

# A REVIEW OF ORAL BIOFILMS

# BioReNuva<sup>®</sup>

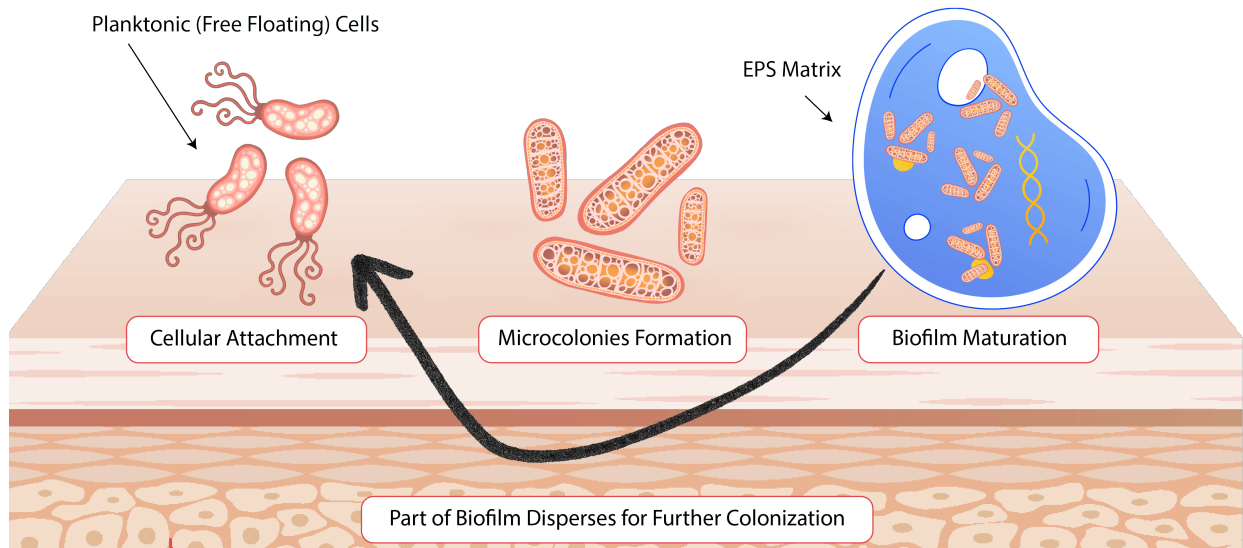
It's not just the microbe—it's the matrix.

Biofilms are communities encased in an EPS (Extracellular Polymer Substance) matrix that make microbes harder to remove and more tolerant to actives.

This makes it harder for your actives to remove relevant microbes related to acne on skin, scalp dandruff, and oral care.

[www.biorenuva.com](http://www.biorenuva.com)

## Biofilm Development Stages



## Biofilms Reduce the Efficacy of Traditional Oral Care Ingredients.

BioReNuva's ReNuva™ RL-50 (Rhamnolipid), an extremely low CMC (<10 mg/L) and Surface Tension (~25 mN/m) biosurfactant, helps address adhesion and matrix buildup of biofilms, safely inhibit problem-causing bacteria, while supporting a healthy oral microbiome.

## ReNuva™ RL-50

INCI: Glycolipids

Cleanses



Foams



Emulsifies



Solubilizes



Surface Tension

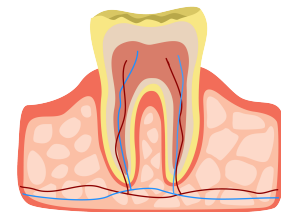
~ 25 mN/m

CMC

< 10 mg / L

EWG Score

1



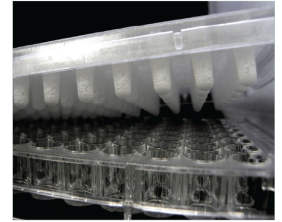
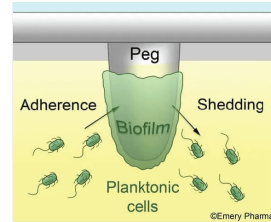
Oral biofilms (plaque) are structured EPS sites with diffusion barriers and micro-niches. The matrix limits access of actives leading to gingivitis, periodontitis and tooth decay.

## STUDY:

### Antimicrobial and Anti-Biofilm Efficacy of ReNuva RL-50 (Rhamnolipid)

#### Methods:

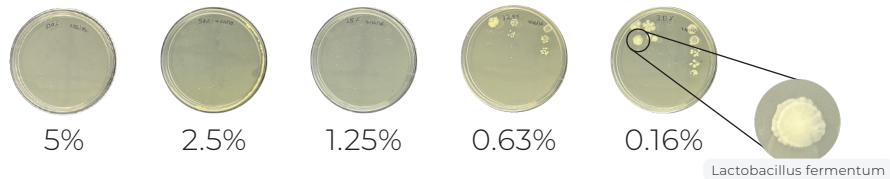
We modeled real-world oral biofilm by growing mixed salivary cultures from multiple volunteers on hydroxyapatite-coated pegs in MBEC plates to mimic tooth enamel. After a 1-minute challenge with graded RL-50



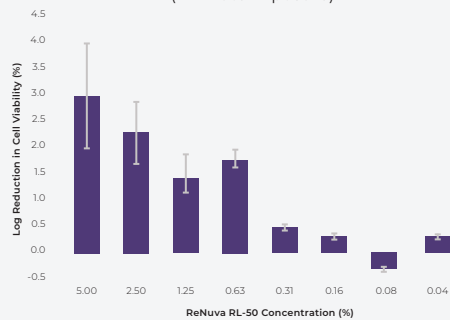
concentrations (5%–0.157%) versus a PBS control, we recovered the biofilm, quantified viable cells by CFU counts to calculate log reductions, and sequenced representative colonies for identification.

#### Results:

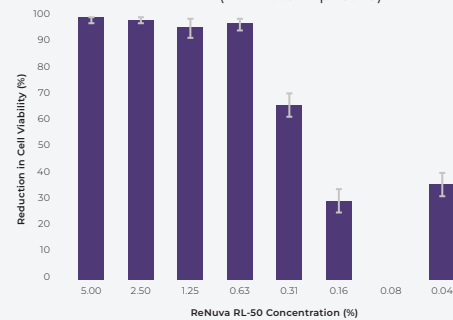
In our in-vitro model, RL-50 produced a clear, concentration-dependent reduction in biofilm viability, with significant inhibition from 0.6125% to 5%. Notably, the caries-associated *Lactobacillus fermentum* declined markedly as RL-50 increased, while the commensal *Streptococcus salivarius* showed no noticeable growth reduction—supporting a microbiome-friendly profile.



Reduction of Oral Biofilm Bacteria by ReNuva RL-50 (1 Minute Exposure)



Reduction of Oral Biofilm Bacteria by ReNuva RL-50 (1 Minute Exposure)



#### Discussion:

ReNuva RL-50 produced a clear, dose-dependent reduction in microbial growth after just a 1-minute exposure, with visible inhibition down to 0.6125%—supporting its potential as a mild, microbiome-friendly preservative booster. Sequencing showed strong suppression of caries-associated *Lactobacillus fermentum* while commensal *Streptococcus salivarius* was unaffected, indicating species-selective action; broader MIC testing is planned to confirm and quantify these findings.