



PROBIKEHL® -
The new Probiotic from SANUM-Kehlbeck

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In recent years there has been increasing recognition of the importance of micro-organisms in the maintenance of our health. Intestinal dysbioses are regarded as the cause of many metabolic and immunological diseases. It therefore follows that the preservation and restoration of an intact intestinal flora is critical for our health. Pre- and probiotics have been in use for years in order to support the intestinal flora and its immune system. In various controlled studies the efficacy of defined strains of Lactobacilli and Bifidobacteria in the prophylaxis and treatment of chronic, inflammatory, infectious and allergic diseases has been demonstrated (1).

By means of new results from microbial research, which verify the importance of the multiplicity of microbial strains for the organism, new challenges have been set for the composition of probiotics. Whilst the first generation of probiotics were predominantly preparations of single organisms, containing one bacterial strain, such as SANPROBI®, the second-generation probiotics are multi-bacterial preparations of various strains. As one advantage of multi-bacterial preparations, the synergistic effects of the various bacterial strains are discussed (3).

Against this background SANUM-Kehlbeck presents a new probiotic called PROBIKEHL®, as the successor to SANPROBI®. The nutritional supplement PROBIKEHL® is a multi-bacterial preparation, containing the following seven bacterial strains:

Lactobacillus plantarum W21, Lactobacillus acidophilus W22, Lactobacillus paracasei W20, Lactobacillus salivarius W24, Lactobacillus lactis W19, Bifidobacterium lactis W51, Bifidobacterium lactis W52.

The total number of germs in PROBIKEHL® is around 1×10^9 CFU/g powder. Apart from Lactobacillus lactis (not examined), these probiotics are acid and bile resistant.

These bacterial strains fulfil multiple tasks within the gastro-intestinal tract. In the literature their activity spectra are divided into three levels and thus summarised (Fig. 1):

Level 1: Bacteria – intestinal lumen (intestinal flora)

Level 2: Bacteria – intestinal epithelium (function as a barrier)

Level 3: Bacteria – hereditary/acquired immune system

The gastro-intestinal tract contains one of the largest lymphocyte populations, with more than 10^{10} immunoglobulin-producing cells, i.e. every sixth cell is a lymphocyte (4). An integration of the micro-organisms with these immune cells allows us to draw conclusions regarding the importance of this interaction for the entire organism.

Level 1: PROBIKEHL® - Inhibition of Pathogenic Germs in the Gut

Infectious processes are promoted by a dysbiosis of the intestinal flora and the associated disorder in the intestinal milieu. This dysbiosis is caused e.g. by the taking of antibiotics, and the consequence of it is that individual bacterial strains, and even several of them, can become pathogenic. In numerous studies it has been shown that giving probiotics, particularly lactobacilli, has a regulatory, anti-infectious action, so that some authors describe these

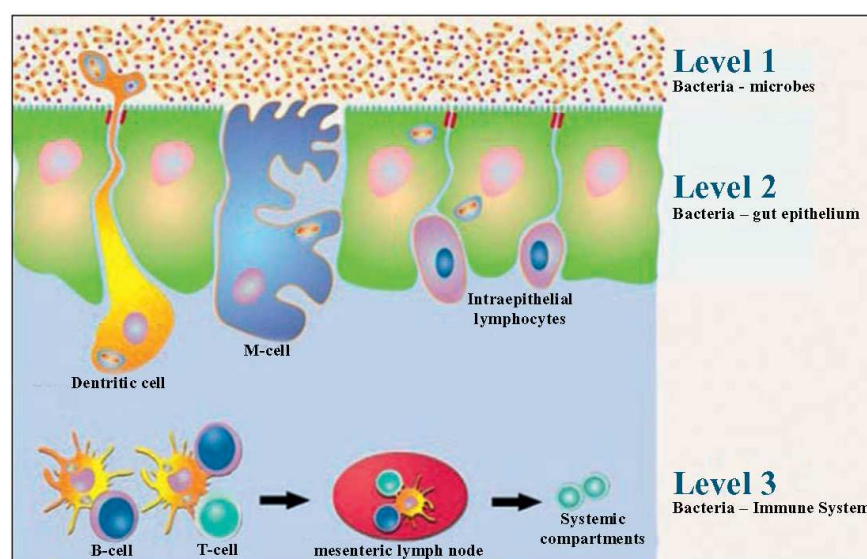


Fig. 1: Activities of probiotic bacterial strains in the gut (Source: Doctoral thesis by Harro M. Timmerman: „Multispecies Probiotics – Composition and Functionality“, 2005, Chapter 1, Page 13.).

bacteria as biotherapeutic, anti-infectious agents (2).

The seven germs contained in PROBIKEHL® likewise have an inhibiting action on the growth of pathogenic strains (Fig. 2). The inhibiting action of PROBIKEHL® bacteria on *Clostridium difficile* should be emphasised, as well as the associated reduction in its toxins (6).

Clostridium difficile is a highly virulent germ, which luxuriates in the gut, especially following a long course of antibiotics, resulting in inflammations of the gut with severe diarrhoea (8) (Fig. 3).

Level 2: PROBIKEHL® - Intestinal Epithelium

The intestinal mucosa is damaged by various diseases, and with it the barrier function of the epithelium (Leaky gut syndrome). The barrier function of the

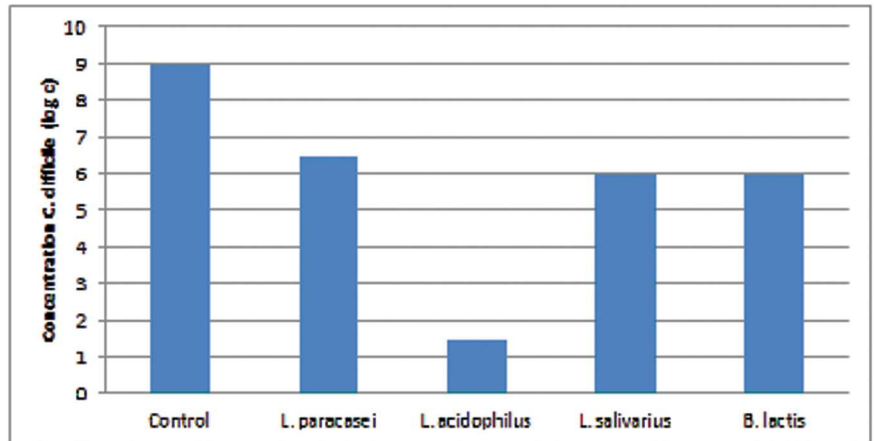


Fig. 3: Inhibition of growth of *Clostridium difficile* by PROBIKEHL® bacterial strains in vitro [Source: Firm's internal data].

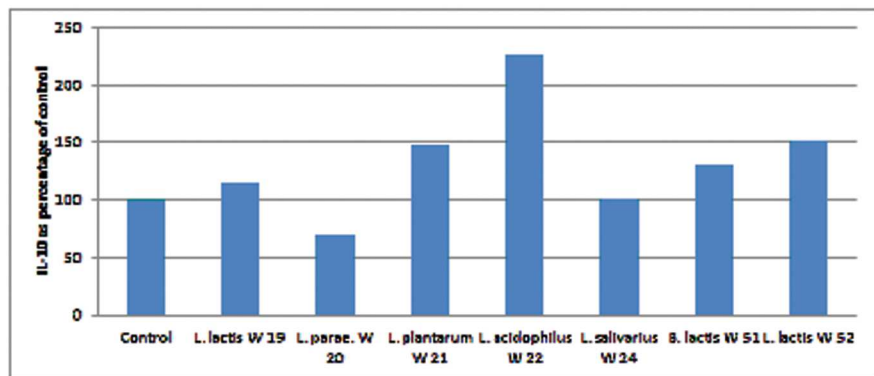


Fig. 4: IL-10 production of peripheral monocytes (peripheral mononuclear blood cells) after incubation with PROBIKEHL® bacterial strains in vitro [Source: Firm's internal data].

	<i>E. coli</i>	<i>E. faecalis</i>	<i>B. subtilis</i>	<i>Cl. perfringens</i>	<i>L. monocytogenes</i>	<i>S. typhimurium</i>	<i>S. aureus</i>
<i>B. lactis</i>	++	++	0	0	N/A	N/A	N/A
<i>B. lactis</i>	+	++	0	0	N/A	N/A	N/A
<i>L. acidophilus</i>	++	++	++	+	+	+	+++
<i>L. paracasei</i>	++	+++	++	+	N/A	N/A	N/A
<i>L. plantarum</i>	+++	+++	+++	++	++	++	N/A
<i>L. salivarius</i>	+++	+++	++	+	++	++	+++
<i>Lc. lactis</i>	+	0	+	0	N/A	N/A	N/A

Fig. 2: Inhibition of the growth of pathogenic germs by PROBIKEHL®. Bacterial strains in vitro. (+ = inhibition, 0 = no inhibition, N/A = no data). [Source: Firm's internal data].



intestinal epithelium can be measured (11) in an in vitro „Trans-epithelial electric resistance“ (TEER) examination model. It was demonstrated that damaged cells of the intestinal epithelium with increased permeability could be significantly improved under the influence of *L. salivarius* and *B. lactis*. Thus Leaky gut syndrome may be tackled.

Level 3: PROBIKEHL® - Immune System

The regulation of the immune system, especially that of the Th1/Th2 balance, takes place substantially via cytokines, e.g. IL-10, which has important functions in the intestinal tract. It is formed from monocytes for the regulation of anti-inflammatory processes. Therefore the influence of probiotics on the formation of cytokines was examined (5).

With regard to the germs contained in PROBIKEHL® it was possible to demonstrate a clear stimulation of IL-10 on peripheral monocytes, which provides an explanation of the action of probiotics on the immune system (7) (4) (Fig. 4).

PROBIKEHL® - Inulin and Fructo-Oligosaccharides (FOS)

As well as its probiotics, PROBIKEHL® contains the prebiotics Inulin and FOS, which means that it is included among the synbiotics. As easily soluble roughage of vegetable origin, Inulin and FOS regulate the intestinal activity and improve the

growth conditions of lactobacilli and bifidobacteria (9). Thus the activity and survival rate of the probiotic bacteria are increased.

PROBIKEHL® in SANUM Therapy

In SANUM therapy regulation of the milieu is of particular importance. Thus PROBIKEHL® represents an extension of the preparations offered for treatment of the milieu, particularly that of the intestinal tract. In allergic illnesses, Crohn's disease, irritable bowel syndrome and chronic inflammatory diseases of the gut, an altered intestinal milieu is, inter alia, due to a low complement of bifido- and lactobacilli.

Here PROBIKEHL® can contribute to a normalisation of the intestinal flora. In studies it has been demonstrated that multibacterial preparations alleviate symptoms of these diseases (10). PROBIKEHL® is employed as a single remedy, or also in combination with other therapeutic agents, such as the SANUM remedies. (See the SANUM therapy schemes for therapists at www.sanum.com).

PROBIKEHL® - Dosages

Adults and children over 12 years of age take 2-4 capsules a day. Children between the ages of 3 and 12 take 1-2 capsules a day. PROBIKEHL® may safely be taken during pregnancy and while breastfeeding. Moreover it is gluten- and lactose-free.

PROBIKEHL® - Summary

PROBIKEHL® is a second-generation multi-bacterial preparation and a successor to the mono-bacterial preparation SANPROBI®. The germs contained in PROBIKEHL® regulate the homeostasis of the intestinal flora. Their action is anti-infectious; they stabilise the barrier function of the gut and regulate the hereditary and humoral immune system. For these reasons it is suited to support the intestinal health, especially in infections, allergic illnesses, irritable bowel syndrome and chronic inflammatory diseases of the gut.

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First published in the German language in the SANUM-Post magazine (110/2015)

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