

SUMMARY

The present inventors have found that infants delivered via caesarean section have an intestinal flora which is different from the intestinal flora of infants born via the vaginal route. Particularly, infants born via caesarean section have a reduced rate of intestinal
 5 colonization by *Bifidobacteria* and have a less diverse *Bifidobacterium* intestinal flora regarding species than infants born via the vaginal route, particularly missing *Bifidobacterium breve*, *Bifidobacterium longum*, *Bifidobacterium infantis* and *Bifidobacterium bifidum*.

10 In one aspect, the present invention refers to use of a composition in the manufacture of a medicament for stimulating the development of a healthy intestinal flora and/or decreasing the occurrence of intestinal pathogens in infants delivered via caesarean section within 3 months of birth, wherein the composition is not human milk and wherein the composition comprises (a) non-digestible galacto-oligosaccharides having at least
 15 50% of its saccharide units of the galacto-oligosaccharides as galactose units, and at least fructo-oligosaccharides, and (b) at least one *Bifidobacterium* selected from the group consisting of *B. Longum*, *B. Breve*, *B. infantis*, *B. catenulatum*, *B. pseudocatenulatum*, *B. adolescentis*, *B. animalis*, *B. gallicum*, *B. lactis* and *B. Bifidum*

20 It was further found that the intestinal flora of infants delivered via caesarean section have a lower content of *Bifidobacteria* compared to the intestinal flora of infants delivered vaginally. Additionally it was found that the intestinal flora of infants born via caesarean section has a high content of (undesirable) *Escherichia coli* 6 weeks after delivery.

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The present inventors have found that these deficiencies in the intestinal flora of infants can be overcome by the administration of non-digestible oligosaccharides to the infant born via caesarean section, preferably included in the nutrition of the infant born via caesarean section. Particularly, it was found that the administration of non-digestible
 30 oligosaccharides resulted in an increased content of bifidobacteriam in infants delivered

via caesarean section, and also reduces *E.coli* content. Overcoming such deficiencies results in improved health and prevents and/or treats a variety of disorders.

A healthy and fully developed gastrointestinal flora has important physiological effects.

- 5 One important aspect is that it reduces the occurrence of (gastrointestinal) infections. Because infants delivered via a caesarean section lack a healthy flora, preventing infection is particularly important for these infants. These infants are normally delivered in a hospital environment, which is a risk for pathogenic infection due to the occurrence of nosocomial bacteria. Additionally, the impaired development of a healthy intestinal
- 10 flora results in faster colonization of pathogenic bacteria compared to a situation where the infants intestinal tract is inoculated by maternal bacteria.

The present disclosure particularly aims to decrease the number and severity of (gastrointestinal) infections in infants born via caesarean section, by (i) stimulating the growth of beneficial bacteria, preferably lactic acid producing bacteria, (ii) decreasing the growth of pathogenic bacteria; and/or (iii) decreasing the adhesion of pathogenic bacteria to the intestinal epithelial cells and/or intestinal mucus.

The present inventors have found that (gastrointestinal) infections can be prevented and treated by non-digestible oligosaccharides, particularly galacto-oligosaccharides. The present non-digestible oligosaccharides are suitable for enteral (particularly oral) administration, making it easy to include these in infant milk formula. The present non-digestible oligosaccharide reduces the occurrence of the infections, as well as reduces the severity of infections due to reduction of intestinal concentrations of pathogens particularly *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus haemolyticus*, *Streptococcus*, *Clostridium difficile*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, *Enterobacter*, *Klebsiella*, *Acinetobacter*, *Proteus*, *Aeromonas*, and *Escherichia coli*.

The occurrence and severity of infection in infants delivered via caesarean section can be even further reduced by providing a mixture of at least two non-digestible oligosaccharides differing in structure and/or degree of polymerization (DP), and even further by providing in addition to a non-digestible neutral oligosaccharide an acidic oligosaccharide, particularly uronic acid oligosaccharide. A mixture of non-digestible oligosaccharides differing in structure and/or DP synergistically stimulates the development of a healthy gastrointestinal flora. Galacto-oligosaccharides, and/or fructo-oligosaccharides are particularly suitable as these were found to stimulate the growth of *B. longum*, *B. breve* and/or *B. infantis* (Example 2). Uronic acid oligosaccharides prevent adhesion of pathogenic bacteria to the intestinal wall, thereby further preventing and/or treating infections caused by pathogens.

Claims

1. Use of a composition in the manufacture of a medicament for stimulating the development of a healthy intestinal flora and/or decreasing the occurrence of intestinal pathogens in infants delivered via caesarean section within 3 months of birth, wherein the composition is not human milk and wherein the composition comprises:

(a) non-digestible galacto-oligosaccharides having at least 50% of its saccharide units of the galacto-oligosaccharides as galactose units, and at least fructo-oligosaccharides, and

(b) at least one *Bifidobacterium* selected from the group consisting of *B. Longum*, *B. Breve*, *B. infantis*, *B. catenulatum*, *B. pseudocatenulatum*, *B. adolescentis*, *B. animalis*, *B. gallicum*, *B. lactis* and *B. Bifidum*.

2. Use according to claim 1, wherein the fructo-oligosaccharides comprise inulins.

3. Use according to any one of claims 1 - 2, wherein the composition comprises a lipid component, a protein component and a carbohydrate component, wherein said lipid component provides 5 to 50% of the total calories, said protein component provides 5 to 50% of the total calories, said carbohydrate component provides 15 to 90% of the total calories.

4. Use according to any one of claims 1 - 3, wherein the composition comprises at least *B. Longum* and/or *B. Breve*.

5. Use according to any one of claims 1 - 4, wherein the composition comprises at least two *Bifidobacteria* selected from the group consisting of *B. Longum*, *B. Breve*, *B. infantis*, *B. catenulatum*, *B. pseudocatenulatum*, *B. adolescentis*, *B. animalis*, *B. gallicum*, *B. lactis* and *B. Bifidum*.

6. Use according to any one of claims 1 - 5, wherein the composition comprises long chain polyunsaturated fatty acids and/or nucleotides.

7. Use according to any one of claims 1 - 6, wherein the composition is to be administered to the infant within one week after birth, preferably within 100 hours after birth.