κ -caseinoglycomacropeptide-containing material can be prepared by separation by various methods. For example, the κ -caseinoglycomacropeptide-containing material can be prepared by treating milk protein with chymosin for isolation. Further, for example, the κ -caseinoglycomacropeptide-containing material can be prepared by acting pepsin on κ -casein and then adding an acid to precipitate a para- κ -casein fraction, and dialyzing the supernatant thus obtained to desalt and then lyophilizing the resultant substance, as required. Further, for example, the κ -caseinoglycomacropeptide-containing material can be prepared by utilizing whey that is produced when rennet or pepsin or both is acted on acid casein for milk coagulation

treatment to form rennet casein curd. Specifically, the κ -caseinoglycomacropeptide-containing material can be prepared from the whey that contains calcium phosphate by adjusting pH and temperature (for example, adjusting pH at 8 to 9 and temperature at 50 to 60°C) to precipitate and remove calcium phosphate and adjusting the supernatant thus obtained to return to the neutral region, concentrating the resultant substance with a reverse osmosis membrane for desalting, and then spray drying, as required.

Alternatively, commercial κ -caseinoglycomacropeptide can be utilized, if available.

[0022]

As the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention, the above κ -caseinoglycomacropeptide-containing material or its processed material can be used as it is, or it is diluted with a solvent to obtain a soluble fraction or an insoluble fraction, which can be used as it is. As the solvent, water, and solvents usually used, such as alcohols, carbohydrates, organic acids, organic bases, inorganic acids, inorganic bases, supercritical fluids, or the like can be used singly or in combination. Further, the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention can be obtained by combining a food component such as water, proteins, sugars, lipids, vitamins, minerals, organic acids, organic bases, fruit juices, flavors, and the like with the κ -caseinoglycomacropeptide itself or a processed material thereof.

[0023]

The agent for stimulating growth and/or improving viability of a lactic acid bacterium according to the present invention can be added to the composition containing a lactic acid bacterium so that the agent is contained preferably at 0.05 to 0.6% by weight, more preferably at 0.1 to 0.4% by weight, further more preferably at 0.2 to 0.3% by weight in terms of the concentration of κ -caseinoglycomacropeptide. In this case, the above composition containing a lactic acid bacterium can contain a lactic acid bacterium of genus *Lactobacillus* preferably at 10^5 CFU/g or more, more preferably in the range of 10^6 to 10^9 CFU/g,

further more preferably in the range of 10^7 to 10^8 CFU/g.

[0024]

According to the investigation by the present inventors, the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention can exert the function of stimulating growth and/or improving viability of the lactic acid bacterium in a low pH environment. The foods and food compositions containing a lactic acid bacterium represented by fermented milk, etc., have generally a low pH environment, which is often unsuitable for growth and/or survival of lactic acid bacteria. Since the agent for stimulating growth and/or improving viability according to the present invention can exert the function of stimulating growth and/or improving viability of a lactic acid bacterium even in a low pH environment, it is useful for stimulating growth and/or improving viability of a lactic acid bacterium in foods and food compositions containing a lactic acid bacterium represented by fermented milk, etc. The agent for stimulating growth and/or improving viability of a lactic acid bacterium according to the present invention can exert its function more effectively in a low pH environment, differentiated from the prior art, considering the pH and the like of foods and food compositions containing a lactic acid bacterium. In this case, the low pH environment is preferably the one having pH of 2.5 to 6.5, more preferably pH of 3.0 to 5.5, further more preferably pH of 3.5 to 5.0, most preferably pH of 3.8 to 4.8.

[0025]

The agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention is preferably applied to lactic acid bacteria of genus *Lactobacillus*, in particular, the *Lactobacillus gasseri* species whose excellent efficacy is being clarified. The *Lactobacillus gasseri* species is, for example, *Lactobacillus gasseri* OLL2716 strain (FERM BP-6999) and *Lactobacillus gasseri* OLL2959 strain (NITE BP-224).

As described hereinbelow, in the present invention, the effect of the agent for stimulating growth and/or improving viability of a lactic acid bacterium according to the present invention to these strains was experimentally confirmed.

[0026]

The information about deposition of these lactic acid bacteria is as described below.

Lactobacillus gasserii OLL2716 strain is deposited to International Patent Organism Depository. The details specifying the deposition are shown below.

- (1) Name of depository: International Patent Organism Depository, National Institute of Advanced Industrial Science and Technology
- (2) Contact address: Chuo Dai-6, 1-1 Higashi 1-Chome, Tsukuba-shi, Ibaraki- Prefecture, Japan, 305-8566
- (3) Deposition No.: FERM BP-6999
- (4) Designation for identification: *Lactobacillus gasserii* OLL2716
- (5) Date of original deposit: May 24, 1999
- (6) Date of transfer to deposit based on the Budapest Treaty: January 14, 2000

Lactobacillus gasserii OLL2716 described above was isolated from human feces. It is a gram-positive bacillus, does not produce gas from glucose, and is catalase-negative. It assimilates glucose, mannose, fructose, galactose, sucrose, cellobiose, lactose, trehalose, starch, and dextrin to produce acids.

[0027]

On the other hand, *Lactobacillus gasserii* OLL2959 strain is deposited to Patent Microorganisms Center of National Institute of Technology and Evaluation (NITE) in Japan. The details specifying the deposition are shown below.

- (1) Name of depository: Patent Microorganisms Center of NITE
- (2) Contact Address: 2-5-8 Kazusa Kamatari, Kisarazu-shi, Chiba Prefecture, Japan, 292-0818
- (3) Accession No.: NITE BP-224
- (4) Designation for Identification: *Lactobacillus gasserii* OLL2959
- (5) Date of original deposit: March 31, 2006
- (6) Date of transfer to deposit based on the Budapest Treaty: November 21, 2007

Lactobacillus gasserii OLL2959 described above was isolated from human feces. It is a gram-positive bacillus and does not produce gas from glucose. It assimilates glucose, mannose, fructose,

galactose, sucrose, and cellobiose.

[0028]

The method for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to the present invention is performed by adding the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* containing the above κ -caseinoglycomacropeptide-containing material as an active ingredient to a composition containing a lactic acid bacterium of genus *Lactobacillus*. Although the timing of the addition may be any of before fermentation, during fermentation, and after fermentation of the lactic acid bacterium of genus *Lactobacillus*, the agent is preferably added before fermentation of a composition containing a lactic acid bacterium since it allows controlling the efficacy and effect of the whole product homogenously, and more preferably before sterilization of a composition containing a lactic acid bacterium since it allows hygienic control of the κ -caseinoglycomacropeptide-containing material.

[0029]

According to the present invention, the agent for stimulating growth and/or improving viability according to the present invention may be used in foods and food compositions. In other words, the agent for stimulating growth and/or improving viability according to the present invention can be used in foods and food compositions containing the above lactic acid bacterium. Examples of the foods and food compositions include various foods and drinks (soft drinks, fermented milk, yoghurt, etc.).

[0030]

The foods and food compositions containing the agent for stimulating growth and/or improving viability according to the present invention and the above lactic acid bacterium can be used as they are and also used in accordance with the ordinary methods for general food compositions, such as by mixing with other foods or food ingredients. The appearance may be any form including generally used states and forms of food and drink, for example, solid form (powder, granules, and the like), paste, liquid, and suspension.

[0031]

Other ingredients are not particularly limited, and water, proteins, sugars, lipids, vitamins, minerals, organic acids, organic bases, fruit juices, flavors and the like can be used as ingredients in the above foods and food compositions. These ingredients can be used as a combination of 2 or more ingredients, and synthetic products and/or foods and food compositions containing these in large amounts can also be used.

10

EXAMPLES

[0032]

The present invention will be explained using Examples, but the present invention is not limited by the Examples. In the present specification, the expression of % refers to % by weight, unless otherwise stated.

15

[0033]

The influence of κ -caseinoglycomacropeptide (CGMP) on the viability of *Lactobacillus gasseri* OLL2716 strain (FERM BP-6999), a probiotic strain in yoghurts, and *Lactobacillus gasseri* OLL2959 strain (NITE BP-244), a probiotic strain of the same species, was investigated in yoghurt. CGMP-10 of Arla Foods Ingredients Japan K.K. was used as CGMP.

20

[0034]

Experimental Example 1

25

To a yoghurt mix containing CGMP at 0.2%, a starter (mixed culture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus*) at 2% and a concentrated culture of *Lactobacillus gasseri* OLL2716 strain (4×10^{11} CFU/g) at 0.025% were added simultaneously to perform fermentation to prepare a yoghurt. At the same time, a yoghurt was prepared in the same manner except that no CGMP was added and used as a control.

30

[0035]

These yoghurts were stored at 5°C for 16 days, the best-before period. No difference was observed in the flavor, physical properties, lactic acid acidity, or pH in the presence/absence of added CGMP during the storage period. The number of cells of *Lactobacillus*

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gasser/ OLL2716 strain was counted at the time of starting storage (immediately after preparation) and 8 and 16 days later. These bacterial cell counts and survival rates (a viable cell count after storage for the days of storage / a viable cell count at the start of storage (%)) are shown in Figure 1.

5 [0036]

[Table 1]

	Start of storage		8 days later		16 days later	
	<i>L. gasseri</i> OLL 2716 (x 10 ⁷ cfu/g)	Survival rate (%)	<i>L. gasseri</i> OLL 2716 (x 10 ⁷ cfu/g)	Survival rate (%)	<i>L. gasseri</i> OLL 2716 (x 10 ⁷ cfu/g)	Survival rate (%)
Control	108.5	100	37.0	34.1	24.0	22.1
Addition of 0.2% CGMP	121.5	100	79.5	65.4	52.0	42.8

[0037]

Experimental Example 2

To a yoghurt mix containing CGMP at 0.2%, a starter (mixed culture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus*) at 2% and a concentrated culture of *Lactobacillus gasser*i OLL2959 strain (2×10^{11} CFU/g) at 0.04% were added simultaneously to perform fermentation to prepare a yoghurt. At the same time, a yoghurt was prepared in the same manner except that no CGMP was added and used as a control.

10 [0038]

These yoghurts were stored at 5°C for 16 days, the best-before period. No difference was observed in the flavor, physical properties, lactic acid acidity, or pH in the presence/absence of added CGMP during the storage period. The number of cells of *Lactobacillus gasser*i OLL2959 strain was counted at the time of starting storage (immediately after preparation) and 8 and 16 days later. These cell counts and survival rates (a viable cell count after storage for the days of storage / a viable cell count at the start of storage (%)) are shown in Table 2. The survival rates (a viable cell count after storage for the days of storage / a viable cell count at the start of storage (%)) of *Lactobacillus gasser*i OLL2959 strain are shown in Figure 2.

20 [0039]

[Table 2]

	Start of storage		8 days later		16 days later	
	<i>L. gasseri</i> OLL 2959 (x 10 ⁷ cfu/g)	Survival rate (%)	<i>L. gasseri</i> OLL 2959 (x 10 ⁷ cfu/g)	Survival rate (%)	<i>L. gasseri</i> OLL 2959 (x 10 ⁷ cfu/g)	Survival rate (%)
Control	121.5	100	29.0	23.9	25.0	20.6
Addition of 0.2% CGMP	118	100	69.5	58.9	49.5	41.9

[0040]

As a result, the survival rates of *Lactobacillus gasser* OLL2716 strain after storage of the yoghurts for 16 day were 22.1% with no CGMP and 42.8% with CGMP with respect to 100% at the start of storage (Immediately after preparation). Further, the survival rates of *Lactobacillus gasser* OLL2959 strain after storage of the yoghurts for 16 days were 20.6%% with no CGMP and 41.9% with CGMP with respect to 100% at the start of storage (immediately after preparation). These survival rates of the lactic acid bacteria are very important for securing the quality of the product and the present invention was shown to substantially improve these elements. Here, the effect of improving a survival rate of a lactic acid bacterium was confirmed.

[0041]

Lactobacillus gasser OLL2716 strain (FERM BP-6999), a probiotic strain for yoghurts, was used to investigate the influence of κ -caseinoglycomacropeptide (CGMP) on stimulation of its growth.

[0042]

Experimental Example 3

To an MRS medium (Difco Lactobacilli MRS Broth (Becton, Dickinson and Company)) containing CGMP at 0.2%, a concentrated culture of *Lactobacillus gasser* OLL2716 strain (4×10^{11} CFU/g) diluted 10 times was inoculated at 1% and cultured at 40°C. On the other hand, a medium containing, in place of CGMP, an equal amount of fat-free milk was prepared, subjected to a similar test, and used as a control.

The number of bacterial cells was counted over time, respectively. The results are shown in Table 3 and Figure 3.

[0043]

[Table 3]

Time elapsed (hour)	0.0	2.0	4.0	5.5	7.0	8.0	9.0
Control (cfu/g)	1.13E+07	1.16E+07	2.40E+07	1.53E+08	7.40E+08	1.53E+09	1.75E+09
Addition of 0.2% CGMP (cfu/g)	1.18E+07	1.19E+07	5.15E+07	4.25E+08	1.06E+09	1.60E+09	1.50E+09

[0044]

As a result, the time required for the cell count of the lactic acid bacterium to reach 10^8 cfu/g was shortened by about 1 hour when CGMP was added as compared with the time when
5 no CGMP was added. Here, the effect of stimulating the growth of a lactic acid bacterium was confirmed.

INDUSTRIAL APPLICABILITY

[0045]

10 The use of the κ -caseinoglycomacropeptide-containing material according to the present invention can provide an agent for stimulating growth and/or improving viability of lactic acid bacteria or the like, which does not affect the flavor and physical properties of a food composition and which has high
15 sustainability of the effect and is excellent.

CLAIMS

1. An agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* in a composition, comprising κ -caseinoglycomacropeptide as an active ingredient, wherein the lactic acid bacterium of genus *Lactobacillus* is the *Lactobacillus gasseri* species.
2. The agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to claim 1, wherein the lactic acid bacterium of genus *Lactobacillus* is at least one selected from *Lactobacillus gasseri* OLL2716 strain and *Lactobacillus gasseri* OLL2959 strain.
3. A method for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* in a composition containing a lactic acid bacterium of genus *Lactobacillus*, wherein the agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to claim 1 or 2 is added to the composition containing a lactic acid bacterium of genus *Lactobacillus*.
4. The method according to claim 3, comprising adding the agent for stimulating growth and/or the agent for improving viability of a lactic acid bacterium to the composition containing a lactic acid bacterium prior to fermentation of the composition containing a lactic acid bacterium.
5. A food composition comprising an agent for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* according to claim 1 or 2 and a lactic acid bacterium of genus *Lactobacillus*.

6. Use of κ -caseinoglycomacropeptide for stimulating growth and/or improving viability of a lactic acid bacterium of genus *Lactobacillus* in a composition containing a lactic acid bacterium of genus *Lactobacillus*, wherein the lactic acid bacterium of genus *Lactobacillus* is the *Lactobacillus gasseri* species.