

Antibacterial activity of *Lactobacillus rhamnosus* X253 with potential oral probiotic properties on oral health

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The oral cavity has become a serious global public health problem, with oral microbial dysbiosis leading to the development of oral diseases and other systemic diseases. Certain probiotics have been reported to have a role in fighting oral diseases. In this study, *Lactobacillus rhamnosus* X253 with strong antibacterial properties was isolated and screened from traditional Chinese fermented milk by tolerance to oral lysozyme and hydrogen peroxide, antimicrobial activity, aggregation ability and biofilm formation activity against *Streptococcus mutans*. Strain X253 showed tolerance to lysozyme and hydrogen peroxide, directly inhibited the growth of *Streptococcus mutans* and *Streptococcus gordonii*, had strong auto-aggregation ability and co-aggregation ability with oral pathogens, and showed strong antagonistic effect on the biofilm formation of *Streptococcus mutans*. In vivo experiments showed that *Lactobacillus rhamnosus* X253 reduced the expression of oral pathogen genes and increased the expression of probiotic genes in the oral cavity; it also reduced gingival bleeding, inhibited halitosis, and maintained oral health. These findings suggest that *Lactobacillus rhamnosus* X253, isolated from traditional Chinese fermented milk, has great potential to prevent the growth of oral pathogens and maintain oral health.