Dr. Aysha Zafna1, Dr. Vidhya Vijayan2, Dr. Darshana V3, Dr. Anjali Sathyan4, Dr. Vaishnavi J S5

1. Assistant Professor, Department of Public Health Dentistry, Vydehi Institute of Dental Sciences

2,3 - Assistant Professor, Department of Pediatric and Preventive Dentistry, KMCT Dental College, Mukkom, Calicut.

4, 5- Lecturer, Department of Pediatric and Preventive Dentistry, KMCT Dental College, Mukkom, Calicut.

**Brief overview on probiotics**

**Introduction**

Healthy living is conditioned on the proper functioning of the digestive ecosystem which is biologically affected by the state of the microbial load of the input, ‘food’, the interaction of food and the gut microbiota, producing the output – ‘healthy living’.

Traditionally, probiotics have been associated with gut health, and most clinical interest was focused on the prevention or treatment of gastrointestinal infections and diseases; however, during the last decade, an increasing number of established and proposed health effects of probiotic bacteria have been reported, including enhancement of the adaptive immune response, treatment or prevention of urogenital and respiratory tract infections, and prevention or alleviation of allergies and atopic diseases in infants.

During the last few years, several authors have suggested that probiotic bacteria originally planned for gut health could also be beneficial to oral health1. Dental caries, periodontal disease and halitosis are among the oral disorders that have been targeted since these are the most prevalent diseases that affect oral health. In spite of countless preventive measures, these diseases still remain a major threat to dentistry.

Any effective antimicrobial treatment against these should modulate the microbial ecology of dental plaque in a pathogen-targeted manner, since indiscriminate antibacterial killing could lead to the disruption of the ecological balance of normal oral flora and result in persistent pathogenesis and possibly unknown clinical consequences. 6 Owing to this growing challenge of health and disease, the concept of microbial and ecological change as a mechanism of preventing dental diseases has become an important consideration in dentistry. Regarding elimination of pathogenic members of oral cavity, this new method, the probiotics approach, has been introduced into the field.

**Bacteria used as probiotics**

1) Lactobacillus species

2) Bifidobacterium

3) Streptococcus

Commercially used probiotics Lactobacilli and Bifidobacterium strains

 Lactobacillus rhamnosus GG

 Lactobacillus johnsonii Lal

 Lactobacillus acidophilus NCFM

Probiotic organisms 2

 L. casei CRL-43i Gilliland (La-Mo)

 Lactobacillus reuteri SD

 Lactobacillus plantarum 299V

 L. rhamnosus 271

 L. casei DN 014001

 Lactobacillus casei Shirota

 Lactobacillus delbruekii subsp bulgaricus 2038

 Streptococcus thermophilus 1131

 Lactobacillus acidophilus SBT-2062

 Bifidobacterium longum SBT-2928

 Saccharomyces boulardii

 B. longum BB536

 Bifidobacterium breve Yakult 3

Current evidence indicates that probiotic effects are strain-specific; therefore, a beneficial effect attributed to one strain cannot be assumed to be provided by another strain, even when it belongs to the same species. A combination of strains can enhance adherence synergistically.

**Vehicle of Administration**:

The vehicle by which probiotics are ingested or delivered in the oral cavity, however influence the cariogenic potential and the oral colonization of a probiotic. The most commonly used dietary lactobacilli are being consumed in milk products.4

Dairy foods containing probiotic bacteria include most major brands of yogurt, culture-containing fluid milks, such as “Sweet Acidophilus Milk” and a few brands of cottage cheese. Dairy foods seem to fit naturally with probiotics because of the traditional association of beneficial fermentation bacteria and fermented dairy products. Consumers naturally associate fermented dairy products with live cultures and perceive a benefit (albeit undefined) in the presence of these cultures.

Yakult (Yakult, Tokyo), are sold in small (65–100 mL) individual serving size bottles containing a milk-based beverage produced by the fermentation of one or more probiotic bacteria. They are marketed to be consumed daily, as a food supplement, but are not in a size that would be considered, at least in the U.S., a significant component of a meal. Their purpose is to provide a significant dose of functional probiotic bacteria.5

Thus, the different vehicles for probiotics administration are –

1. Milk Products

- Milk drink

- Yogurt

- Cheese

b) Fruit Juices

c) Lozenges

d) Powder

e) Gelatine

f) Straw

g) Tablets

h) A probiotic lozenge administered medical device.

i) Capsules

**Mechanism /interaction of probiotic organisms in oral cavity:**

Probiotics may act direct interaction or indirect interaction on oral biofilm and microflora and vice versa.

|  |  |  |
| --- | --- | --- |
|  | | |
| **DIRECT INTERACTIONS IN DENTAL PLAQUE** |  | **INDIRECT PROBIOTIC ACTIONS IN THE ORAL CAVITY** |
| * Involvement in binding of oral micro-organisms to proteins (biofilm formation) * Action on plaque formation and on its complex ecosystem by competing and intervening with bacteria-to bacteria attachments * Involvement in metabolism of substrates (competing with oral micro-organisms of substrates available) * Production of chemicals that inhibit oral bacteria (antimicrobial substances) |  | * Modulating systemic immune function selection pressure on developing oral microflora colonization by less pathogenic species. * Reduction of malodor.   **Other effects**   * Inhibit growth of pathogenic bacteria * Enhance growth of other friendly bacteria. * Reduce toxins * Increased immunity/ bacterial resistance * Produce vitamins and other nutritional factors * Reduce cholesterol * Alleviate flatulence |

Hence, probiotics have the following functions in the oral cavity.

1. Prevent dental caries.
2. Improves periodontal health.
3. Controls microbial infections
4. Treat halitosis

**Conclusion:**

The results of this review confirm that more studies are necessary to evaluate the efficacy of probiotics with correct methodological design, in broader population samples, and over longer periods of time. Comparative trials of different strains of probiotic species would be recommended.

**References:**

1. [Haukioja](http://www.ncbi.nlm.nih.gov/pubmed/?term=Haukioja%20A%5Bauth%5D) A Probiotics and Oral Health Eur J Dent. 2010 Jul; 4(3): 348–55.
2. Goldman AS, Yee R, Holmgren CJ and Benzian H Global affordability of fluoride toothpaste Globalization and Health 2008;4(7):1-8.
3. Thankappan S , Sherin N, Thomas V; Probiotics —New horizons in dentistry ;Journal of Indian dental association (2008);2(6):153-155.
4. Teughels W., Essche V M,  Sliepen I and Quirynen M. Probiotics and oral health care. Periodontology 2000(2008);48(1):111-147
5. Mary Ellen Sanders. Use of Probiotic Bacteria to Modulate Human Health. J. Nutr. 130: 384S–390S, 2000.
6. R. Eckert , R. Sullivan , and W. Shi Targeted Antimicrobial Treatment to Re-establish a Healthy Microbial Flora for Long-term Protection Adv Dent Res 2012; 24(2):94-7.