

Bio.Me Oral

A multi-strain probiotic developed for the improvement of oral health and prevention of gingivitis.

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It has been speculated for centuries that dental health can impact our whole being, but now research confirms the role that the oral microbiota can play in systemic health and disease¹. Additionally, periodontal diseases and dental caries are one of the most prevalent health problems worldwide^{2,3}. There is a missing piece in our oral health routine that respects the delicate balance of the oral microbiome for preventative measures.

Bio. Me Oral promotes a balanced oral microbiota, and thereby promotes general health. It should be part of any prophylactic or therapeutic oral health routine.

Bio.Me Oral Strain Selection

The nine specifically selected probiotic strains in Bio.Me Oral can exert health effects at different levels in the mouth. These strains have the capacity to:

- inhibit oral pathogens associated with development of gingivitis
- inhibit biofilm formation
- strengthen the immune system

Probiotic strain	Inhibition of biofilm	Stimulation of immune system (IL-10 production)	Inhibition of oral pathogens			
			Aa	Fn	Pg	Pi
B.bifidum W23		+		+	+	+
B.breve W25	+	+		+		+
B.lactis W51	+			+	+/–	
E.faecium W54	+/–		+	+	+	
L.plantarum W21	+			+/–	+/–	
L.rhamnosus W71	+	+/–		+	+	+
L.salivarius W24	+		+	+	+	+
L.salivarius W57	+/–	+	+	+	+	+
S.thermophilus W69		+	+	+	+	+/–

Table 1: Selection criteria. *Aggregatibacter actinomycetemcomitans* (Aa), *Fusobacterium nucleatum* (Fn), *Porphyromonas gingivalis* (Pg), *Prevotella intermedia* (Pi)

Nutritional Information		Per Dose
Actives		1g (0.5 tsp)
Winclove Smile Probiotic		2.5 billion CFU
Bifidobacterium bifidum W23, Bifidobacterium breve W25, Bifidobacterium lactis W51, Enterococcus faecium W54, Lactobacillus plantarum W21, Lactobacillus rhamnosus W71, Lactobacillus salivarius W24, Lactobacillus salivarius W57, Streptococcus thermophilus W69		
Other Ingredients: Maize starch, Maltodextrin, Hydrolysed rice protein.		

The Oral Microbiome

The mouth is one of the most heavily colonised parts of our bodies, harbouring an estimated 600+ different bacterial species⁴. A balanced oral microbiota protects the mouth from infections and contributes to the maintenance of oral health⁵. However, the oral microbiota can be easily disturbed by factors such as poor oral hygiene, dietary habits, smoking, immunodeficiency, and aging^{6,7,8}. These disturbances can cause dental caries and periodontal diseases, such as gingivitis and in more severe cases periodontitis (gum disease)⁹. Furthermore, an association has been found between the composition of the oral microbiota and systemic disease, such as cardiovascular disease and pregnancy complications^{10,11}.

Oral diseases start with the growth of dental plaque, a biofilm formed by the accumulation of bacteria and their toxins together with saliva⁹. Current treatment of plaque and oral diseases involve mouthwashes and professional teeth cleaning, and in more advanced cases, antibiotics or surgery⁴. However, with ever increasing antibiotic resistance and their unwanted side effects such as antibiotic-associated diarrhoea, there is an increased need for novel therapies that do not involve conventional antimicrobial agents.

Probiotics have therapeutic potential in the management of caries and periodontal diseases, since they prevent dysbiosis by inhibiting growth of periodontal pathogens and modulating disease-associated inflammatory pathways. Several meta-analyses have found significant effectiveness for the use of probiotics in the management of oral health and gingivitis^{12,13}.

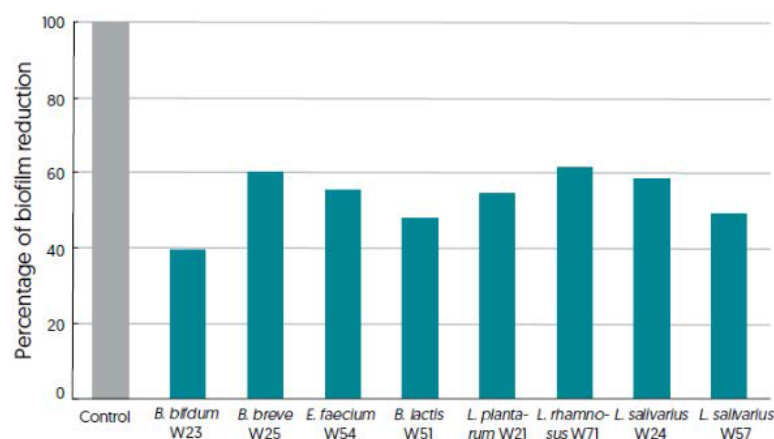
Evidence

In vitro strengthening of the immune system

Besides a more direct effect of probiotics on development of biofilms, probiotic strains can also inhibit the development of gingivitis by modulating the immune system. A screening was performed for the probiotic strains in Bio.Me Oral for their capacity to induce IL-10, an anti-inflammatory cytokine. Several strains showed a stimulating effect on IL-10 production, and these effects are strain-specific.

In vitro inhibition of pathogens

Another selection criterion for the bacteria of Bio.Me Oral is their ability to inhibit pathogens associated with development of gingivitis, these include: *Aggregatibacter actinomycetemcomitans* (Aa), *Fusobacterium nucleatum* (Fn), *Porphyromonas gingivalis* (Pg) and *Prevotella intermedia* (Pi). The effect of the probiotic strains in inhibiting growth of these pathogens was tested *in vitro*. Graph 1 shows the inhibitory effects of the strains.



Graph 1: Biofilm inhibition

In vitro inhibition of biofilm formation

An important virulent factor in oral health is the formation of biofilms, also known as (dental) plaque. The effects of the probiotic strains in Bio.Me Oral on biofilm formation were tested *in vitro* in a model with antibiotic vancomycin resistant *Enterococcus faecium*. The results show that biofilm formation of *E. faecium* was strain-specifically modulated. Nevertheless, supernatants of all probiotic strains had a diminishing effect on biofilm formation and showed a reduction between 37% – 62%. See graph 1.

References on request.

References

1. Scannapieco FA, The Oral Microbiome: Its Role in Health and in Oral and Systemic Infections, Clinical Microbiology Newsletter, 2013; 35:20, 163-179
2. Iheozor-Ejiofor Z, et al. Water fluoridation for the prevention of dental caries. Cochrane Database Syst Rev. 2015;6:CD010856.
3. Dye BA. Global periodontal disease epidemiology. Periodontol 2000. 2012;58:10-25.
4. Paster BJ, et al. Bacterial diversity in human subgingival plaque. Journal of bacteriology 2001;183:3770-83.
5. Devine DA, et al. Prospects for the development of probiotics and prebiotics for oral applications. Journal of Oral Microbiology 2009;1:1.
6. Laleman I, et al. Probiotics reduce mutans streptococci counts in humans: a systematic review and meta-analysis. Clin Oral Inves-
tig. 2014;18:1539-52.
7. Hasslöf P, et al. Early intervention with probiotic Lactobacillus paracasei F19 has no long-term effect on caries experience. Caries
Res. 2013;47:559-65.
8. Killian M, et al. The oral microbiome – an update for oral healthcare professionals. Br Dent J. 2016;221(10):657-666.
9. Marsh PD. Dental plaque as a biofilm and a microbial community – implications for health and disease. BMC Oral Health 2006;6
Suppl 1:S14.
10. Beck JD, et al. Systemic effects of periodontitis: epidemiology of periodontal disease and cardiovascular disease. J Periodontol
2005;76:2089-100.
11. Xiong X, et al. Periodontal disease and adverse pregnancy outcomes: a systematic review. Brit J Obstet Gynaecol 2006;113:135-43.
12. Martin-Cabezas R, et al. Clinical efficacy of probiotics as an adjunctive therapy to non-surgical periodontal treatment of chronic
periodontitis: a systematic review and meta-analysis. J Clin Peri- odontol. 2016;43(6):520-30.
13. Gruner D, et al. Probiotics for managing caries and periodontitis: systematic review and meta-analysis. J Dent. 2016;48:16- 25.