

ROLE OF PROBIOTICS IN ORAL HEALTH: A REVIEW

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ABSTRACT:

In recent years, probiotics have been used to promote oral health. Time has come to shift the paradigm of treatment from elimination of specific bacteria to altering bacterial ecology by using probiotics. The concept of administering of beneficial bacteria with a view to replace harmful microbes with useful ones has been reviewed by probiotic concept. The mechanism of action of probiotics is related to their ability to compete with pathogenic microbes for adhesion sites to antagonize these pathogens or to modulate host's immune response. Probiotics approach has shown promising results in the oral health with respect to control of chronic diseases such as dental caries, periodontitis and recurring problems such as candidal infections, halitosis etc. This article summarizes the currently available data on the potential benefits of probiotics for oral health.

Key words: oral health, dental caries, halitosis, periodontitis, probiotics.



INTRODUCTION:

Humans of 21st century are quite advanced, health conscious, and alert with our surroundings. As we are proceeding towards perfection, our daily schedule is becoming quite hectic and people are not able to balance their health with kind of stress they are going through. Therefore taking into consideration the present scenario, people want to be on safer side so that their health can be managed easily.

It's only been since 1990s that people wanted to know about probiotic and their health benefits. Probiotic are the live bacterias and yeasts that are good for our health; especially digestive system. It is a common belief that the

bacterias are usually harmful for our health, but this fact can't also be denied that our body is in touch with many of the good as well as harmful bacterias. Probiotics are often the helpful bacterias that help us to keep our gut healthy. These are naturally found in our body and we can also find them in almost everything from yoghurt to chocolate.

According to WHO, Probiotics can be defined as "live microorganism which when administered in adequate amount confer a health benefit on host"^[1]. WHO consultation was also the first effort towards the assessment of probiotics efficacy and resulted in may 2002 in a document named "Guidelines for the

evaluation of probiotics in food”^[2] The term probiotics originally referred to the microorganism that have effect on other microorganisms.^[3] The conception of probiotics involved the notion that substances secreted by one microorganism stimulated the growth of other microorganisms. The term was used again to describe tissue extracts which stimulated microbial growth.^[4]

In the following decades, intestinal lactic acid bacterial species with alleged health beneficial properties have been introduced as probiotics including *L. rhamnosus* , *L. casei* , *L. johnsoniae* .^[5]

Probiotics Prospects in Oral Health

There has been a paradigm shift towards an ecological and microbial community based approach to understanding oral diseases. Dental problems can be successfully cured by manipulation of the resident oral micro flora and by modulating immune host responses. The increased popularity of probiotics and their supplements to improve GI health has prompted interest in the utility of this approach for oral applications. As the society is becoming resistant to drugs, the cure of diseases is quite difficult. Therefore health officers are focusing more on building up the immunity of society so that the use of antibiotics can be minimized and drug resistance can be avoided. This changing attitude is also relevant to the prevention of dental diseases.^[6]

There has been a paradigm shift away from treating dental diseases by targeting specific oral pathogen towards an ecological and microbial community based approach to understand conditions such as caries and periodontal diseases.^[7]

Mechanism of action:

It is likely that MOA varies according to the specific strain or combination of strains used, the presence of prebiotics and the conditions that are being treated, as well as the stage of disease process in which the prebiotic is administered.^[8]

They act by:

- Prevention of adhesion of pathogens to host tissues.
- Stimulation and modulation of mucosal immune system.
- Modulation of cell proliferation and apoptosis through cell response.
- Killing or inhibition of growth of pathogens through production of bacteriocins or other products such as acids or peroxides, which are antagonistic towards pathogenic bacteria.

Oral Health and Micro flora

There are several sites in human mouth which are heavily colonized by microbes. Supra and subgingival plaque results in complex climax community.^[9] Many oral

bacterias, especially streptococci , also survive within buccal epithelial cells.^[10]

The oral micro flora does not play a role in disease initiation rather actively contributes to the spread and progression of disease especially when the host becomes immuno compromised.

Oral commensals help in development of immune system, maintenance of healthy oral tissues by influencing expressions of mediators such as intracellular adhesion molecule 1 (I CAM-1) , E-selectin and IL8 , modulating immune responses and enhancing cellular homeostatic mechanisms.¹¹⁻¹³

True oral commensals microorganisms are : S.mitis , S.oralis , A.naeslundii , F.nucleatum , H.parainfluenzae .^[14]

Microbial Populations Associated With Oral Diseases

The most common oral diseases are caries and periodontitis, which result from shift in the balance of resident microbiota at a site. Microbes found in case of dental caries and periodontal diseases are different from each other and are also distinct from those that predominate at healthy sites.

In case of dental caries there is an increase in acidogenic and acid tolerating species such as S.mutans, lactobacilli etc in periodontal disease , there is an increase in plaque mass and

shift towards increase in obligatory anaerobic and proteolytic bacteria , many of which are gram negative and currently unculturable. Other common infections such as candidiasis and halitosis are also commonly seen.

Role of Probiotics in Prevention of Oral Diseases

A) Role in Dental Caries:

Many early studies concentrated on utilizing bacteria that expressed bacteriocins or bacteriocin like inhibitory substance that specifically prevented the growth of cariogenic bacteria.^[15] Another approach has been to identify food grade and prebiotic bacteria that may have potential in caries prevention. These have been selected because of their likely ability to colonize teeth and influence the supragingival plaque, its adhesion to hydroxyappetite as a surrogate for colonization of teeth and mixed species biofilm. ^[16] Recently, oral lactobacilli have also been screened for their utility as potential probiotic strain and strains of oral lactobacilli have been isolated that are inhibitory against S.mutans, A.actinomycetemcomitans, P.gingivalis.^[17]

B) Role in Periodontal Diseases

Patients with moderate to severe gingivitis who were given either one of two L.reuteri formations had reduced plaque and gingivitis scores compared to placebo group. Similarly regular intake of tablets containing L.salivarius resulted in benefits in terms of pocket

depth and plaque index in individuals at high risk of periodontal disease (smokers) Sub gingival application of beneficial oral bacteria (*S.sanguis* , *S.salivarius* , *S.mitis*) has been shown to delay recolonization by periodontal pathogen, reduce inflammation and improve bone density.^[18-20]

C) Role in Other Oral Diseases:

S.salivarius K12 produces salivaricin , a lantibiotic with inhibitory activity towards most *S.pyogenes*. This strain has been commercially promoted as a probiotic that is protective against malodour. Many other strains of *S.salivarius* also produces bacteriocins or BLIS , leading to suggestions for their usefulness as oral probiotics .^[21-23]

CONCLUSION:

Probiotics represent a new area of research in oral medicine, the examination of the close relationships between food and oral health. The existence of probiotics in the indigenous oral microflora of humans warrants exploration because these bacterias offer advantage of being perfectly adapted to the human oral ecosystem. Oral health can be well maintained by use of probiotics without any other systemic harmful effects and drug resistance can also be well avoided.

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