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Beneficial Effects of Probiotics on Human Health

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Abstract: ***According to the FAO/WHO Probiotics are "live microorganisms" which administered in adequate amounts confer a health benefits to the host. Different type of strains are used as Probiotics but predominantlyi.e. Lactobacillus and Bifidobacterium are used as source of Probiotics. Probiotics helps in control certain disease and provide health benefits. It is generally used to control lactose intolerance, Diabetes, cancer, diarrheal diseases and ulcer etc. Probiotics are beneficial microorganism can be used as dairy products and also used as supplemented products. This paper provides an overview, function, beneficial effects on human health and different type of strains used as Probiotics.***

Keywords: Probiotic, Lactobacillus, Bifidobacterium

1. Introduction

Probiotics termed asnatural products. According to FAO/WHO in 2001 defined the term Probiotics as "live microorganisms.There are different types of sources of probiotics. Generally fermentative dairy products are used assubstrate for Probiotics. Non-dairy Probiotics products such as fruits and vegetablesjuice also developed as source of Probiotics. Supplemented Probiotics also available, the freeze dried bacterium can be introduces in the capsules and tablets and these can be consumed as a sources of Probiotics.

Table 1: Different types of bacteria used as a Probiotics [2]

Lactobacilli	*Bifidobacteria*	Other species
L. acidophilus	*B. adolescentis*	*Bacillus subtilis*
L. casei	*B. animalis*	*Enterococcus faecalis*
L. crispatus	*B. bifidum*	*Enterococcus faecium*
L. delbruckii	*B. breve*	*Escherichia coli*
L. gallinarum	*B. infantis*	*Lactococcus lactis*
L. gasseri	*B. lactis*	*Leucnostoc mesenteroides*
L. johnsonii	*B. longum*	*Pediococcus acidilactici*
L. paracasei		*Pediococcus pentosaceus*
L. plantarum		*Saccharomyces boulardii*
L. reuteri		*Sporolactobacillus inulinus*
L. rhamosus		*Streptococcus thermophilis*

Various strains of micro-organisms that are majorly used as Probiotics are: *Lactobacillus, Bifidobacterium, Saccharomyces, Enterococcus, Streptococcus, Pediococcus, Leuconostoc, Bacillus, Escherichia coli*[1]. *Lactobacillus*and *Bifidobacterium* arecommonly used bacteria as Probiotics [2] table 1.Nobel prize winner scientist Eli Metchnikoff revealed the beneficial effect of Probiotics. Which administered in adequate amounts, confer a health benefit on the host" (FAO/WHO,2001). When administered inside body works as defensive tools to control different disease. Consumption of Probiotics helps in therapeutics benefits as well as maintain the microbial populations inside the gut. In our gastrointestinal tract there have different types of bacteria habited. These bacteria confers good health benefits and Symbiosis relationship with the host [3]. The non-pathogenic bacteria(beneficial) are more in number than pathogenic bacteria in the site of GI tract. This type of composition in the gut microbiota is called Normobiosis. If the pathogenic bacteria are more in number that confer diseases in the body of the host. This means pathogenic bacteria dominate over non-pathogenic bacteria. The Probiotics acts as soldier improving barrier function in the epithelial layer of the host, due to this host is less susceptible to pathogenic microorganisms. In human these different types of bacteria enter into the mucus membrane on epithelial cell of the gut and create symbiotic relationship [4]. These bacteria are directly suppress the attachment and growth of the pathogenic microorganisms and produce allergy [5,6,7]. Probiotics have been shown to improve lactose digestion by reducing the intolerance symptoms as well as by slowing orocecal transit [8].Consumption of Probiotics gives various health benefits fig.1 indicate the benefits of Probiotics regarding health [9,10,11].

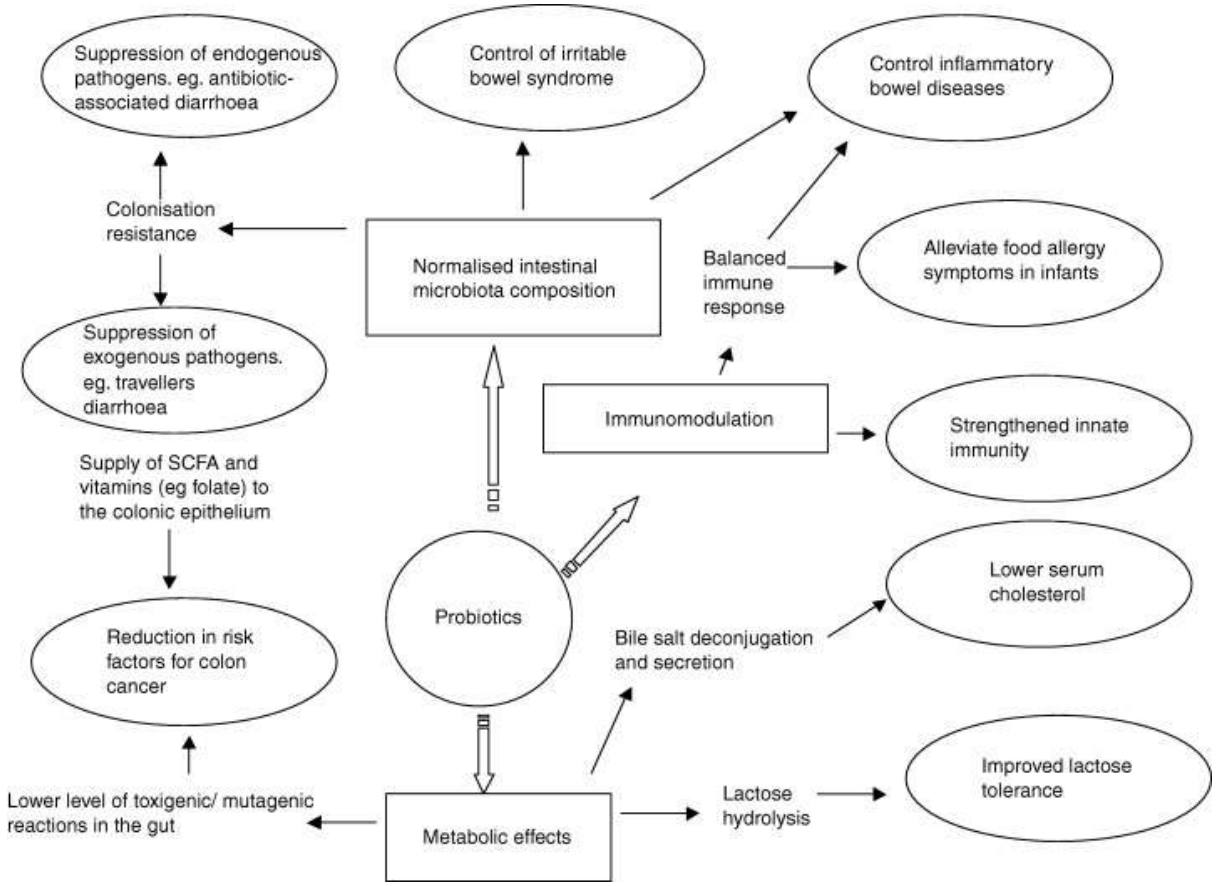

Figure 1: Benefits of Probiotics regarding health. [9,10,11]

These beneficial micro-organisms that can be consumed as a diet supplement are now termed as Probiotics. Some of the fermented milk products which are consumed worldwide are: yogurt, curd, cheese, butter milk etc. The low level of proteins, vitamins and amino acids will increased by fermented products inside gut microflora. The micro-organisms that carryout this transformation of food by the process of fermentation are more beneficial to our health.

2. Carriers of Probiotics

Fermentative dairy products, Non-dairy productssuch as fruits and vegetables juice also developed as source of Probiotics. Yogurt is the main carrier of Probiotics. Yogurt production is carried out by fermentation process.Milk is fermented under 40º-45ºC to become a sour in taste [12].Conversion of lactose into lactic acid of the milk (milk usually from cow, sheep and goat)for the production of yogurt. It is acidic in nature. Yogurt produces the organic acid and lowered down the pH in the intestine and changes the oxidation-reduction potential in the intestine due to this it will act as antimicrobial compound and inhibit the growth of pathogenic microbes.Supplementedproducts such as capsules and tablets are also used as a source of Probiotics.

3. Selection of bacteria used as Probiotics

Some principle for a lactic acid bacteria used as Probiotics (a) exert a beneficial effect on the host (b) the cell number into foodstuff will become high during cell count and remain viable throughout the shelf life of the products (c) resistant when passage through GI tract (d) adhesion with human intestinal mucosa (e) property of antimicrobial to kill the pathogenic microorganisms (f) colonize in the lumen of GI tract [13].

4. Therapeutic effect of Probiotics

4.1 Control gastrointestinal disorder.

Many pathogenic microbes have increased antibiotic-resistance gene. Due to this industries do not developed antibiotics those are effective against pathogenic microbes. Studies revealed that Probiotics is used to treatment and prevention of gastrointestinal disorder [14]. In GI tract the microbial balance is very useful for homeostasis [15].LABintake gives beneficial effects on GI tract of human beings and this bacteria release some enzyme and vitamins for improvement in self-absorption of lactose, remedies from viral and drug induced diarrhea, post-operative pouchitis, irritable bowel syndrome, inflammatory bowel syndrome, antineoplastic effects on human cell line, maintenance of normal insulin level in blood and boost the absorption of fatty acids through intestine. LAB produced lactic acid in the intestine and this acid will lower down the pH to prevent the growth of pathogenic microorganisms such as *Salmonella Sp*. or strain of*E.coli*. [16,17].

4.2 Control Antibiotics induced diarrheal diseases

20% patients suffer from this diarrhea.When patients receivingantibiotics and developing this type of symptoms, and this is most common side effects developed by antibiotics therapy[18]. In the age of 65 or above patient

intake again and again antibiotics induces this diseases. Antibiotics disrupt only the intestinal microflora. Broad spectrum antibiotics (tetracycline and chloramphenicol) induces diarrhea [19]. Certain agents can controlled disease such as (*Lactobacillus, Saccharomyces, Bifidobacterium and streptococcus*)these are Probiotics and balance the intestinal microbiota. Antibiotic induced is common and limited illness and after certain period of time this disease will destroyed during treated by Probiotics.A commercial prepared Lactinex contain (*lactobacillus acidophilus* and *lactobacillus bulgaricus*) and placebo introduced to the 79 hospitalized patients getting ampicillin [20] . 43 patient receiving placebo and 36 patient receiving Lactinex. The Lactinex in-taking patients does not producing ampicillin induced diarrhea while 14% placebo in-taking patient producing ampicillin induced diarrhea [14].

4.3 Lactose intolerance

Lactase is an enzyme that hydrolyse the disaccharides lactose into monosaccharides galactose and glucose these monosaccharides is the key source of energy for the growth of human beings. The main function of lactase is hydrolysis. Lactase is a β-galactosidase and generally placed in enterocytes on the small intestine. Lactase function is very crucial during the infant period, in this period lactose is the main source of nutrition. Deficiency of β-galactosidase is represents the low lactose digestion or inability to digest the lactose is called as lactose intolerance. Symptoms are nausea, cramping, bloating and loose stools. Symptoms appear from 25 minutes to 2 hours after consumption of milk. A systemic disease is also associated with lactose intolerance including skin disease, rheumatological complaints, chronic fatigue, and failure to thrive in children [21]. Deficiency of lactase is different type which may lead to cause lactose intolerance. (a)Primary lactase deficiency-the deficiency of lactase start in 2 year of children or above. But symptoms may not arise, (b)Secondary lactase deficiency-injury in the small intestine results of infection, (c) Developmental lactase deficiency occurs in infant premature baby. Symptoms may occurs only short period of time,(d)Congenital lactase deficiency this is a disorder and genes transmitted from parents and cause disorder. These cases arises very rare [22]. Yogurt is fermentative dairy product have low lactose constituent but all other components of the milk is presents in the yogurt. And responsible for releasing lactase enzyme with the help of microbes.

4.4 Irritable bowel syndrome

Symptoms of IBS is abdominal pain, bloating and change in stool density/solidity in the absence of organic acids [23]. It is multifactorial disorder such as genetic cause, abnormal pain, behaviour pathways and gastrointestinal microbiota [24]. In IBS the level of Bifidobacterium and lactobacilli low. So Probiotics products increases the level of Bifidobacterium and Lactobacillus. These products enhances the growth of pathogenic microorganisms and also enhance the viability of the microbes.

4.5 Diabetes

According to the WHO Diabetes is a chronic disease when pancreas does not produce insulin. Increased glucose level in the body called as Hyperglycaemia and may lead to severe cause it also affect nerves and blood vessels. Diabetes mellitus is categorized into two groups (a)type-1 diabetes mellitus is destruction of pancreatic beta cells (b) type-2 diabetes mellitus is low level of insulin production.Oral intake *L. casei* can also relief from autoimmune destruction of pancreas beta cells in NOD mice [25]. Dahi is a source of Probiotics. Dahi is generally inducing the insulin resistance against type-2 diabetes [26].

4.6 Cancer

Colon cancer is second common cause and lead to death [27]. Probiotics have an beneficial effects against cancer cell and act as anticancer therapy for prevent from this disease [28,29,30]. LAB strains exhibit cytotoxic effect against cancer cell line studied in vitro [31]. *L. acidophilus* 36YL exhibits anticancer activity on breast, stomach, cervical and colorectal cancer cell lines, the strains also secrets some substance and that substance are cytotoxic against human colorectal cancer cells and human cervical cancer cells [32].The traditional fermented foods of minorities nationalities from that food wang et.al., isolate 10 Lactobacillus strains exhibit antiproliferative activity and higher adhering capability on human cancer cell lines.

4.7 Vaginal candidiasis

In the epithelial layer of vagina *lactobacilli* creates a healthy environment. *Lactobacilli* adhere on the epithelial layer and protects from pathogenic microbe. Pathogenic microbes release some factors to causes bacterial vaginosis (BV) and urinary tract infections (UTIs) but *lactobacilli* minimize the association. *Lactobacilli* colonizing on the surface of vaginal during menopause. *Lactobacillus acidophilus* can be intake oral and protects from vaginal candidiasis.Mechanism of action mainly depends on the colonization creates a biofilm on the surface of vagina, releasing some metabolite on the other part of vagina, produces acidic products and bacteriocin like substance H_2O_2[33,34,35].

5. Conclusion

This above study was aimed to produce health benefits of Probiotics i.e. control gastrointestinal disorder, control Antibiotics induced diarrheal diseases, lactose intolerance, irritable bowel syndrome, diabetes, cancer and vaginal candidiasis. LAB can be isolated from various source like dairy products, non dairy products and supplemented products. Traditional fermented food products also source of Probiotics. These advantages can promote the use of Probiotics as diet because are rich of *Lactobacillus, Bifidobacterium, Saccharomyces, Enterococcus , Streptococcus, Pediococcus, Leuconostoc, Bacillus* and *E.coli bacteria.*

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