



# Oral Probiotics: For A Healthy Mouth and Body

## What are oral probiotics? ...

Oral probiotics are strains of bacteria that are good for your oral health. These bacteria could colonize in your mouth and help maintain a healthy pH level and balanced oral microbiome.

## How do these oral probiotics work? ...

- ① Binding to dental surfaces
- ② Alteration of environment conditions of the mouth
- ③ Modulation of oral biofilm functions
- ④ Production of antimicrobial substances against oral pathogens
- ⑤ Enhancing oral epithelium barrier functions
- ⑥ Reduction of pathogen induced inflammatory response and tissue damage

## Why use probiotics in oral health? ...

Probiotics have broad inhibitory activity against dental caries, gingivitis and periodontal disease associated pathogens, such as *S.mutans*, *P.gingivalis*, and *A.viscosus*. Administration of probiotic supplements may reduce the use of antibiotics, hence lowering the risk of antibiotic resistance in oral pathogens.



### Great Safety

Less safety concerns



### Broad-inhibitory

Against oral pathogens  
direct or indirect



### Long-Term Efficacy

Maintain oral microecological  
homeostasis



### Formulation Flexibility

Capsule, tablet,  
toothpaste, liquid

## Oral Health Probiotics

- ✓ *W.coagulans* PB-BC02
- ✓ *L.fermentum* HH-LF392
- ✓ *L.paracasei* HH-LP58
- ✓ *L.johnsonii* LBJ 456®

## Probiotics in Dental Caries

Dental caries and dental plaque are caused by a mixture of acid-producing bacteria, especially *S.mutans*, which colonizes the dental surface and causes damage to the hard tooth structure. Previous studies showed that both cell suspension of *W.coagulans* PB-BC02 and *Lactobacillus* supernatants (*L.fermentum* HH-LF392 and *L.paracasei* HH-LP58) could inhibit *S.mutans* growth and biofilm formation.

Fig 1. Inhibitory effect of probiotics on *S.mutans*

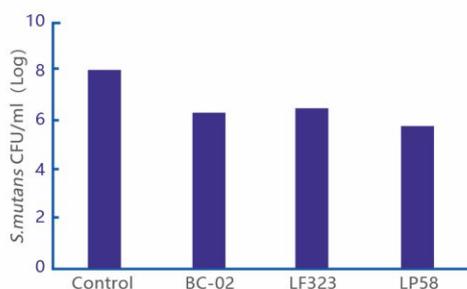


Table 1. Inhibitory effect of probiotics on *S.mutans* biofilm

Absorbance	Control	PB-BC02	LF323	LP58
OD 540nm	4	1.5	1.8	1.1

## Probiotics in Periodontitis

Periodontitis is a complex infectious disease associated with inflammation and the loss of periodontal attachment and bone support. *A.actinomycetemcomitans*, *F.nucleatum*, and *P.gingivalis* are the most important periodontal pathogens. Previous studies showed that probiotics suspensions (*L.rhamnosus* PB-LR76, *L.casei* PB-LC39, *L.fermentum* HH-LF392, *L.johnsonii* LBJ 456®) could inhibit the growth of such pathogens and reduce *P.gingivalis*-induced inflammation.

Table 2. Inhibitory effect of probiotics on periodontal pathogens

Pathogens	Inhibition zone(diameter, mm)		
	PB-LR76	PB-LC39	HH-LF392
<i>P.gingivalis</i>	17±2	15±1	17±1
<i>F.nucleatum</i>	13±1	17±1	17±2
<i>A.actinomycetemcomitans</i>	32±0	26±2	31±0

Table 3. Effects of LBJ 456® on gingival epithelial cell IL-6 level(ppm)

	2H	6H	24H
Control	19.588±2.588	15.397±2.386	23.105±5.585
LBJ456®	14.105±2.019	16.669±3.159	17.805±1.548
<i>P.gingivalis</i>	101.151±4.977	190.522±24.108	581.334±64.373
LBJ456®+ <i>P.gingivalis</i>	19.808±3.446	15.366±2.854	16.172±1.231

## Probiotics in Halitosis

Most halitosis has an oral origin. The causative agents of halitosis are volatile sulphur compounds (VSCs), such as  $H_2S$ ,  $CH_3SH$ , and  $(CH_3)_2S$ . Previous study found that compound probiotics (PB-BC02, LBJ456®, PB-LR76, HH-LF392) could reduce VSCs concentration in mouth air.

Table 4. VSCs concentrations(ng/10 mL mouth air)

VSCs	Probiotics		Placebo	
	0 day	14 days	0 day	14 days
$H_2S$	4.71	1.50	4.80	2.66
$CH_3SH$	1.69	0.75	1.88	1.31
$(CH_3)_2S$	1.14	0.68	1.27	0.81

## Wide Applications

**Nutraceuticals:** Capsule, chewable tablet, chewing gum, powder

**Personal Care:** toothpaste, mouthwash

## Product Quality

