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Improving the growth kinetics of *Lactobacillus* species using fungal polysaccharides

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Introduction: The human microbiome and its probiotic constituents have been the subject of many recent studies, primarily concerning their influence on the human health. Alpha and beta glucans are polysaccharide compounds whose immunomodulatory action had been investigated intensively. Several studies conducted within the last decade have found that these compounds also affect human intestinal flora, especially probiotic bacteria, to which they have a prebiotic effect. Researchers found that fungal polysaccharides improve survival of probiotic bacteria under unfavorable conditions. Moreover, it was found that fungal polysaccharides can induce faster growth of probiotic bacteria, which can lead to faster colonization of the human gastrointestinal system. The purpose of this study is to investigate the growth kinetics of different species of probiotic bacteria from the Lactobacillus genus supplemented with fungal polysaccharides.

Methodology: Investigation of bacterial growth was conducted by measuring the increase of bacterial density in cultures on a HIDEX Sense Multi-Technology Microplate Reader, which allowed 24-hour measurement of optical density while shaking and incubating the cultures at 37°C.

Results: We found that all six of the investigated Lactobacillus species display a very similar response to supplementation of growth media with fungal polysaccharides. Supplementation resulted in significant reduction of LAG phase in all six species compared to control samples, combined with increased growth rate (shorter duplication time) in the majority of samples, compared to control. The effect was found to be dose-dependent, culminating at 1% w/w extract. The effect was confirmed using high-purity yeast beta-glucans, which were shown to be effective even at much lower concentrations.

Conclusions: In this study we demonstrated that fungal polysaccharides, namely fungal beta-glucans, induce a significant change in the growth kinetics of different Lactobacillus species– reduction of LAG phase and increase of growth rate. This strong effect can be of great significance in development of future therapies for digestive disorders or development of new pharmaceuticals.

Biography

Filip Petrović is a Master's degree student at the University of Rijeka-Department of Biotechnology, studying Biotechnology in Medicine and having previously graduated as Bachelor of Biotechnology and Drug Research. His area of experience is in dietary supplements, having worked for several years in pharmaceutical companies as a Representative. His scientific background is in research of probiotics and prebiotics, aiming at the development of innovative pharmaceutical products.

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