

HUMAN BIOTA is characterised by containing: a selection of scientifically proven probiotic strains of human origin, together with complementary prebiotics of natural origin. It represents the evolution of probiotic supplementation and is an ideal product for restoring healthy gut flora after illness or antibiotic use.

Each HUMAN BIOTA capsule contains over 42 billion live cells from 12 beneficial strains of human origin. Although the origin of a probiotic strain is not the sole criterion for efficacy, strains of human origin exhibit the ability to colonise at multiple sites in the gastrointestinal tract.

The activity of the strains helps to boost immune function, disease resistance, optimal digestion and absorption of nutrients, improved vitamin synthesis, better lactose tolerance, and improved gastrointestinal transit.

The GPS™ enteric coating of the capsule protects the product from gastric juices and ensures 100% potency.

**Ingredients:** Potato starch, bacterial culture (42 billion live active healthy cells per capsule; see nutritional information), inulin (from chicory root, *Cichorium intybus*), arabinogalactan (from *Larix laricina*), antioxidant (l-ascorbic acid), anticaking agent (magnesium salts of fatty acids), GPS™ enteric-coated vegetable capsule (glazing agent: hydroxypropylmethylcellulose; aqueous enteric-coating solution; purified water).

#### Nutritional information:

#### 1 enteric capsules (640 mg)

<i>Lactobacillus rhamnosus</i> UB5115	31,5 billion CFU
<i>Lactobacillus casei</i> UB1499	8,324 billion CFU
<i>Lactobacillus acidophilus</i> UB5997	1,680 billion CFU
<i>Bifidobacterium infantis</i> UB9214	105 million CFU
<i>Bifidobacterium lactis</i> UB3963	105 million CFU
<i>Bifidobacterium bifidum</i> UB4280	42 million CFU
<i>Bifidobacterium breve</i> UB8674	42 million CFU
<i>Bifidobacterium longum</i> UB7691	42 million CFU
<i>Lactobacillus crispatus</i> UB4719	42 million CFU
<i>Lactobacillus gasseri</i> UB8141	42 million CFU
<i>Lactobacillus acidophilus</i> LA-14	37,8 million CFU
<i>Lactobacillus rhamnosus</i> GG	37,8 million CFU
Inulin	15 mg
Arabinogalactan	15 mg

CFU: Colony-Forming Unit Cells

The enteric coating GPS™ protects capsule contents from stomach acids and delivers 100% potency to the intestines.

#### Size and format:

30 enteric-coated vegetable capsules

#### Recommended daily dose:

1 capsule daily. If you are taking antibiotics, take this product at least 2-3 hours before or after taking them.

Do not exceed the stated recommended daily dose.

Store preferably refrigerated.

#### Indications and uses:

- Helps restore mucosal barrier integrity and function
- To help repopulate the flora of the entire intestinal tract.
- To strengthen the immune system after illnesses.
- To prevent and overcome antibiotic-associated diarrhoea
- To promote long-term general well-being.

#### Cautions:

Consult a health-care practitioner before using if you have fever, vomiting, bloody diarrhoea, or severe abdominal pain; or if you have a special medical condition, or if you have an immune-compromised condition (e.g. AIDS, lymphoma). Discontinue use if symptoms of digestive upset persist beyond 3 days.

The seven species of *LACOBACILLUS* in our formula support the digestive process by focusing on breaking down and absorbing nutrients. While eating the right foods is important, having an adequate and diverse spectrum of probiotic species provides many health benefits. The *Lactobacillus* species release and intensify functional ingredients and vitamins in foods, while also producing B vitamins and vitamin K. Furthermore, as their name suggests, they break down the lactose present in milk, which is found in many foods and can cause problems ranging from mild intestinal discomfort to food intolerance.

**LACTOBACILLUS RHAMNOSUS:** it contains two beneficial human strains belonging to this species: UB5115 and GG.

It is one of the most widely researched probiotic species due to its tolerance to acidic conditions. This product contains more than 3,5 billion colony-forming units (CFU) from this species. It colonises in the gut membranes and offers numerous health benefits: it increases lactic acid production, actively suppressing the growth of harmful bacteria such as *Salmonella* <sup>(1)</sup>, and it is effective in preventing antibiotic-associated diarrhoea <sup>(2)</sup> and *Clostridium difficile*-associated diarrhoea <sup>(3)</sup>. It strengthens the immune system and is a good adjuvant for the influenza vaccine <sup>(4)</sup>. It improves intestinal barrier function for the relief of autoimmune diseases such as arthritis <sup>(5)</sup> and allergies <sup>(6)</sup>. It improves the blood lipid profile <sup>(7)</sup> and reduces cholesterol <sup>(8)</sup>. It may prevent or relieve symptoms of postpartum depression and anxiety <sup>(9)</sup>, regenerate the vaginal flora in women by reducing colonisation by oral bacteria and fungi <sup>(10)</sup>, and may reduce the prevalence of gestational diabetes mellitus <sup>(11)</sup>. In children, it reduces the frequency and duration of diarrhoea and vomiting <sup>(12)</sup>, rotavirus diarrhoea <sup>(13)</sup>, and antibiotic-associated diarrhoea <sup>(14)</sup>. It reduces the incidence of atopic dermatitis <sup>(15-16)</sup>. Drinking milk supplemented with *L. rhamnosus* reduces the risk of tooth decay in children <sup>(17)</sup>.

*L. rhamnosus* GG strain: one of the most studied probiotic strains in the world. Its benefit has been described in infant diarrhoea <sup>(18)</sup>, respiratory infections <sup>(19)</sup>, antibiotic-associated diarrhoea <sup>(20)</sup>, infectious diarrhoea associated with *Clostridium difficile* <sup>(21)</sup>, inflammatory bowel diseases such as Irritable Bowel Syndrome <sup>(22)</sup>, improves gastrointestinal function after pancreatic surgery <sup>(23)</sup>.

**LACTOBACILLUS CASEI:** this product contains the UB1499 human strain. It reduces the duration and incidence of infections such as bronchitis, pneumonia and rhinopharyngitis <sup>(24-26)</sup>. Regarding intestinal infections, it boosts immunity against bacterial infections (e.g., *E. coli*) and viral infections (e.g., influenza vaccinations) <sup>(27-30)</sup>. In children, it improves allergic rhinitis symptoms <sup>(31)</sup>, helps to eradicate *H. pylori* in combination with antibiotic therapy <sup>(32)</sup>, is effective against viral diarrhoea <sup>(33)</sup>, and improves the general incidence of infections <sup>(34)</sup>.

**LACTOBACILLUS ACIDOPHILUS:** this product contains the UB5997 and LA-14 human strains. It improves the general symptoms of patients with Irritable Bowel Syndrome <sup>(35)</sup>. It helps to maintain an acidic environment in the intestinal tract by preventing the growth of harmful bacteria and reduces antibiotic-associated diarrhoea <sup>(36)</sup>. It reduces total plasma cholesterol and low-density lipoprotein (LDL) cholesterol <sup>(37-38)</sup>. It helps to improve digestive health by maintaining the intestinal barrier, restoring intestinal flora, improving digestion, boosting the immune system, and supporting beneficial bacteria that thrive in the colon <sup>(39)</sup>. It helps to improve symptoms of allergic rhinitis <sup>(40)</sup>, hay fever <sup>(41)</sup>, and atopic dermatitis <sup>(42)</sup>. When used in combination with *B. bifidum*, it reduces the incidence of radiotherapy-induced diarrhoea in cervical cancer patients <sup>(46)</sup>.

*L. acidophilus* LA-14 strain: is well known for its effects on proper vaginal health. After one week of oral consumption they colonise the vagina <sup>(44)</sup>. It also has microbicidal activity against various pathogens responsible for bacterial vaginosis and aerobic vaginitis <sup>(45)</sup>. Preliminary studies also indicate that it may promote kidney health <sup>(46)</sup>. Its effect on immunity by increasing IgG levels has also been studied <sup>(47)</sup>. In addition, this strain has been found to be resistant to a number of antimicrobials and to produce a bacteriocin with antimicrobial activity against *Listeria monocytogenes* <sup>(48)</sup>. A recent study reveals that it may have benefits in the prevention of liver damage <sup>(49)</sup>.

**LACTOBACILLUS CRISPATUS:** this product contains the human strain UB4719. Numerous studies have shown its considerable potential for maintaining the health of the female reproductive system, helping to prevent recurrent urinary tract infections, as well as bacterial vaginosis and candidiasis <sup>(50-52)</sup>. It is also capable of modulating the immune system <sup>(53)</sup>, reducing allergic symptoms in mice <sup>(54)</sup>.

**LACTOBACILLUS GASSERI:** this product contains the human strain UB8141. It improves functional dyspepsia by improving the gastric microbiota and helping to suppress *Helicobacter pylori* in the stomach <sup>(55)</sup>. It is also a predominant species in the vaginal flora, inhibits the adherence of pathogenic bacteria and helps prevent and treat bacterial vaginosis <sup>(56)</sup>. It has antimicrobial activity through the production of bacteriocins <sup>(57-58)</sup>, improves symptoms such as diarrhoea in Irritable Bowel Syndrome <sup>(59-60)</sup>, helps strengthen the immune system <sup>(61)</sup> and may help regulate allergic response <sup>(62)</sup>. In recent years, its effect on weight control has been studied. It has reducing effects on abdominal adiposity, body weight and other measures of obesity, helping to regulate blood lipids (triglycerides, cholesterol), suggesting its beneficial influence on metabolic disorders <sup>(63-65)</sup>.

The five strains of *BIFIDOBACTERIUM* in the HUMAN BIOTA are the dominant species within the large intestine (colon) of healthy individuals. They are among the first probiotics that we are exposed to at birth, which attach to the mucosal lining of the colon to establish a strong immune system. Strengthening their numbers further enhances the body's resistance to disease, including common cold and flu viruses.

**BIFIDOBACTERIUM LONGUM:** this product contains the human strain UB7691. A protein factor produced by *B. longum* inhibits the adhesion of the enterotoxigenic strain of *Escherichia coli* <sup>(66)</sup>. It has anti-inflammatory properties and is indicated for gastrointestinal complaints such as ulcerative colitis <sup>(67)</sup>, antibiotic-associated diarrhoea <sup>(68-69)</sup>, Irritable Bowel Syndrome <sup>(70)</sup>, and seasonal allergies <sup>(71-72)</sup>. It aids the formation of lactic acid and formic acid, lowering the pH of the intestines and preventing the proliferation of harmful bacteria <sup>(73)</sup>. It is also a significant producer of B vitamins <sup>(74)</sup>.

**BIFIDOBACTERIUM INFANTIS:** this product contains the human strain UB9214. It is the dominant probiotic inhabiting the distal part of the small intestine and colon. It is one of the first species to colonise the infant intestinal tract <sup>(75)</sup> and is critical in adults for intestinal health and immune system function <sup>(76)</sup>. It is extremely good at surviving stomach and bile acids <sup>(77)</sup> and is generally able to adhere to intestinal tissues <sup>(78)</sup>. It produces acetic acid and inhibits pathogenic bacteria <sup>(79)</sup>. It produces bacteriocins, which act against *Salmonella*, *Shigella*, and *E. coli* <sup>(80-81)</sup>. It relieves many symptoms of Irritable Bowel Syndrome (e.g., pain, bloating), normalises bowel movements, and regulates the IL-10/IL-12 ratio <sup>(82-84)</sup>. It reduces systemic pro-inflammatory biomarkers in chronic inflammatory diseases such as ulcerative colitis, chronic fatigue syndrome, and psoriasis, demonstrating that the immunomodulatory effects of microbiota are not limited to the mucosa but encompass the systemic immune system <sup>(85)</sup>. It can alleviate symptoms of untreated coeliac disease <sup>(86)</sup>.

**BIFIDOBACTERIUM BIFIDUM:** this product contains the human strain UB4280. They are found in the mucosal lining of the last part of the small intestine and are the predominant strains that colonise the large intestine and support bowel health, hygiene, and functionality. They reduce serum cholesterol and dissolve bile salts <sup>(87-88)</sup>. *B. bifidum* also provides antibacterial activity against *Helicobacter pylori* <sup>(89-90)</sup>, reduces apoptosis in the intestinal epithelium of children with necrotising enterocolitis <sup>(91)</sup>, regulates the immune system response <sup>(92-94)</sup>, reduces the duration and severity of colds <sup>(93)</sup>, provides anti-inflammatory activity in chronic diseases of the large intestine (e.g., irritable bowel syndrome) <sup>(95-96)</sup>, and reduces the incidence of radiotherapy-induced diarrhoea associated in cervical cancer patients <sup>(97)</sup>.

**BIFIDOBACTERIUM BREVE:** this product contains the human strain UB8674. It maintains colonic homeostasis by reducing inflammation through induction of intestinal IL-10 producing Tr1 cells <sup>(98)</sup>. It protects colon function, relieves constipation, and reduces gas, bloating, and diarrhoea <sup>(98-99)</sup>. It improves ulcerative colitis symptoms <sup>(100)</sup>. In addition, it stimulates the immune system <sup>(99, 101)</sup>, inhibits *Escherichia coli* <sup>(102)</sup>, and suppresses the *Candida* fungus <sup>(103)</sup>. It reduces fat, liver function, and systemic inflammation in people prone to obesity <sup>(104)</sup>. In neonates, it improves gastrointestinal problems by stabilising the intestinal flora <sup>(105)</sup> and reduces the incidence of necrotising enterocolitis <sup>(106)</sup>. In children with coeliac disease, it reduces the pro-inflammatory cytokine TNF-alpha <sup>(107)</sup>. It improves adverse effects in chemotherapy patients, such as fever, infections, and intestinal disorders <sup>(108)</sup>.

**BIFIDOBACTERIUM LACTIS:** this product contains the human strain UB3963. It has an immunoregulatory effect, mitigating allergic rhinitis <sup>(109)</sup>, strengthens the immune system <sup>(110-112)</sup>, it can help prevent eczema in children <sup>(113)</sup>, improve symptoms of the Irritable Bowel Syndrome <sup>(114)</sup>, can help with dental health <sup>(115)</sup>, intestinal transit <sup>(116)</sup> and in children it helps balance the intestinal flora <sup>(117)</sup>, strengthen the immune response in newborns <sup>(118)</sup> and to reduce the symptoms of acute diarrhoea <sup>(119)</sup>. It can also help regulate lipids and inflammation in patients with metabolic syndrome and obesity <sup>(120-121)</sup>.

**INULIN:** It is a fructooligosaccharide (FOS) of plant origin, extracted from the root of chicory (*Cichorium intybus*). It acts as a prebiotic, creating the right environment for probiotics or beneficial microorganisms to reproduce faster and in greater numbers <sup>(122-124)</sup>. It increases the population of *Bifidobacterium* probiotics in the colon and reduces toxic metabolites and harmful enzymes. It prevents pathogenic and autogenous diarrhoea and constipation and protects liver function <sup>(125)</sup>.

**ARABINOGALACTAN:** It is an arabino-oligosaccharide (AOS) of plant origin from the larch tree (*Larix laricina*). It is an excellent prebiotic that increases the production of short-chain fatty acids (mainly butyrate), which acts as an energy substrate for the epithelial cells of the colon and protects the intestinal mucosa. It activates the immune response and selectively stimulates the growth and activity of probiotic bacteria <sup>(126)</sup>. It is useful in fighting infections due to its ability to decrease bacterial adherence <sup>(127-128)</sup>. In addition, it lowers the intestinal pH and improves mineral absorption <sup>(128-131)</sup>.

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