

A COMPREHENSIVE REVIEW ON PROBIOTICS AND ITS SIGNIFICANCE

Abstract

Probiotics contain live bacteria and yeast that when consumed in adequate amount do wonders to human health. The most popular super supplements available in the market today are Probiotics. Bacteria's are usually considered as dangerous or harmful, but the fact is human body contains both types of bacteria i.e., good and bad. Hence, Probiotics are good bacteria which are required by our body. In this review, an overview of probiotics, gut health benefits, their role in immune system and disease prevention. Furthermore, current trends in the development of probiotic products also discussed. Overall, this review aims at better understanding of probiotics and their significance as emerging functional foods.

Keywords: Probiotics, supplements, good bacteria, gut health, functional food.

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I. INTRODUCTION

In the digestive intestinal tract Probiotic bacteria are present. Around more than 400 different types of bacteria that reside in the human intestinal tract. To ensure the levels of healthy bacteria, Probiotic complex should be maintained for healthy and strong being. Probiotics are gaining attention from various fields such as food and medicinal companies, governmental organizations (such as the WHO/FAO, 2002), and researchers.

- **Features of Probiotics Products**

- Helps in maintaining a healthy settled stomach
- Yields a boost of good bacteria to human body
- Furnish a good health and overall well-being
- Comprise of no milk (lactose), wheat (gluten) and soy

Probiotics means “let the good microbes from distinct domain get their profits and acquire rest”. The functions of probiotics include, helps in the digestion of food, to maintain the digestive system’s pH, to destroy the bad microbes, production of useful products, and accompaniment the missed digestive enzyme functions (because of missed or defective genes), and many more. Probiotics will enlarge or increase the competency of biological fermenters, the digestive system.

Probiotics are very beneficial to overall health. They are especially good for the digestive system. Probiotics may help in lowering the content of bad bacteria that causes infections after taking medication like antibiotics; also probiotics may help in replenishing the amount of good bacteria in the gut. So, it is obvious that many metabolic functions are being performed by human intestinal micro-flora such as fermenting indigestible and endogenous mucus dietary residues, vitamin K production, saves energy and absorption of ions. Probiotics play crucial roles in the development and the homeostasis of the epithelial cell proliferation and differentiation and in the immune system (Cammarota et al., 2009). Probiotics are traditional foods such as different types of cheese, salty fishes, yogurt and probiotic beverages and so on, which exist from the olden times. Such complex food contains various types of useful bacteria. Hence, probiotics are not new innovation (Amara et al., 2012). The fermented milk might be the first actual use of food having Probiotics (Hosono, 1992). Later on, fermented milk is converted into cheese; yogurt and many more (Metchnikoff et al., 1910; Metchnikoff, 2004 and Amara et al., 2012).

People in olden times, in their daily diet include Probiotics containing food (Amara et al., 2012). When due to any reason, our intestinal microflora gets affected critically; Probiotics are given in the form of tablets in large dosage (Reid et al., 2003). A considerable balance of bacteria such as coliform, lactobacilli, streptococci and clostridia and is a sign of a healthy intestine. The balance of our intestinal flora could change under certain conditions such as high fat diets, stress, excessive meat, alcohol use, sugar, inadequate food, fluoride in drinking water and chlorine and antibiotics, exposure to environmental toxins, genetic disorders, and many other factors (Hosono, 1992). However, in reality human health is affected by many different factors such as exogenous and endogenous that results in change of position of microflora position. Useful microflora builds immune system slowly and undertakes good health to be prepared for the pathogens (Bandyopadhyay et al., 2009 and Cammarota et al., 2009).

II. ROLE OF PROBIOTICS IN NURTURING OUR HEALTH IN DISEASE MANAGEMENT AND TREATMENT

- Probiotics help to revitalize in any loss of beneficial microflora and to reduce the destructive effect of antibiotic present in human gut. Some *Bacillus* species are recommended for use with antibiotics while they are resistant to them (Bandyopadhyay et al., 2009 and Cammarota et al., 2009).
- Improving intestinal tract health (Vanderhoof, 2000).
- Certain cancer risk is reduced (Mego et al., 2005).
- Helps in controlling serum cholesterol levels (Helivak et al., 2005).
- Probiotics helps to improve digestion of lactose.
- The preventative functions performed in the intestinal mucosa which include the secretion and the synthesis of antibacterial peptides are regulated by probiotics (Cammarota et al., 2009).
- Control Blood pressure (Hypertension) (Helivak et al., 2005).

Based on these evidences, although it is clear that Probiotics may help with faster healing of many intestinal diseases such as irritable bowel syndrome, inflammatory bowel disease and diarrhea, still more research is needed. However, probiotics helps in treatment and prevention of urinary tract infections, liver diseases, vaginal yeast infections, and allergic disorders such as allergic rhinitis, atopic dermatitis, tooth decay, other oral problems and reduces the severity of flu and common cold.

III. CONSUMPTION PROFILE OF PROBIOTICS

India is becoming a significant market for the major probiotic market with an expected annual growth rate of 22.6%. Many prominent probiotic industries in India are Nestle, Amul, Yakult Danone, Mother Dairy, etc. In India, probiotics generally come in fermented milk and milk product forms, wherein fermented milk occupies a total market share of 38% while milk products occupy 62% of the market share (**Indian Consumer Survey, 2010**).

Amul was the first to break through nationally in February 2007 with its probiotic ice cream profile in. Another success for Amul in the probiotics category was the introduction of probiotics lassi. The major contribution of sales in Amul is its probiotic products, where Dahi (India Yogurt) contributes 25% and ice cream contributes 10%. On the other hand, Mother Dairy has the largest milk (unprocessed/liquid) plants in Asia, which sells more than 25 lakh liters of milk daily. The company's probiotics products are b- Activ Curd, Nutrifit (Mango & Strawberry), b-Activ Probiotic Lassi, and b-Activ Probiotic Dahi. 15% turnovers of their fresh dairy products are made of Probiotic products. In India, Nestle launched NESVITA, which was the first healthy digestion Dahi containing Probiotics. Yakult, a probiotic beverage manufactured from *Lactobacillus*, sugar, and fermented milk is sold by Yakult Danone India Pvt.Ltd. (YDIPL) a 50:50 joint venture between The French- Danone Group and Japan's Yakult Honsha. After the introduction of Yakult in India, the demand and visibility for probiotics products are rising and are expected to grow further in the future. Even though acceptance is increasing, it will take a long time until Indian consumers change their attitudes.

IV. GLOBAL CONSUMPTION SCENARIO OF PROBIOTICS

Probiotics are increasing interest since the last few years and has been called as ‘magic bugs’ as they play protective and important role to keep the gut fit and healthy. Probiotics have increased tremendous popularity to promote healthy intestine amongst the individuals, those who are looking for “natural” means. From 2010 to 2014, the sales of probiotic products increased by 35% worldwide, reaching a value of \$30.3 billion from US\$23.1 billion. Some places like Latin America (47%), Asia Pacific (67%) and Eastern Europe(67%) have increased their use by more than the average and made up almost half of the global sales in the year 2014 (**Statista, 2014**).

In developed countries the growth of the probiotic products has been impressive. Supplements made from probiotics have seen the highest grounding in its formula, packaging, marketing and delivery.

On the other hand, probiotic supplements anticipated to grow by 60% from 2015 to 2020. This is much higher compared to the growth of the growth of sour milk products and yoghurt i.e. 25% and 4% respectively.

V. RECENT TRENDS IN DEVELOPMENT OF PROBIOTIC PRODUCTS

For the development of new probiotic formulations in the category of functional foods, the use of probiotics has increased dramatically and their potential domain of application offers an innovative approach for the management in human clinical care which is extraordinarily: high cholesterol, oncology, inflammatory bowel diseases or infectious diseases, protection against diarrhea, allergic diseases, lactose intolerance, H. pylori infection, and even systemic disease. The clinical benefits of probiotics could broaden to fields such as allergic disease and cancer (**Alexandre et al., 2014**).

There is a wide diversity of functional foods that have been developed currently. Among these foods, probiotic functional foods have beneficial effects on the overall health. It can be split into probiotic dairy foods and probiotic non-dairy foods:

- 1. Probiotics dairy foods:** Probiotics dairy food market grows every year as demand for dairy increases. Health promoting effects of the probiotic bacteria are originated initially from milk products, bioactive substances from fermented dairy products and preventing lactose intolerance. Therefore, the development of probiotic products is an important research priority for the design of new foods and is a challenge for both the food industries as well as the science sectors.
- 2. Probiotics non-dairy foods:** The demand for the non-dairy probiotic products is also increasing as the number of vegetarianism increasing throughout the developed world. The non-dairy probiotic products are on the rise interest among the vegetarians and customers with lactose intolerance. Among the non-dairy based fermented products, soy based, grain-based, fruits and vegetables based foods are increasing popularity (**Prado et al., 2008; Gupta et al., 2012; Gawkowski et al., 2013; Martins et al., 2013**).

The difference between dairy probiotic foods and non-dairy based fermented food products is listed in the table below:

S.no.	Parameters	Dairy probiotic foods	Non-dairy probiotic foods
1.	Lactose intolerance	Negative effect	No issue
2.	Calcium availability	Positive effect	No issue
3.	High fat	Negative effect	No issue
4.	Cholesterol content	Negative effect	No issue
5.	Dietary fiber	No issue	Positive effect
6.	Digestibility	Not easy	Easy to digest
7.	Survival rate of probiotics	High	Low
8.	Flavour (diacetyl/acetaldehyde)	Positive effect	No issue
9.	Phyto-chemicals	No issue	Negative effect
10.	Isoflavones	No issue	Positive effect

(Source- Anonymous)

All specific health claims related to probiotic food composition and their protection in the human still pose a real challenge to ensure the reliability of their physical fitness. Today the commonly used probiotics strains have been selected from the strains of lactic acid bacteria like Lactobacillus, Bifid bacterium and Streptococcus (**Baquerizo et al., 2014**) but recently new probiotic from other species & genera have also been currently added. It is well known that different probiotic strains produce different responses. Hence, certain strains might have specific goals in reducing the risk and treating human disease (**Isolauri E et al., 2004**).

VI. CONCLUSION

In this review in depth exploration of probiotics which include mode of action and significance in human health are explained. There are different types of microbes that humans are exposed during their lives that are not suitable for health. The useful microflora present in gut could be destroyed by antibiotic treatment. To overcome this situation, in order to regenerate microflora, probiotics should be used. To improve overall health and to recover any losses in digestive microflora, probiotics are the best and affordable way. Probiotics are the rapidly expanding functional foods. Indian probiotic industry is at early stage of growth and currently accounts for a minor part which is less than 1% of total market turnover globally. Also, probiotic industry's enormous growth is very near in coming future, as it is rising at a steady pace. Better understanding of the significance of probiotics will surely contribute in promoting overall health of the well-beings and their integration into healthcare practices.

REFERENCES

- [1] Amara, A. In: Amara, A. (Ed.), *Toward Healthy Genes*. Schu" ling Verlage, Germany, 2012.
- [2] Alexandre Y, Le Blay G, Boisrame-Gastrin S, Le Gall F, Hery-Amaud G, et al. Probiotics: A new way to fight bacterial pulmonary infections? v.44, p.9-17, 2014.
- [3] Bandyopadhyay, P., Das Mohapatra, and P.K. Effect of a Probiotic bacterium *Bacillus circulans* PB7 in the formulated diets: on growth, nutritional quality and immunity of Catlacatla (Ham.). *Fish Physiol. Biochem.* v.35, p.467–478, 2009.
- [4] BaquerizoNole KL, Yim E, Keri JE. Probiotics and prebiotics in dermatology. v.71, p.814-821, 2014.
- [5] Cammarota, M., De Rosa, M., Stellavato, A., Lamberti, M., Marzaioli, I., Giuliano, M. In vitro evaluation of *Lactobacillus plantarum* DSMZ 12028 as a probiotic: emphasis on innate immunity. *Int. J. Food Microbiol.* v.135, p.90–98, 2009.
- [6] Gawkowski D, Chikindas ML. Non-dairy probiotic beverages: the next step into human health, v.4, p.127–142, 2013.
- [7] Gupta S, Abu-Ghannam N. Probiotic fermentation of plant based products: possibilities and opportunities, v.52, p.183–199, 2012.
- [8] Helivak P, Odraska J, Ferencik M, Ebringer L, Jahnova E. One year application of probiotic strain *Enterococcus faecium* M-74 decreases serum cholesterol levels. v.106, p.67-72, 2005.
- [9] Hosono, A. Fermented milk in the orient. In: Naga sawa, Y., Hosono, A. (Eds.), *Functions of Fermented Milk: Challenges for the Health Sciences*. Elsevier Applied Science, London, UK, p.61–78, 1992.
- [10] Isolauri E, Sutas Y, Kankaanpaa P, Arvilommi H, Salminen S. Probiotics: effects on immunity. *Am J Clin Nutr*; 73(Suppl. 2): S444–50, 2004.
- [11] Martins EMF, Ramos AM, Vanzela ESLB, Stringheta PC, Pinto CLO, Martins JM. Products of vegetable origin: a new alternative for the consumption of probiotic bacteria; v.51, p.764–770, 2013.
- [12] Mego M, Holec V, Drgona L, Hainova K, Ciemikova S, et al. Probiotic bacteria in cancer patients undergoing chemotherapy and radiation therapy. v.21, p.712-723, 2005.
- [13] Metchnikoff, I.I. *The Prolongation of Life: Optimistic Studies*. Springer Publishing Company, New York, NY, USA, 2004.
- [14] Metchnikoff, I.I., Mitchell, P.C. *Nature of Man or Studies in Optimistic Philosophy*. Kessinger Publishing, Whitefish, MT, USA, 1910.
- [15] Prado FC, Parada JL, Pandey A, Soccol CR. Trends in non-dairy probiotic beverages, v.41, p.111–123, 2008.
- [16] Reid, G., Sanders, M.E., Gaskins, H.R., Gibson, G.R., Mercenier, A., Rastall, R., Roberfroid, M., Rowland, I., Cherbut, C., Klaenhammer, T.R. New scientific paradigms for Probiotics and prebiotics. *J. Clin. Gastroenterol.* 37, 105–118, 2003.
- [17] Vanderhoof JA, Whitney DB, Antonson DL, Hanner TL, Lupo JV, Young RJ. *Lactobacillus* GG in the prevention of antibiotic-associated diarrhea in children. v.135, p.564-568, 2000.
- [18] WHO/FAO. *Guidelines for the Evaluation of probiotics in Food*. London, 2002.