

## Probiotics the promising future – A review

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### **Abstract:**

The mere spell of the word microorganism often gives a threat of health hazard. But, friendly microorganisms called Probiotics have changed this concept and have given a new dimension for both general and oral health. Probiotics are live microorganisms conferring beneficial effect to the host and their spectrum of applications are expanding day by day in dentistry. This article would provide a comprehensive view about probiotics and oral health.

**KEYWORDS:** Probiotics, Lactobacillus, oral health, Dentistry

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### **INTRODUCTION:**

For quite a lot of years bacteria named Probiotics have been supplemented in foods due to favorable results in human.

The chief constituents in yoghurt and fermented milk are the bacteria<sup>1</sup>.

1. **Probiotics:** According to FAO/WHO, living microorganisms, principally bacteria that are safe for human

consumption and, when ingested in sufficient quantities, have beneficial effects on human health, beyond the basic nutrition<sup>2</sup>.

2. **Antibiotics** annihilate the detrimental bacteria that are able to cause disease, while also devastate the microorganisms that help to fight infection. But Probiotics regenerate the valuable

bacteria which can be beneficial in human to fight against infection <sup>3</sup>.

3. **Prebiotics** are generally defined as not digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacterial species already established in colon, and thus in effect improve host health <sup>3</sup>.

4. **Synbiotics** are the combination of probiotics and prebiotics <sup>4</sup>.

**5.Replacement therapy** also called bacteriotherapy occasionally used interchangeably with probiotics <sup>5</sup>.

**HISTORY:**

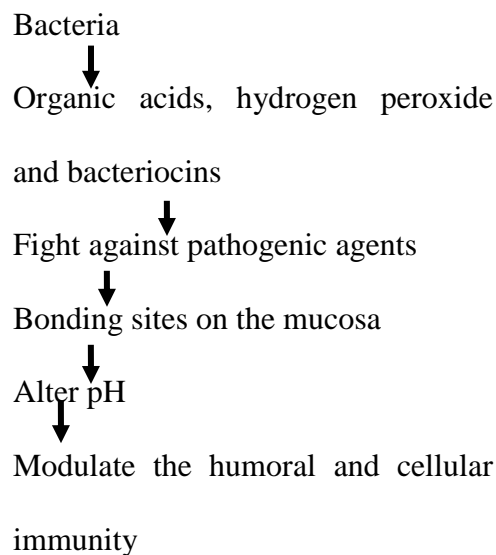
Nobel laureate Elie Metchnikoff put forward that the reason for the apparent longevity of Bulgarian peasants was that they consumed large quantities of fermented milk products like curd and buttermilk. He thought that decreased production of toxins in the intestine are due to replacement of the harmful organisms by lactic acid bacteria<sup>5</sup>.

**CONTENTS:**

Most of the probiotics are bacteria. Among them lactic acid bacteria are more popular. Lactobacillus bulgaricus (L. bulgaricus), Lactobacillus plantarum, Streptococcus thermophilus (S. thermophilus), Enterococcus faecium, Enterococcus faecalis, Bifidobacterium species, and Escherichia coli were listed <sup>5</sup>.

**MODE OF ACTION:**

Numerous mode of action have been proposed that includes <sup>6</sup>.



**Suggested mechanisms of Probiotic in the oral cavity:**

### Direct interactions in dental plaque<sup>7</sup>

- Involvement in binding of oral micro-organisms to proteins.
- Action on plaque formation and on its complex ecosystem
- compete with oral micro-organisms of substrates available.
- Production of antimicrobial substances.

### Indirect probiotic actions in the oral cavity<sup>7</sup>

- Modulate immune function.
- Effect on local immunity.
- Effect on non-immunologic defense mechanisms.
- Regulation of mucosal permeability.
- Selection pressure on developing oral microflora towards colonization by less pathogenic species.

### PROPERTIES:

Fuller<sup>8</sup> in 1989 listed the following as features of a good probiotic.

1) It should be a strain, which is capable of exerting a beneficial effect on the host

animal, e.g. increased growth or resistance to disease.

2) It should be nonpathogenic and non-toxic.

3) It should be present as viable cells, preferably in large numbers.

4) It should be capable of surviving and metabolizing in the gut environment e.g. resistance to low pH, organic acids acid and bile.

5) It should be stable under storage and field conditions.

### FOOD CONTAINING PROBIOTICS:

Several food acts as carrier for probiotics which includes yogurt, ice cream, buttermilk, , kefir, kombucha, miso and several other fermented products<sup>5</sup>.

### PROBIOTIC STRAINS IN THE ORAL CAVITY:

1. A basic prerequisite to be an oral probiotics is the ability to bond and inhabitant over the oral mucosal surfaces<sup>9</sup>.

2.Action of the probiotic strains on the oral cavity is dubious as oral mucosa is not their innate habitation (9).

3.Researchers proved that lactobacilli strains maintain oro microbiological balance. But there is negligible proof that these lactobacilli strains are momentary or stable oral colonizers<sup>9</sup>.

### **Probiotics and dental caries:**

Inclusion of *Lactobacillus rhamnosus GG* in milk or processed cheese was associated in reduction of the incidence of dental caries in children. *Bifidobacterium lactis* in ice cream reduced oral *S.mutans* count. Nikawa *et al.* reported decreased incidence of dental caries in children fed with cow milk fermented with *Lactobacillus reuteri*. Similar results were achieved when children ingested fluids or capsules containing probiotics. In a study, *S. mutans* count was reduced comparably in children who used xylitol enriched or probiotics-enriched chewing gum<sup>10</sup>.

### **PROBIOTICS AND PERIODONTAL DISEASE:**

Diminished gingival diseases have been observed with the use of *L. reuteri*. Inhabitant lactobacilli inhibit *P. gingivalis* and *Prevotella intermedia* by 82% and 65%, respectively<sup>11</sup>. Probiotic strains included in periodontal dressings at optimal concentration of 10<sup>8</sup> CFU/ml have been shown to diminish *Bacteroides* sp., *Actinomyces* sp., *S. intermedius*, and *C. albicans*<sup>11</sup>. In a beagle dog model subgingival application of *Streptococcus sanguinis*, *Streptococcus salivarius* (*S. salivarius*), and *Streptococcus mitis* concealed the population of *Porphyromonas gulae* and *P. intermedia*<sup>12</sup>. The recent research has shown that tablets containing *L. salivarius* WB21 reduced the pathogens in subgingival plaque<sup>10</sup>.

### **Probiotics and oral candidiasis:**

Reduction in the oral fungal count was found in the geriatric patients

consuming cheese for 16 weeks containing *L. rhamnosus* strains GG and LC705 and *Propionibacterium freudenreichii* ssp (13).

**Probiotics and halitosis:**

Decreased concentration of volatile sulphur compounds in the exhaled breath has been observed with *S. salivarius* K12, *Weissella confusa* isolates and with microorganisms forming lactic acid <sup>13</sup>.

**Probiotics and voice prosthesis:**

Turkish yogurt containing *Streptococcus thermophilus* and *Lactobacillus bulgaricus* effectively abolished the biofilm formation on indwelling voice prostheses <sup>7</sup>.

**PROBIOTICS AND XEROSTOMIA:**

Evidence suggests that probiotics can also efficiently lessen the risk xerostomia <sup>5</sup>.

**Probiotics and immunity:**

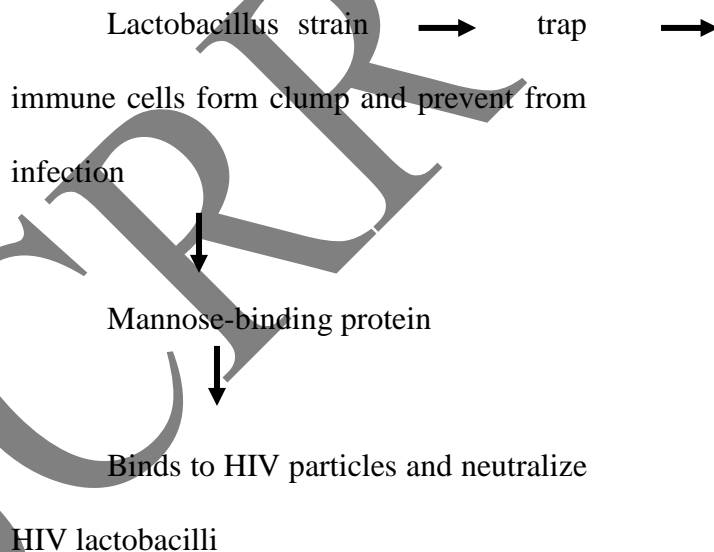
Probiotics can enhance the immune response by (5)

1. Stimulating macrophages
2. Production of cytokines

3. Escalating natural killer cell
4. Rising the levels of immunoglobulins

**PROBIOTICS AND HIV:**

Mechanism of action on HIV <sup>14</sup>



**OTHERS:**

Probiotics can also be used for <sup>5</sup>

1. Cancers (colon, bladder)
2. Detoxify carcinogens
3. Lower serum cholesterol
4. Hypertention
5. Food allergies
6. Urogenital health

7. optimize effects of vaccines (e.g. rotavirus vaccine, typhoid fever vaccine)

BLIS K12 is a Probiotic called. He was looking for protective mouth bacteria that could prevent sore throats, which can lead to complications such as rheumatic fever in children. After following with administration of *Streptococcus salivarius* K12 in Dunedin schoolchildren for many years, they didn't appear to get sore throats as often as others<sup>15</sup>.

*Streptococcus mutans* count decreased in the saliva of orthodontic adolescents<sup>16</sup>.

**PROBIOTICS AND MEDICINE:**

Probiotics have been tried in (16)

1. Bacterial vaginosis
2. Diarrhea (acute infectious, antibiotic-associated, and persistent)
3. Irritable bowel syndrome (IBS)
4. Necrotizing enterocolitis in neonates
5. Ventilator-associated pneumonia
6. Crohn disease

7. Eczema
8. Pancreatitis
9. Ulcerative colitis

**PROBIOTICS AND FUTURE:**

Genetically modified microbes reduce the harmful properties of pathogenic strains and augment the beneficial probiotic strains<sup>17</sup>.

The use of probiotics will give a newer facet to oral health. Thorough understanding of the concepts of probiotics and further research in the field would bring an everlasting healthy life with a healthy smile.

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