



Asian Journal of Phytomedicine and Clinical Research

Journal home page: www.ajpcrjournal.com



PROBIOTICS IN DENTISTRY

R. V. Geetha*¹ and Archana. K¹

*¹Faculty of Microbiology, Saveetha Dental College and Hospitals, Saveetha University, Chennai, India.

¹Graduate student, Saveetha Dental College and Hospitals, Saveetha University, Chennai, India.

ABSTRACT

Science is becoming more and more advanced, it is providing numerous techniques and provides tools to diagnose, treat various infections. Probiotics are the developing field of science which can destroy many oral diseases. They are dietary supplements which are nothing but the cultures of bacteria, yeasts or other microorganisms that stimulates health promoting flora and suppress disease causing pathogens. Probiotics have now been widely used in medical as well as dental field. Probiotics can be used to prevent oral infections such as dental caries, periodontal disease and halitosis. They can also be used the aim of this review is to understand the mechanism of action of probiotic bacteria in the oral cavity and the effects and also the application of probiotics in the field of dentistry. Which can improve the oral health.

KEYWORDS

Probiotics, Oral health and Oral diseases.

Author for Correspondence:

Geetha R V,
Department of Dental,
Saveetha Dental College and Hospitals,
Saveetha University,
Chennai, Tamilnadu, India.

Email: rgeetha2010@yahoo.in

INTRODUCTION

Diet has a major role in health of an individual. Probiotics are the subject of research in food and nutrition¹. The term "probiotics" means "for life". The term was first used by Lilly and Stillwell in 1905². They described probiotics as "Substances secreted by one microorganism which stimulates the growth of another". An International Life Science Institute Europe defined probiotics as-" Viable microbial food supplement which beneficially influence the human health"³. Probiotics are microorganisms which can eliminate

the pathogenic bacterial in the oral cavity and can improve oral health.

SELECTION OF PROBIOTICS

The probiotic selected should have the following properties:

1. They should be non-toxic and non-pathogenic,
2. They should have a good shelf life,
3. They should withstand gastrointestinal juice,
4. They should replace oral and intestinal micro flora,
5. They should produce beneficial effect⁴.

ACTION OF PROBIOTICS ON ORAL HEALTH

Probiotics can be used in prevention and treatment of diseases.

Direct action

Lactobacillus species maintains the ecological balance. The action of probiotics on oral cavity are Direct interaction on plaque, binding of microorganisms to the proteins forming the bio film, metabolism of chemicals and substrates inhibiting oral bacteria⁵. Beneficial microbes compete with diseases and develop microbes for nutrition. Probiotics strengthen the immune modulation of host and immune response^{6,7}.

Indirect action

- Modulatory systemic immune function.
- Effect on local immunity,
- Regulation of mucosal permeability,
- Prevent plaque by neutralising free electrons.
- They act as antioxidants and produce antioxidants⁸⁻¹⁰.

MEANS OF ADMINISTRATION

Lactobacillus - These species produce enzymes for digestion of proteins and carbohydrates, synthesis of vitamin B and vitamin K. There are around 100 species. The consumption of milk which contain lactobacillus can reduce dental caries⁵. Bididobacterium - These bacteria are present in large intestine. There are nearly 30 species. They

are involved in fermentation of carbohydrates into short chain fatty acids. These species reduces diarrhoea, constipation, bowel diseases and prevent damage to DNA and cancers¹¹. Saccharomyces boulardi - It is an yeast causing breakdown of bacterial enterotoxins¹². Most of the species of bacteria involves in production of vitamins, decreases serum cholesterol level and has anti carcinogenic activity. Probiotics can also be administrated in the form of lozenges, mouth rinse, fruit juices, milk and dairy products, cheese, kefir, powders, capsules, gels, yoghurt and gelatin tablets².

PROBIOTICS AND HALITOSIS

Halitosis may be due to numerous factors such as consumption of particular food, metabolic disorders, respiratory tract infection. It involves both gram positive bacteria and gram negative bacteria. The bad odour causing bacteria can be depleted by antimicrobial treatment in order to maintain normal oral cavity. Also regrowth of malodour causing microorganism can be prevented by colonisation of oral cavity with probiotics^{13,14}. An unbalanced micro flora in the oral cavity produce malodorous substances called Volatile Sulphur Compounds (VSCs) which are by-products of degradation of the microbial proteins, blood, mucins in salivation and food remains in oral cavity and also methyl mercaptans¹⁵. Kazor and team examined bacterial species and compared malodorous microorganisms with healthy. It was found that Atropobium parvulum, Eubacterium sulci, Fusobacterium periodontium. Streptococcus salivarius was found to reduce malodour as it has the capability of producing bacteriocins. Halitosis can be controlled with the use chlorohexidine¹⁶. Probiotics can be used for gut and mouth associated halitosis.

PROBIOTICS AND YEAST

Consumption of probiotics cause hypo salivation and dryness of mouth. Research on oral pathology, such as yeast infections with respect to probiotics might further broaden the field of their potential

applications. *Candida albicans* is the leading cause of oral infections, most common among elders and immuno compromised patients^{5,17}.

IN VOICE PROSTHESIS

In larynx, probiotics strongly reduce pathogenic bacteria n voice prosthesis bio films. It has been evidenced that consumption of butter milk can prolong life time of voice prosthesis. Consumption of 2 kg Turkish yogurt per day eliminate bio film formation on indwelling voice prosthesis. Research has been carrying out to determine if it would be possible to treat other infections of upper digestive tract with probiotic containing dairy products^{2,18}.

DENTAL CARIES

1-6 years old children with *L. rhamnosus* reduced the risk of dental caries. It was studied that only strains like *Streptococcus thermophilus* and *Lactococcus lactis* are able to adhere to the saliva-coated hydroxy apatite incorporated into a biofilm. Changes in micro flora within oral cavity result in overgrowth of *Streptococcus sorbines*, *Streptococcus mutants* and *Porphyromonas gingivalis* causes caries which can lead to tooth loss, infection. *Streptococcus mutants* produce pathogenic microbe resulting in caries. Consumption of carbonated drinks containing *Streptococcus mutans* causes fermentation of sugars in the oral cavity^{19,20}.

PERIODONTAL DISEASES

The main agents causing periodontal diseases are *P. gingivitis*, *Treponoma denticola*, *Tannerella forsythia* and *Aggregatibacter actinomycetem comitans*. Probiotics prevent periodontitis. Probiotic tablets are used in the treatment of gingivitis. Probiotic bifidobacterium reduce gingival and periodontal inflammation. The treatment involving lozenges containing *L.brevis* for 4 days. It will reduce salivary levels of prostaglandin E2. *L.brevis* reduces plaque and yogurt reduces probing depths. Probiotic mouth rinse can control plaque and gingival inflammation^{21,22}.

STATUS OF PROBIOTICS IN DENTISTRY

Sporlac, *Saccharomyces boulardi* and yogurt are the most common probiotics. *Lactobacillus* is used in pediatric patients. Genetically modified *Bacillus mesentricus* can be used as alternative for B-complex. For preparation of antibiotics sporulating *Lactobacillus* are used^{8,9}.

CONCLUSION

Probiotics is the new field of research in oral medicine and microbiology. Bacteriotherapy seems to be a natural method for maintaining oral health. Research should be directed towards the action of probiotics in oral health in order to identify beneficial bacteria to improve oral health.

ACKNOWLEDGEMENT

The author wish to express their sincere gratitude to Department of Dental, Saveetha Dental College and Hospitals, Saveetha University, Chennai, Tamilnadu, India for providing necessary facilities to carry out this review work.

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBLIOGRAPHY

1. Isolauri E. Pro in human dis, *Am J clin Nutr*, 73(6), 2001, 1142S-6S.
2. Cagler E, Kargul B, Tanboga I. "Bacteriotherapy and Probiotics"-role on oral health, *Oral Dis*, 11(3), 2005, 131-7.
3. De Vrese M, Schrezenmeir J. Probiotics, prebiotics and synbiotics - approaching a definition, *Am J clin Nutr*, 73(2 suppl), 2001, 361S-364S.
4. Patil M B, Reddy N. Bacteriotherapy and Probiotics in dentistry, *KSDJ*, 2, 2006, 98-102.
5. Meurman J H. Probiotics: do they have a role in oral medicine and dentistry?, *Eur J Oral Science*, 113(3), 2005, 188-96.
6. Huovinene P. Bacteriotherapy; the time has come, *Br Med J*, 323(7309), 2001, 353-54.

7. Orrhage K, Brisinar B, Nord C E. Effect of supplements WH bifidobacterium confum and Lacto Acidophilus on intestinal mucosa by a probiotic strain, Lactobacillus Rhamnosus GG after oral consumption, *Applied and environmental Microbiology*, 65(1), 1999, 351-354.
8. Suvarna V C and Roby V G. Probiotics in human health - A current assessment, *Current science*, 88(11), 2005, 1744-48.
9. Izumita D A. New approach in dentistry, *Clinical and Basic Medical Research on EM-X-A collection of Research papers*, 2, 2001, 77-81.
10. Minnaks *et al.* Lactobacillus bacterium during a rapid increase in probiotic use of L.Rhamnosus GG in Finland, *CID*, 35(10), 2002, 1155-60.
11. Dominique G, Fabienne P, Isabella M, Martini R, Mierreille G. Proposed model: Mechanism of immuno modulation induced by probiotic bacteria, *Clin Vaccine Immunol*, 14(5), 2007, 485-92.
12. Nicole M R, Martijn B K. Effects of probiotic bacteria on diarrhoea, lipid metabolism and carcinogenesis: A review of papers published between 1988-1998, *Am J Clin Nutri*, 71(2), 2000, 405-11.
13. Button J P, Chilcott C N, Taff J R. The rationate and potential for reduction of oral malodour using Streptococcus salivarius probiotics, *Oral Dis*, 11(suppl 1), 2005, 29-31.
14. Scully G and Greenman J. Halitosis (breath odour), *Periodontology* 2000, 48, 2008, 667-75.
15. Kazor C E *et al.* Diversity of bacterial populations on the tongue dorsa of patients with halitosis and healthy patients, *J.Clin. Microbial*, 41(2), 2003, 558-563.
16. Sullivan A, Nord C E. Probiotics and gastrointestinal diseases, *J Intern Medical*, 257(1), 2005, 78-92.
17. Hatakka K, Ahola A J, Yli -Knuuttila H, Richardson Prevalence T, Meurman J K *et al.* Probiotics reduce the prevalence of oral candida in the elderly - a randomized controlled trial, *J Dental Research*, 86(2), 2007, 125-30.
18. Busscher H J, Free R H, Weissenbruch RV, Albers R W J, Van Der Mei H C. Preliminary observations on influence of dairy products of biofilm removal from silicone rubber voice prostheses *in-vitro*, *J diary Science*, 83(4), 2000, 641-7.
19. Nase L *et al.* Short term Consumption of a probiotic bacteria, lactobacillus Rhamnosus GG, *In milk on dental caries and caries risk in children Caries Res*, 35(6), 2002, 412-420.
20. Comelli E M *et al.* Selection of dairy bacterial strains as probiotics for oral health, *Eur J Oral Science*, 110(3), 2002, 218-24.
21. Riccia D N *et al.* Anti-inflammatory effects of lactobacillus brevis (CD2) periodontal diseases, *Oral Dis*, 13(4), 2007, 376-85.
22. Harini P M and Anegundi R T. Efficacy of a probiotic and chlorohexidine mouth rinses: *A short term clinical study. JISPPD*, 28(3), 2010, 179-182.

Please cite this article in press as: R. V. Geetha and Archana. K. Probiotics in dentistry, *Asian Journal of Phytomedicine and Clinical Research*, 5(3), 2017, 112-115.