CLAIMS

1. A method for preparing a pre-conditioned probiotic *Lactobacillus reuteri* strain, the method comprises the following steps:

a) cultivating a probiotic *L. reuteri* strain in the presence of galacto-oligosaccharides (GOS) in a growth medium, thereby pre-conditioning the probiotic *L. reuteri* strain; and

b) harvesting the pre-conditioned probiotic *L. reuteri* strain from the growth medium.

2. The method according to claim 1, wherein GOS is added in step a) to the growth medium in an amount selected in a range of 0.2 wt% to 8 wt%, preferably in a range 0.5 wt% to 7 wt%, more preferably in a range of 0.75 wt% to 6 wt%, and most preferably in a range of 0.75 wt% to 5 wt%, such as a range of 0.75 wt% to 4 wt% or 0.75 wt% to 3 wt% GOS in the growth medium.

3. The method according to any one of claims 1 to 2, wherein GOS added to the growth medium in step a) has a degree of polymerization (DP) of 3–8.

4. The method according to any one of claims 1 to 3, wherein the probiotic *L. reuteri* strain is at least one *L. reuteri* strain selected from the group consisting of *L. reuteri* strain DSM 17938, *L. reuteri* strain ATCC PTA 5289, *L. reuteri* strain ATCC PTA 6475, *L. reuteri* DSM 32846, *L. reuteri* DSM 32847, *L. reuteri* DSM 32848, *L. reuteri* DSM 32849, *L. reuteri* DSM 33632, *L. reuteri* DSM 33633, *L. reuteri* DSM 33634, *L. reuteri* DSM 33635, *L. reuteri* DSM 27131, *L. reuteri* DSM 32465, *L. reuteri* DSM 32231, *L. reuteri* DSM 32232, *L. reuteri* ATCC PTA 6127 and *L. reuteri* strain ATCC PTA 4659, preferably the probiotic *L. reuteri* strain is selected from the group consisting of *L. reuteri* strain DSM 17938, *L. reuteri* strain ATCC PTA 5289, *L. reuteri* strain ATCC PTA 6475, *L. reuteri* DSM 32846, *L. reuteri* DSM 32848, *L. reuteri* DSM 32849 *L. reuteri* DSM 27131, *L. reuteri* DSM 32465 and *L. reuteri* strain ATCC PTA 4659, and more preferably *L. reuteri* strain DSM 17938.

5. The method according to any one of claims 1 to 4, further comprising:

washing the harvested pre-conditioned probiotic *L. reuteri* strain.

6. The method according to any one of claims 1 to 5, further comprising:

drying the harvested pre-conditioned probiotic *L. reuteri* strain,

7. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain, wherein the pre-conditioned probiotic *L. reuteri* strain has been prepared by cultivating a *L. reuteri* strain in the presence of galacto-oligosaccharides (GOS) in a growth medium.

8. The composition according to claim 7, wherein the composition is in a form selected from the group consisting of a powder, a sachet, a tablet, a capsule, an oil formulation, an emulsion, an oil-in-water emulsion (o/w emulsion), and a water-in oil emulsion (w/o emulsion).

9. The composition according to any one of claims 7 to 8, wherein the composition is an administrable form selected from the group consisting of a nutritional composition, a pharmaceutical formulation, a dietary supplement, a functional food product, and a functional beverage product.

10. The composition according to any one of claims 7 to 9, wherein the *L. reuteri* strain is at least one *L. reuteri* strain selected from the group consisting of *L. reuteri* strain DSM 17938, *L. reuteri* strain ATCC PTA 5289, *L. reuteri* strain ATCC PTA 6475, *L. reuteri* DSM 32846, *L. reuteri* DSM 32847, *L. reuteri* as DSM 32848, *L. reuteri* DSM 32849, *L. reuteri* DSM 33632, *L. reuteri* DSM 33633, *L. reuteri* DSM 33634, *L. reuteri* DSM 33635, *L. reuteri* DSM 27131, *L. reuteri* DSM 32465, *L. reuteri* DSM 32231, *L. reuteri* DSM 32232, *L. reuteri* ATCC PTA 6127 and *L. reuteri* strain ATCC PTA 4659, preferably the probiotic *L. reuteri* strain is selected from the group consisting of *L. reuteri* strain DSM 17938, *L. reuteri* strain ATCC PTA 5289, *L. reuteri* strain ATCC PTA 6475, *L. reuteri* DSM 32846, *L. reuteri* DSM 32848, *L. reuteri* DSM 32849 *L. reuteri* DSM 27131, *L. reuteri* DSM 32465 and *L. reuteri* strain ATCC PTA 4659, and more preferably *L. reuteri* strain DSM 17938.

11. The composition according to any one of claims 7 to 10, wherein the composition comprises an effective amount of a freeze-dried or spray-dried, pre-conditioned probiotic *Lactobacillus reuteri* strain.

12. The composition according to any one of claims 7 to 11 obtainable by the method according to any one of claims 1 to 6.

13. Non-therapeutic use of an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to a method of any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for improving or increasing the survival, persistence and/or probiotic effect, preferably of a *L. reuteri* strain, in the digestive tract of a healthy subject.

14. The non-therapeutic use according to claim 13, wherein improving or increasing the survival, persistence and/or probiotic effect:

- is an increase of mineral bioavailability, preferably an increase of mineral solubility and/or mineral absorption, in the intestinal tract of the healthy subject, wherein the mineral is preferably selected from the group consisting of magnesium, calcium and iron, more preferably selected from the group consisting of calcium and iron; and/or
- is an increase in stress tolerance of *L. reuteri* strain in the intestinal tract of the healthy subject, preferably an increase of stress tolerance to bile and gastric acid in the intestinal tract of the healthy subject; and/or
- is an increase in adhesion of *L. reuteri* strain to mucus in the intestinal tract of the healthy subject; and/or
- is an increase of epithelial integrity in the intestinal tract of the healthy subject; and/or
- is a promotion of bone formation and/or bone mineralization, and/or a promotion of the maturation, differentiation and/or activity of osteoblasts of the healthy subject.

15. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for use as a medicament.

16. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for use in the prevention and/or treatment of a disease in a subject in need thereof, wherein the subject is suffering from a disrupted intestinal barrier or disruptions in mucosal lining, preferably wherein the disrupted intestinal barrier or disruptions in mucosal lining is associated with a disease or condition selected from the group consisting of non-alcoholic fatty liver disease (NAFLD), celiac disease, malnutrition, anxiety, stress, irritable bowel syndrome (IBS), Crohn's disease, ulcerative colitis, functional gastrointestinal disorders, such as functional abdominal pain, diarrhea, infantile colic, infectious diseases, depression, autism spectrum disorders, diverticular disease, periodontitis, osteopenia and/or osteoporosis.

17. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for use in the prevention and/or treatment of mineral deficiency in a subject in need

thereof, wherein the mineral is preferably selected from the group consisting of magnesium, calcium and iron, and more preferably selected from the group consisting of calcium and iron.

18. The composition for use according to claim 17, wherein the subject is suffering from iron deficiency, preferably iron deficiency anemia.

19. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for use in the prevention and/or the treatment of bone loss.

20. A composition comprising an effective amount of a pre-conditioned probiotic *Lactobacillus reuteri* strain as prepared according to any one of claims 1 to 6 or a composition according to any one of claims 7 to 12 for use in promoting growth and development of bones or teeth in children.