PROBIOTICS

Assist.Prof.Zainab.a.aldhaher

According to World Health Organization, the definition of probiotics refers to "live microorganisms which when administered in adequate amounts, confer benefits to the health of the host" probiotic bacteria including lactobacilli and bifidobacteria are good colonizers of the gastrointestinal tract, vagina and oral cavity of humans

"prebiotics" are non-digestible food ingredients such as inulin, fructo-oligosachharides, and lactulose that cannot be digested by humans but support the growth of beneficial bacteria. The term "synbiotic" is used when a product contains both probiotics and prebiotics

Probiotics can be bacteria, molds or yeast. However, most probiotics are bacteria. Among bacteria, lactic acid bacteria are more popular. *Lactobacillus acidophilus*, *Lactobacillus casei*, *Lactobacillus lactis*, *Lactobacillus salivarius*, *Lactobacillus plantrum*, *Lactobacillus bulgaricus*, *Lactobacillus rhamnosus*, *Lactobacillus johnsonii*, *Lactobacillus reuteri*, *Lactobacillus fermentum*, *Streptococcus thermophilus*, *Enterococcus faecium*, *Enterococcus faecalis*, *B. bifidum*, *Bifidobacterium breve*, *B. longum*, and *Saccharomyces boulardii* are commonly used bacterial probiotics. A probiotic may be made out of a single bacterial strain or it may be a consortium as well. Probiotics can be in powder form, liquid form, gel, paste, granules or available in the form of capsules, sachets, etc.

Mechanisms of action explaining beneficial probiotic effects include modulation of host immune response leading to strengthening of the resistance to pathogenic challenge and alteration of the composition and metabolic activity of host micro-flora at the specific location. Among paramount selection criteria for probiotics are:-

1. Adhesion and colonization (at least transitory) in the human body. Adhesion may increase the retention time of a probiotic and place bacteria and host surfaces (body fluids and epithelial cells) in close contact, thus facilitating further probiotic activity.
2. Enhancement of the non-specific and specific immune response of the host.
3. Production of antimicrobial substances and competition with pathogens for binding sites.
4. Survival and resistance to human defense mechanisms during the oro-gastro-intestinal transit.

Probiotics are provided in products in one of the following basic ways:

1. A culture concentrate added to a beverage or food (such as a fruit juice).
2. Inoculated into prebiotic fibers.
3. Inoculants into a milk-based food (dairy products such as milk, milk drink, yogurt, yogurt drink, cheese, kefir, and bio-drink).
4. As concentrated and dried cells packaged as dietary supplements (non-dairy products) such as powder, capsule, gelatin tablets

Probiotics in controlling periodontal infection and halitosis

Periodontitis is a multifactorial disease that encompasses the hard- and soft-tissue, microbial colonization, inflammatory responses and adaptive immune responses. Treatment of periodontal diseases in recent years has moved towards an antibiotic/anti-microbial model of disease management. Probiotics decrease the pH of the oral cavity so that plaque bacteria cannot form dental plaque and calculus that causes the periodontal disease. they make excellent maintenance product because they produce antioxidants. Antioxidants prevent plaque formation by neutralizing the free electrons that are needed for the mineral formation.

Probiotics could also be used in the treatment of halitosis in significant reduction of volatile sulfur compounds after gargling twice daily with 15 ml for 2 min.

Role of probiotics in dental caries

Dental caries is one of the most common oral diseases that needs early prevention and intervention. *Streptococus mutans* is one of main causative organism for dental caries. Elevated levels of streptococcus counts are strongly associated with increased risk of dental caries. Studies have shown that probiotics containg *L. rhamnosus* and *L. casei* have significantly reduced the growth of oral *streptococci* and dental caries risk. Fermentation of glucose, fructose, and mannitol by *L. rhamnosus* resulted in pH values between 5.2 and 6.8 following 24 hours of incubation, thus decreases the decalcification effect of *S. mutans.* Certain conditions are required to remove cariogenic bacteria from the teeth surface to fight against dental caries. Firstly, probiotic bacteria must be able to stick to the tooth surface where cariogenic bacteria reside. Secondly, they must become a part of the biofilm that develops on teeth. Finally, they must compete with cariogenic bacteria. All this effects of probiotics helps in reduction of the levels of cariogenic bacterial growth.