

# Intestinal microbiota management on a scientific basis: Ecologic® probiotics

**W**inclove Bio Industries BV has developed an innovative range of probiotic food supplements called Ecologic®. Ecologic® stands for evidence-based designer probiotics, designed to manage the intestinal microbiota. The products are developed in collaboration with leading university hospitals to manage or prevent microbiota disturbances. This has led to six specific applications for Ecologic®; antibiotic-associated problems, traveller's diarrhoea, allergy, Inflammatory Bowel Disease (IBD), constipation and vaginal infections. All Ecologic® probiotics are characterized by an excellent two years stability at room temperature and survival of the gastrointestinal (GI)-tract. These multispecies evidence based designer probiotics, marketed on an exclusive co-branding collaboration basis, might be just what you are looking for.

## Intestinal microbiota management

Why is there a need to manage the microbiota? Is it not able to maintain a healthy balance by itself? Under natural conditions, a protective microbiota evolves and there is no need for a probiotic supplement to manage the intestinal microbiota. In a healthy situation a natural balance exists in the intestinal microbiota. The billions of bacteria present in the intestine are capable of processing our food, producing vitamins, protecting us from infections and supporting the immune system. In this ideal situation, the digestive system works properly and pathogens are unable to do much harm. However, the intestinal microbiota can become imbalanced. Several factors, such as stress, antibiotics, an erratic lifestyle, travelling or spoiled food can



disturb the balance. It has also been shown that humans live in relatively unnatural conditions which affect their intestinal microbiota. Most food for human consumption is processed and often even sterile. This affects the access to certain bacteria and thereby the colonization rate of these certain bacteria. The hygiene hypothesis even suggests that reduced exposure to microbial components early in life (via food or environmental factors) may be associated with an increased prevalence of allergic disease in children. A disturbed microbial balance can lead to complaints such as abdominal pain, constipation or diarrhoea. More severe ailments, such as allergy, IBD, Irritable Bowel Syndrome (IBS) and vaginal infections are also indirectly linked to an imbalance in the gut microbiota.

Disturbance can only be prevented or treated when it is properly managed. A solution to this can be the use of probiotics. Probiotics are defined by R. Fuller (1989) as 'live beneficial bacteria which affect the host by improving its intestinal microbial balance'. Probiotic bacteria are active on three levels inside the body (figure 1);

- microbe-microbe interactions (level one)
- microbe-gut epithelium interactions (level two)
- microbe-immune system interactions (level three).

At level one, probiotic bacteria are able to compete for nutrition and can produce antimicrobial substances against pathogenic species. At level two, probiotic bacteria are able to compete for

adhesion receptors with pathogenic bacteria and able to strengthen the barrier function of the gut barrier via several pathways. At level three, probiotic bacteria are able to stimulate the immune system to produce antibodies against pathogenic bacteria.

Not every probiotic bacterial strain is the same. One particular strain might be effective at level one, another might be effective at level two and yet another might only be effective at level three. Some are effective on all three levels. Besides this, not every ailment is the same. Allergy requires bacteria that are predominantly active on level three, where they repress the over-activated immune system, while traveller's diarrhoea requires bacteria that are predominantly active at level one, where they excrete antimicrobial substances against pathogenic bacteria causing the diarrhoea. This underlines the need for designer probiotics. Such probiotics consist of bacterial strains with qualities that are important for the particular ailment and which act at the appropriate level.

## Multispecies design: Ecologic®

Disturbance of the balance in the intestines can only be prevented or treated when it is properly managed. Ecologic® probiotics are designed for specific applications. For each application, specific strains are selected based on the in vitro characteristics of these strains. For example, bacterial strains which are capable in inhibiting *Clostridium subspecies* are selected for the prevention of antibiotic-associated diarrhoea. On the other hand, bacterial strains that are capable of balancing the immune system are selected for the prevention of the development of allergy. The strains are combined in one designer probiotic, making this probiotic specifically effective for its purpose. All Ecologic® probiotic products are multispecies probiotics, since research has shown that multispecies probiotics are more effective than monospecies or mono-strain probiotics.<sup>1</sup> Probiotic strains can show synergistic or additional effects and can thereby improve each other's chances of successful colonization. This enhances the efficacy of the probiotic.

Survival of bacteria throughout the intestine is also an important feature that determines the efficacy of the probiotics. The survival of bacteria of the Ecologic® products has been substantially tested and all products show an excellent survival of the GI-tract. Apart from survival, activity is an important factor that determines the efficacy of a probiotic. Ecologic® probiotics contain a special matrix which increases the survival rate and the activity of the bacteria inside the intestine. In addition, this matrix is specifically designed for the preservation of the product at room temperature. In other words, no refrigeration is needed to obtain stable and active probiotics.

All Ecologic® formulations are tested in several clinical studies performed in cooperation

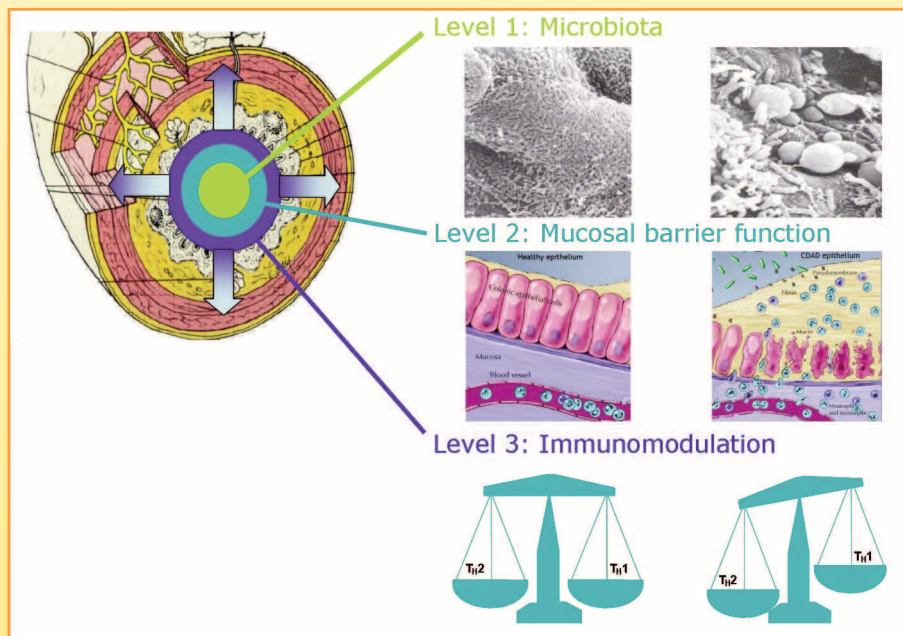


Figure 1: Mode of action of probiotics

Specific disease related formulations	
Product	Application
Ecologic® AAD	Reduces side effects of antibiotics
Ecologic® TRAVEL	Risk reduction travellers' diarrhoea
Ecologic® PANDA	Risk reduction eczema/allergy
Ecologic® 825	IBD patients
Ecologic® RELIEF	Reduces constipation
Ecologic® FEMI	Risk reduction vaginal infections (topical application)

Table 1: An overview of all Ecologic® applications

with (university) hospitals in different locations throughout Europe. We have formed multi-disciplinary projects on various intestinal microbiota related topics with university hospitals.

### What Ecologic® can do for you

At present, there are six Ecologic® probiotic formulations. Table 1 shows an overview of all currently developed and available Ecologic® products.

Antibiotics are lifesavers, but they also have a collateral effect: besides attacking pathogenic bacteria, they attack bacteria with a desired function. In the area of antibiotics and probiotics, Winlove has developed a specific formulation: **Ecologic® AAD**. It has been proven that up to 39% of all people using antibiotics develop antibiotic-associated diarrhoea (AAD).<sup>2</sup> Other related problems can include nausea, vomiting, IBS, and feebleness as a result of lower resistance. Ecologic® AAD has been proven to be effective for risk reduction of frequent and watery defecation (diarrhoea-like defecation pattern) in a probiotic group of healthy volunteers compared with the placebo group.<sup>3</sup> Moreover, the intestinal microbiota in the probiotic group remained more stable and this group experienced increased comfort.

One activity that might not immediately be identified as a cause of gastro-intestinal problems is travelling. Many people travelling to exotic destinations can be faced with negative essentials of their journey. Due to contaminated food and poor local hygiene, so called traveller's diarrhoea can occur. With an incidence rate of 20-50% this affects many travellers. Bacterial strains which have a strong effect on the inhibition of enterotoxigenic *Escherichia Coli* (and other common pathogens causing food infections) are selected and combined in a single powerful probiotic formulation called **Ecologic® Travel**. A study has been conducted with over 200 travelers. Preliminary results show that 42% of the travelers experience benefits from the use of Ecologic® Travel.

A major upcoming problem in the Western society is allergy. More babies are allergic, suffer from eczema and have a high risk of developing hay fever, asthma and/or food allergy later in life.

It is known that the immunological basis for the development of allergy is founded at a very young age and that atopic babies have a less diverse microbiota composition in comparison with healthy babies.<sup>4</sup> A potential new way to prevent the development of allergy might therefore be the early administration of specific probiotic strains. Winlove is a partner in the Probiotic and Allergy (Panda) project. The project focuses on the underlying mechanisms and the role of probiotics in the prevention of allergy. **Ecologic® Panda** has been specifically developed to prevent the development of allergy and atopic eczema in children. Results of the Panda project show that Ecologic® Panda is able to reduce the incidence of allergy after three months.<sup>5</sup>

IBD is a group of severe gastro-intestinal problems, including Ulcerative Colitis (UC), Crohn's Disease (CD) and pouchitis. IBD is mainly characterized by inflammation of the GI-tract, the cause of IBD is unknown. It is, however, believed that a disturbed microbiota plays an important role in both its development and persistence. For example, it has been proven that UC patients have a less diverse microbiota in comparison to healthy volunteers.<sup>6</sup> **Ecologic® 825** has been designed to rebalance the intestinal microbiota. A pilot study (n=60) shows that common symptoms such as diarrhoea, constipation, abdominal pain, cramps and bloating can be decreased by 65% within one month of probiotic use.<sup>7</sup>

One well known gastro-intestinal disorder is constipation. Many people suffer from constipation, but there are some high-risk groups for chronic constipation including the elderly, children and pregnant women. In children, chronic constipation can lead to depression and absence from school. Apart from painful stools and abdominal pain, children with constipation suffer from inconvenient faecal incontinence (dirty underwear). **Ecologic® Relief** consists of strains selected for their capacity to increase bowel movement and inhibit the pathogens that are present in increased levels in the intestinal microbiota of people with constipation. It has been shown that Ecologic® Relief is capable to increase the frequency of bowel movements per week and to decrease fecal incontinence

as well as abdominal pain.<sup>8</sup>

Besides gastro-intestinal applications of Ecologic®, there is one Ecologic® product specifically developed for topical application. It has been shown that women with an abnormal vaginal flora are at greater risk of developing vaginal infections. **Ecologic® FEMI** has been developed to enhance the natural vaginal microbiota by preventing or alleviating any imbalance in this flora. The formulation has been tested in a small pilot study. In total, 10 patients with proven recurrent vulvovaginal candidiasis were treated with Ecologic® Femi. Preliminary results show that 70% of the patients showed a significant improvement of the condition after treatment.

### Winlove Bio Industries- It's all about Biology

Winlove Bio Industries is the producer and owner of the Ecologic® brand. Winlove also develops broad spectrum tailor-made probiotics. Winlove's mission is to develop specific product concepts and services, in close cooperation with relevant research institutions, in order to achieve significant improvements in the health and quality of life, in both human and veterinary applications. Our research projects create an insight into the mechanisms and effectiveness of our probiotics. We utilize this knowledge and our research contacts for the sales support of our customers. Our sales support can include: lectures given by our scientists and research contacts, customer specific articles, and background information on mechanism of action, to name just a few. We provide technical services, packaging and registration assistance. We are now looking for the best partners to sell Ecologic® products on an exclusive co-branding basis in their home market.

### More information

Please visit our websites [www.winlove.com](http://www.winlove.com) for further information on our company and [www.ecologic.eu.com](http://www.ecologic.eu.com) for background information on all our products for both professionals and users. For sales and marketing information, please contact our global sales agent: Spencer Food, Ivor Hidding; [hidding@spencerfood.com](mailto:hidding@spencerfood.com).

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