Efficacy of Probiotic Toothpaste on subjects with Periodontitis - A Randomised Double-Blind Study

Philip Koshy, Swaminathan Dasan, Muniandy Sekaran and Yaacob Hashim
1. Division of Microbiology, Institute of Biological Sciences, Faculty of Science, University of Malaya, MALAYSIA
2. Dept of Oral Pathology, Oral Medicine and Periodontontology, Faculty of Dentistry, University of Malaya, MALAYSIA
3. Dept of Molecular Medicine, Faculty of Medicine, University of Malaya, MALAYSIA
*sekaran@um.edu.my

Abstract
Probiotics have been successful in the treatment of digestive related diseases. However, its use to overcome dental disorders is an innovative approach in Oral Biology. Probiotics have shown to possess antibacterial activity and it thus can control pathogens from causing dental diseases like gingivitis. Gingivitis can lead to periodontitis when not treated and eventually to loss of teeth. Past studies indicate that probiotics also lowers the pH so that bacterial dental plaque cannot form mature dental plaque and calculus that can lead to periodontal disease. In this clinical study, Probiotic toothpaste is assessed in this randomized parallel, double blind study to evaluate its efficacy, in comparison to a placebo, on patients with chronic gingivitis or early periodontitis. The toothpaste contains bacteriocin extracted specifically from lactic acid bacteria found in Probiotics. This randomized, parallel, double blind study, in which 60 adult patients diagnosed with chronic gingivitis or early periodontitis, 30 of whom were subjected to the test Probiotic toothpaste and the remaining 30 used a control toothpaste evaluated the healing of gingival tissues using clinical indices. This parallel study was carried out over a period of 2 months. The clinical indices used in this study were Plaque Index (PI), Gingival Index (GI), Papillary Bleeding Index (PBI) and Stain Index. The results of this study indicated that the Probiotic toothpaste containing bacteriocin was marginally significant in its efficacy to control plaque and gingivitis when compared to the placebo toothpaste and both the test and control toothpastes had no effect on dental staining.

Keywords: Bacteriocin, periodontitis, gingivitis, probiotics.

Introduction
Accumulation of dental plaque on tooth-gingival interfaces is a key determining factor in the onset of gingivitis and progression to periodontitis.1 Because of the role of bacteria in plaque formation, many approaches have been used to mitigate the formation and facilitate the removal of dental plaque from the tooth surfaces.2 A high level of plaque control is of considerable importance in the prevention of both dental caries and periodontal diseases.3 Antibacterial agents that control the formation of bacterial plaque are believed to reduce plaque-associated gingivitis. Clinical studies have confirmed that a dentifrice containing 0.3% tricosan and fluoride significantly retard the formation of plaque-associated gingivitis for 14 weeks.4 Supragingival plaque control is largely the responsibility of the individual, using toothbrushes and interdental cleaning devices5 and remains the most widely accepted method of oral disease prevention6.

Prolonged accumulation of dental plaque on tooth surfaces is known to induce a series of clinically observable inflammatory changes in the gingival tissues such as redness, bleeding and swelling. Tissue inflammation is associated with increased levels of a variety of inflammatory mediators and indeed a large number of reports have appeared in recent years showing that diseased periodontal tissue is associated with elevated levels of cytokines. Supragingival plaque associated with healthy tissues (i.e. no clinical gingivitis and no caries) is usually thin, ranging up to 20 cells in thickness and consist mainly of gram negative, coccal shaped organisms. These organisms include Streptococcus sanguis, Streptococcus mitis and Actinomyces naeslundii. Gram negative organisms such as Veillonella prevotella may be detected in low numbers.7

The reasons for using dentificies are manifold and cover cosmetic, preventive and therapeutic purposes. However all these reasons have one major factor in common namely dental plaque.3 No dentifrice has been shown to have real therapeutic value in prevention of periodontal disease. Studies are currently directed towards finding a substrate which either inhibits bacterial plaque accumulation or calculus formation. Nevertheless the use of dentificies has made and is continuing to make major contributions to oral hygiene and oral health. Although it is true that in several instances this reduction is associated with fluoride in drinking water, it appears that in many parts of the world the observed reductions can be attributed to the introduction and extensive use of fluoride dentificies.8

The recognized ability of the intestinal microflora and probiotic microorganisms to exert a wide number of beneficial and potentially therapeutic effects without the side effects normally encountered with traditional drug therapies, has created a great deal of interest in the use of probiotic bacteria as a potential bio-therapeutic.9