ISSN: 0975-833X

Available online at http://www.journalcra.com

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

International Journal of Current Research
Vol.8, pp.079-081, September, 2010

RESEARCH ARTICLE

BENEFITS OF PROBIOTICS: A REVIEW

Senthil, R.*[1] and Arulkanna, P[2]

[1]Department of Biochemistry, M.I.E.T Arts and Science College, Thiruchirappalli.
[2]Department of Biochemistry, S.K.S.S Arts College, Thirupanandal, Thanjavur.

ARTICLE INFO

Article History:
Received 27th July, 2010
Received in revised form
18th July, 2010
Accepted 25th August, 2010
Published online 4th September, 2010

Key words:
Probiotics,
Lactic acid bacteria,
Non lactic acid bacteria.

ABSTRACT

The interaction of the gastrointestinal microflora with the human host has been the subject of considerable debate in the last decade. Manipulation of the enteric microflora with probiotic organisms has been attempted in a wide range of clinical settings, in the hope of achieving health benefits in the host. Probiotics are the health enhancing the functional food ingredients used therapeutically to prevent diarrhea and enhances immune system. They may also have potential to prevent allergy, indigestion, lower serum cholesterol. This review focuses information regarding the probiotics and their proposed uses.

INTRODUCTION

The intestinal tract harbours a complex bacterial community (microbiota), integrated by more than 800 different bacterial species, which have an enormous impact on the nutritional and health status of the host (Nadal *et al*., 2007). The metabolic activity developed by the gut microbiota contributes to the digestion of dietary compounds, salvage of energy, supply of nutrients and transformation of xenobiotic. In addition to promoting normal gastrointestinal functions and providing protection from infection, the intestinal microflora also exerts important effects on systemic metabolism and immune function.

Gut microbial ecology

The gut colonization process starts immediately after birth and the development and establishment of the infant's microbiota highly depend on environmental factors. In general, Bifidobacterium populations are dominant in the first months of life, especially in breast-fed infants (up to 90% of the total faecal bacteria) due to the bifidogenic effect of breast milk (Gueimonde *et al.,* 2006).

Probiotics

In 2001, an International Life Sciences Institute Europe consensus document proposed a simple and now widely accepted definition of probiotics as "viable microbial food supplements which beneficially influence the health of humans." (Salminen 2001) Probiotics consist of lactic acid producing bacteria (LAB), non-lactic acid producing bacterial species, and non-pathogenic yeast.

***Corresponding Author:** *senthilmiet@yahoo.com*

Lactic acid-producing probiotic bacteria

Lactobacillus

The genus Lactobacillus normally predominates in the small intestine. Lactobacillus species are facultative anaerobes. Commonly available probiotic lactobacillus species L*. acidophilus L. salivarius, L. brevis L. gasseri L. plantarum, L. bulgaricus* etc.,

Bifidobacterium

Bifidobacteria are strictly anaerobic and normally vie for predominance in the large intestine. *Bifidobacterium* is another well-documented genus of lactic acid producing bacteria. Commonly available probiotic Bifidobacteria species like B. *adolescentis B. breve B. longum, B. animalis B. infantis B. thermophilum, B. bifidum B. lactis* etc.,

Streptococcus

Streptococcus species are not typically associated with health benefits. However, one facultative anaerobic species, Streptococcus thermophilus, is known to promote health. It is one of the two primary species found in yogurt cultures, the other being L. bulgaricus.

Enterococcus

Found in a number of probiotic products, the facultative anaerobe *Enterococcus faecium* has a variety of beneficial characteristics.

Non-lactic acid-producing probiotic bacteria

Bacillus

Bacillus species are ubiquitous facultative or obligate aerobic, spore-producing organisms found in the soil and water. Spores of a number of *Bacillus* species are used as

probiotics and are often referred to as soil-based probiotics (Hong *et al.,* 2005).

Yeast probiotics

Saccharomyces

The yeast genus *Saccharomyces* contains species of S. *boulardii* is used as a probiotic. Unaffected by gastric acid and bile, *S. boulardii* proliferates along the entire gastrointestinal tract.

Benefits of probiotics

Nutritional benefits

The action microorganism during the preparation of cultured foods or in the digestive tracts has been shown to improve the quantity, availability and digestibility of some dietary nutrients. Fermentation of food with lactic acid bacteria increases folic acid in yoghurt, bifidus milk and kefir, Sour cream containing approximately twenty times more folic acid than milk. Lactic acid bacteria are known to release various enzymes into the intestinal lumen that exert synergistic effects on digestion. The bacterial enzymatic hydrolysis may enhance the bio availability of protein and fat (Friend *et al.,* 1984) and increase the production of free amino acids. Short chain fatty acids (SCFA) such as lactic acid, propionic acid and butyric acid also produced by lactic acid bacteria when absorbed these SCFAs contribute to the available energy pool of the host and may protect against the pathological changes into the colonic mucosa.

Vitamin production

LAB produces small amounts of certain B vitamins, including folates and vitamin B12. Microbial synthesis of vitamin K in the intestine appears to have nutritional significance in most animal species. Bifidobacteria, streptococci, and enterococci have been shown to produce vitamin K (Bently *et al.,* 1982).

Enhancement of mineral bioavailability

Mineral absorption requires an acidic medium, especially when the minerals are in the form of inorganic salts. Stomach acid is usually sufficient to dissolve mineral salts, but when stomach acid is inadequate mineral salts may not fully dissociate. LAB aid mineral absorption via the production of acidic microenvironments adjacent to the intestinal lining and by generating SCFA that donate protons necessary for mineral absorption, Animal studies have demonstrated that LAB, especially in the presence of a probiotic growth factor like inulin, increase intestinal absorption of calcium, magnesium, potassium and zinc (Delzenne *et al.,* 1995).

Immunological effects

Lactic acid bacteria are thought to stimulate both non-specific host defence mechanisms and certain types of cell involved in the specific immune response. The result is often increased phagocytic activity and/or elevated immunological molecules such as secretory IgA, which may affect pathogens such as salmonellae and rotavirus. Most attention in this respect has been diverted towards the intake of probiotics (lactic acid bacteria) (Schifrin *et al.,* 1995) and interactions between cell wall components and immune cells.

Diarrhoea

The use of probiotics in diarrhoea is a wide and controversial field. Different types of diarrhoeas can benefit from probiotics use in its prevention, treatment or recovery. Infectious diarrhea lacks a microflora balance as a consequence or cause, promoting the development of dismicrobism, which is the alteration of the optimal rate between different types of bacteria, favouring the development of harmful species. Probiotics can act in the process of dismicrobism (Gismondo *et al.,* 1999).

Reduction of cholesterol

Studies have shown that some probiotics can lower total serum cholesterol and low density lipoprotein cholesterol. *In vitro* studies have shown *L. casei* and *L. acidophilus* effectively remove cholesterol from culture media. Researchers postulate that LAB assimilate cholesterol in the gut or deconjugate bile acids disrupting the intestines-to-liver circulation of cholesterol (Anderson *et al.,* 1999).

Reduction of food allergy

The ability of probiotics to reduce the symptoms of food allergy was noted over 20 years ago. Since then, several well-designed studies have indicated that supplementation with specific probiotic strains are effective for atopic disorders. In infants with atopic eczema and cow's milk allergy, a whey formula supplemented with *L. rhamnosus* GG was shown to significantly improve clinical symptoms and markers of intestinal inflammation. In children with atopic dermatitis, a combination of *L. rhamnosus* and *L. reuteri* proved beneficial (Majamaa *et al.,* 1997). Consumption of these select *Lactobacillus* probiotics downregulates over-expressed immune responses.

Active against to pathogens

In the intestinal tract, a delicate balance constantly needs to be maintained between beneficial and pathogenic organisms. A variety of factors can shift the intestinal microflora balance in favor of pathogens. These factors include antibiotics, immunosuppressants, stress, aging, poor diet, excessive alcohol intake, environmental pollutants, and infections. Many studies have confirmed that probiotics promote a more favorable balance of intestinal microflora by reducing populations of harmful microorganisms. Probiotics accomplish this task primarily by producing substances toxic to pathogenic organisms such as lactic acid, acetic acid, formic acid, hydrogen peroxide, and bacteriocins (Rosenfeldt *et al.,* 2003). Long-term, a re-established healthy balance may reduce the risk of a variety of chronic degenerative or immunologically-mediated diseases.

Promote to digestion

Most lactic acid probiotic bacteria are capable of metabolizing a variety of carbohydrates, including lactose. Some LAB species also secrete proteolytic and lipolytic enzymes that facilitate digestion of proteins and fats. People who produce inadequate amounts of stomach acid and cannot activate the proteolytic enzyme pepsin and individuals with pancreatic insufficiency deficient in pancreatic proteases and lipases all benefit from dietary supplementation with probiotics. Enhanced protein digestion often benefits people with allergies due to increased gut permeability defects by reducing the ability of large proteins to cross the intestinal barrier, enter the bloodstream, and trigger immune responses (Rautava *et al.,* 2005).

CONCLUSIONS

Probiotics can be essential for the normal digestive, endocrine and immunological functions. While the development of foods containing probiotic bacteria are being investigated for their positive effects both on general health and for specific disease states, a rational selection and design of probiotics remains an important challenge for scientific community. There is also an urgent need for the development of correct formulations and novel ways of their administration in different clinical situations.

REFERENCES

Anderson, J.W., and Gilliland, S.E. 1999. Effect of fermented milk (yogurt) containing Lactobacillus acidophilus L1 on serum cholesterol in hypercholesterolemic humans. *J Am Coll Nutr*,18:43-50.

Bentley, R., and Meganathan, R. 1982. Biosynthesis of vitamin K (menaquinone) in bacteria. *Microbiol Rev*,46:241-80.

Delzenne, N., Aertssens, J., Verplaetse, H., Roccaro, M., and Roberfroid, M. 1995. Effect of fermentable fructooligosaccharides on mineral, nitrogen and energy digestive balance in the rat. *Life Sci*,57:1579-87.

Friend, B.A., and Shahani, K.M. 1984. Nutritional and therapeutic aspects of lactobacilli. *J Appl Nutr*;36: 125-53.

Gismondo, MR., Drago, L., and Lombardi, A. 1999. Review of probiotics available to modify intestinal microflora. *Int J Antimicrob Ag*;12(4):287–92.

Gueimonde, M., Salminen, S., and Isolauri. 2006. Presence of specific antibiotic (tet) resistance genes in infant faecal microbiota. *FEMS Immunol Med Microbiol*,48:21–5.

Hong, H.A., Duc, L.H., and Cutting, S.M. 2005. The use of bacterial spore formers as probiotics. *FEMS Microbiol Rev*,29:813-35.

Majamaa, H., and Isolauri, E. 1997. Probiotics: a novel approach in the management of food allergy. *J Allergy Clin Immunol,*99:179-85.

Nadal, I., Donat, E., Ribes-Koninckx, C., Calabuig, M., and Sanz Y. 2007. Imbalance in the composition of the duodenal microbiota of children with coeliac disease. *J Med Microbiol*,56:1669–74.

Rautava, S., Kalliomaki, M., and Isolauri, E. 2005. New therapeutic strategy for combating the increasing burden of allergic disease: Probiotics-A Nutrition, Allergy, Mucosal Immunology and Intestinal Microbiota (NAMI) Research Group report. *J Allergy Clin Immunol*,116:31-7.

Rosenfeldt, V., Benfeldt, E., and Nielsen, SD. 2003. Effect of probiotic Lactobacillus strains in children with atopic dermatitis. *J Allergy Clin Immunol*,111:389-95.

Salminen, S. 2005. Human studies on probiotics: aspects of scientific documentation. *Scand J Nutr*,45:8-12.

Schiffrin, EJ., Rochat, F., and Link-Amster, H.A. 1995. Immune system stimulation by probiotics. *Journal of Dairy Science,* 78: 1597–1606.

****