

Protection/Restoring the Oral Microbiome against glucose

Background

The oral microbiome is a strong and diverse community of 700 different species. When the oral microbiota is in balance, the teeth and gums are protected. In that case, bacteria responsible for:

- Caries – Cariogenic bacteria
- Tooth decay – Periodontitis
- Sensitive gums – Gingivitis

have no chance to grow and perform their destructive work.

A balanced oral microbiota also prevents bad breath because bacteria producing bad smell molecules are suppressed.

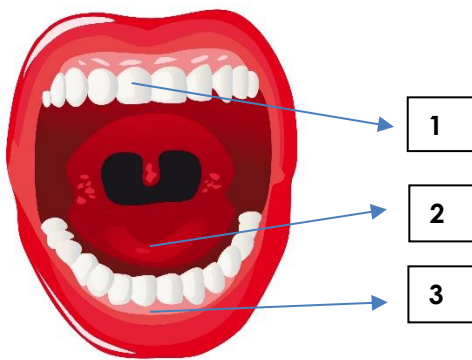
The main protective bacterium is *Streptococcus salivarius*. This bacterium has anti-microbial peptides against almost all pathogenic microorganisms.

Very few things can disturb the oral microbiota including:

- Fermentable sugars such as glucose, Fructose, Sucrose
- Anti-microbial agents such as alcohol

Scope of the test

This test demonstrates the support of preBIULIN ORAL to the oral microbiome after it has been challenged with glucose. Glucose favours the growth of cariogenic bacteria and disturbs the oral microbiome.

Test Laboratoria	S&C Laboratory (PL) BASECLEAR (NL)
Test period	2019
Test area	 <p>1 – Teeth 2 – Tongue 3 – Gum</p>
Application	20 g of the test product is used
Design of the study	<p>3 hours before the test and during the test the volunteers didn't eat or drink anything. Only water was allowed.</p> <p>All volunteers had healthy teeth, and gums and they had no bad breath problems.</p> <p>Before the treatment, the oral microbiota was collected with DNA swabs.</p>

	<p>The oral cavity was rinsed with a 50% glucose solution for 30 seconds. 1 hour later the oral cavity was rinsed with the test product for 1 minute.</p> <p>1 hour later the oral microbiota was collected with DNA swabs.</p> <p>The oral microbiota before rinsing with 50% glucose and 1h after rinsing with the test product was compared.</p>	
	T0	Before the treatment, the DNA of the Oral microbiota was collected with a DNA swab. The DNA was collected by swabbing for 20 seconds on the tongue, 20 seconds on the teeth and 20 seconds on the gums.
	T1	1 hour after the treatment with the test product the DNA of the Oral microbiota was collected with a DNA swab. The DNA was collected by swabbing for 20 seconds on the tongue, 20 seconds on the teeth and 20 seconds on the gums.
Results interpretation	<p>The oral microbiota was profiled through detailed analysis and interpretation of the sequencing results sequencing-based 16S or IST profiling experiment.</p> <p>Short sequence reads were generated using the Illumina MiSeq platform. Assignment of sequence reads into Operational Taxonomic Units (OTUs) was performed using a proprietary pipeline (BASECLEAR). Classification of bacterial organisms is based on a combination of 16S gene databases. The result is a list of OTUs and corresponding frequencies.</p>	
	<p>The test person had a healthy oral microbiota. It can be assumed that the oral microbiota before the treatment was in balance and was protecting the oral cavity.</p> <p>After the treatment, each specie was compared to its initial population. This was performed by determining the abundance of each specie/genus.</p>	

Tested Formula	Ingredients	Placebo	3.3%pORAL
	Aqua	90	86.7
	Alcohol Denat	10	10
	preBIULIN ORAL	-	3.3

Results

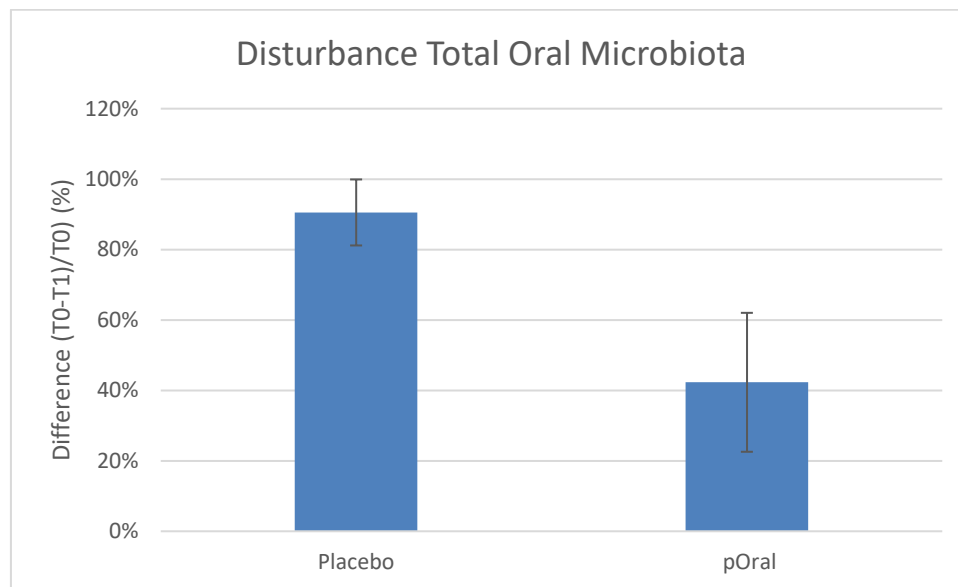
Influence on the oral microbiome

A genus of microorganisms is disturbed when its abundance changed significantly. In this study, a change of 30% is considered significant. The number of genera that were disturbed by more than 30% was counted:

	Placebo	3.3% pORAL
Volunteer	Amount disturbed (%)	Amount disturbed (%)
V1	77.3%	47.4%
V2	97.9%	63.5%
V3	96.4%	16.0%
Average	90.5%	42.3%

p-value	0,04803	p-value < 0,05: statistically significant difference
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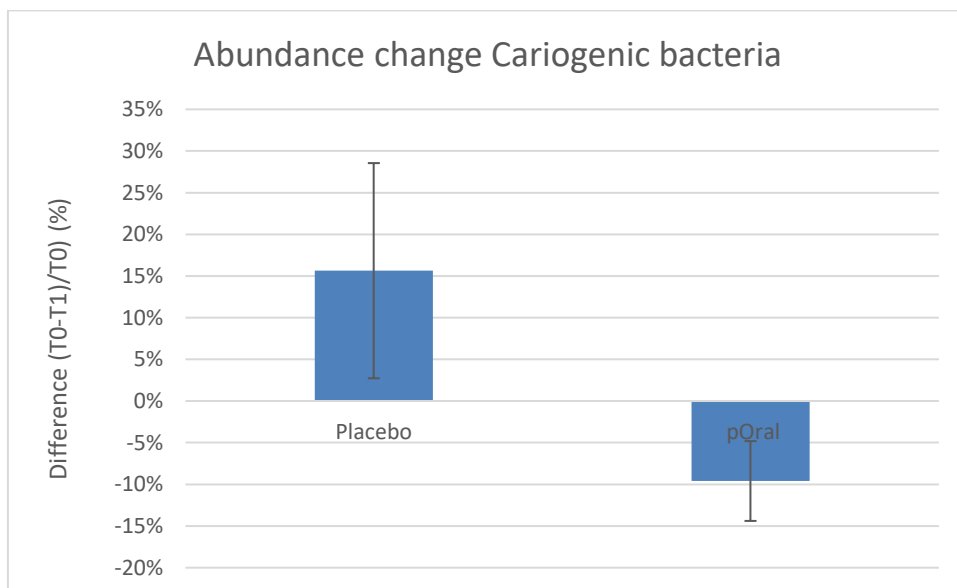
The oral microbiome remains almost completely destabilized by the glucose even after rinsing the mouth with a standard mouthwash. Rinsing the mouth with a mouthwash containing preBIULIN ORAL improved the stability significantly. This test also demonstrates that preBIULIN ORAL annulates the destructive effect of alcohol, as the mouthwash contained 10% alcohol.



Influence on cariogenic bacteria

	Placebo	3.3% pORAL
Volunteer	Difference (%)	Difference (%)
V1	3.8%	-8.6%
V2	33.6%	-15.9%
V3	9.5%	-8.6%
Average	+16%	-10%

p-value 0,020775 p-value < 0,05: statistically significant difference



The cariogenic microorganisms are significantly promoted by a mouthwash containing 10% alcohol after consuming glucose. The addition of preBIULIN ORAL keeps the cariogenic bacteria under control and hence helps to protect the health of the teeth significantly.

The following cariogenic bacteria have been monitored:

Streptococcus	Bifidobacterium	Lactobacillus	Propionibacterium	Other
<i>S mutans</i> <i>S sanguinis</i> <i>S sobrinus</i> <i>S oralis</i>	<i>B animalis</i> <i>Bi adolescentis</i> <i>B saguini</i> <i>B longum</i> <i>B bifidum</i> <i>B breve</i> <i>B biavatii</i> <i>B ruminantium</i>	<i>L acidophilus</i> <i>L reuteri</i> <i>L crispatus</i> <i>L plantarum</i> <i>L sucicola</i> <i>L vaginalis</i> <i>L casei</i> <i>L fermentum</i> <i>L mucosae</i> <i>L parafarraginis</i> <i>L johnsonii</i> <i>L gasseri</i> <i>L rogosae</i> <i>L helveticus</i>	<i>P namnetense</i> <i>P acidifaciens</i> <i>P australiense</i>	<i>Scardovia wiggsiae</i>

Conclusion

preBIULIN ORAL supports the protective oral microbiome and simultaneously reduces the growth of cariogenic bacteria after the consumption of a high amount of fermentable sugar, such as glucose.

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