

FUNCTIONAL OAT BEVERAGE WITH EMPHASIS ON THE CONTROL OF CARIES AND PERIODONTITIS MICROORGANISMS

Stefhani Andrioli Romero¹, Giovanna Alexandre Fabiano¹, Svetoslav Dimitrov Todorov², Bruno Bueno Silva³, Renato Corrêa Viana Casarin³, Mabelle Freitas Monteiro³, Adriane Elisabete Costa Antunes¹

¹. FCA-UNICAMP, School of Applied Sciences, R. Pedro Zaccaria, 1300, Limeira - SP, Zip code: 13484-350;

². FCF - USP, School of Pharmaceutical Sciences, Av. Prof. Lineu Prestes, 580 – Bloco 13B. CEP: 05508-000 – São Paulo, SP;

³. FOP-UNICAMP, Piracicaba Dental School, Av. Limeira 901, Piracicaba, SP, 13414-230;

Caries and periodontitis are diseases associated with dysbiosis that can compromise children's oral health, causing pain, bleeding gums, impaired feeding, and weight/growth gain due to inadequate nutrient intake. Some studies have shown microorganisms with an inhibitory effect on *Streptococcus mutans* – the main cause of caries – and *Porphyromonas gingivalis* – a pathogen associated with periodontitis. Among them, *Lactobacillus rhamnosus* LRB and *Lactobacillus rhamnosus* SP1, are species with potential inhibitory action in both species. Thus, the present project aims to develop a functional oat beverage and evaluate potential inhibitory effects on species associated with oral diseases. The beverage developed is based on oats, the prebiotic inulin and xylitol, a non-cariogenic sweetening agent. For the development of the beverage, viability tests were carried out, which demonstrated the permanence of the amount of bacteria *Lb. rhamnosus* LRB in $\log 8,01 \pm 0,78$ and *Lb. rhamnosus* SP1 in $\log 8,25 \pm 0,37$, for 28 days in refrigeration (4°C); pH was kept slightly below 4.5 and the titratable acidity curve at 0.5% on the day of fermentation and remained between 0.6 and 0.77% throughout the fermentation and storage period. In addition, through the digestion protocol of the beverage 16 days of conservation, it was observed that, in the digestion process, *Lb. rhamnosus* SP1 log had a small variation between the salivary (7,57 log), gastric (7,17 log) and intestinal phases (6,92 log) and remained very close to the viability value before digestion (7,94 log). The *Lb. rhamnosus* LRB, in the salivary phase ($\log 8,13$), remained very close to the viability value before digestion ($\log 7,97$), but in the gastric and enteric phases it did not obtain a result as high as that of *Lb. rhamnosus* SP1. In vitro analyses were also performed, verifying the production of bacteriocins by the strains and concluding that there was no action against *S. mutans* and *P. gingivalis*. In addition, it was observed that, through antibiogram analysis, in the plaques inoculated with *Lb. rhamnosus* SP1, a halo of inhibition was observed in the antibiotics Kanamycin, Tetracycline, Tylosin, Clindamycin, Erythromycin, Chloramphenicol, Ampicillin, Gentamicin and Streptomycin and resistance against Vancomycin and Nalidixic acid. In the case of *Lb. rhamnosus* LRB, halo of inhibition was generated in the antibiotics Kanamycin, Tetracycline, Chloramphenicol, Ampicillin and Gentamicin and resistance to Streptomycin, Vancomycin, Tylosin, Nalidixic Acid, Clindamycin and Erythromycin. Therefore, the proposed functional oat beverage is promising based on the results observed so far, but further analysis is still needed to verify its functionality for the microbial ecology in the mouth, which is related to the composition of the bacteria present, preserving the bacteria associated with health and reducing the bacteria associated with periodontitis and caries. These results require as next steps the verification of biofilm formation and competition between microorganisms, as well as the mimicking of the oral cavity of children in The Simulator of the Human Intestinal Microbial Ecosystem (SHIME) to simulate the passage of the beverage in this environment and biofilm evaluation before and after treatment.

References

- ABDELRAHMAN, M.; HSU, K. L.; MELO, M. A.; DHAR, V.; TINANOFF, N. Mapping evidence on early childhood caries prevalence: complexity of worldwide data reporting. *International journal of clinical pediatric dentistry*, v. 14, n.1, 2021.
- BISWAS, S.; TURNER, L.; BISWAS, I. *Lactobacillus rhamnosus* LRB mediated inhibition of oral streptococci. *Molecular Oral*

The Yakult logo is displayed in a bold, red, sans-serif font.

International Symposia

Beneficial Microbes

March 27th and 28th, 2025

27 e 28 de Março, 2025

WYNDHAM SÃO PAULO IBIRAPUERA CONVENTION PLAZA

SÃO PAULO - BRAZIL

Microbiology, [S. l.], v. 33, n. 5, p. 396–405, 2018. a. DOI: 10.1111/omi.12242.

RODRÍGUEZ G, RUIZ B, FALEIROS S, et al. Probiotic Compared with Standard Milk for High-caries Children: A Cluster Randomized Trial. Journal of Dental Research. 2016;95(4):402-407. doi:10.1177/0022034515623935

Acknowledgements: CAPES; Programa de Pós-Graduação em Ciências da Nutrição e do Esporte e Metabolismo (PPG-CNEM); Laboratório Lácteos Prebióticos e Probióticos (FCA-UNICAMP); Laboratório de Biologia Molecular da Área de Periodontia do Departamento de Prótese e Periodontia (FOP- UNICAMP); Laboratório de Microbiologia de Alimentos, Departamento de Alimentos e Nutrição Experimental (FCF - USP São Paulo).