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Ayurvedic and Modern Nutritional Approaches for the Impact of Probiotics on Human Health: A Review

Review Article

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Abstract

Background: Human are unique reservoir of diverse and highly living community of microorganisms which collectively forms the human microbiome. The human gut is home to more than 100–1000 different types of microbes, all of which have a profound impact on host health by modulating the internal environment of the host. These organisms are essential for good digestion, anabolism and catabolism. Lactobacillus and Bifidobacteria are commonly used probiotic cultures. They play important role in maintenance of good health, immune system. In Ayurvedic classical text, Dadhi (Curd) and Takra (Buttermilk) are considered as the source of Probiotic, which is beneficial for the gut health. It is beneficil for the diarrhoel disease, constipation, gastroenteritis, inflammatory bowel disease, irritable bowel syndrome. Aims and Objectives: The purpose of the study is to highlight the various impact of probiotics on human health through Ayurvedic and Modern nutritional aspects. Method and Materials: This paper has been taken from various research paper from PubMed, Google scholar etc. Discussion & Conclusion: The microbiome diversity is likely important in health maintenance, and it is likely that broad-spectrum probiotics may increase the effectiveness of treatment. They have an important role in the maintenance of immunologic equilibrium in the GI tract through direct interaction with immune cells. Probiotics are useful and friendly microbes. There is a relationship between disease, health, the immune system, and changes in the microbiota. They are able to compete with the bad microbes and colonize our digestive system. They are also able to ferment our food to simpler by products and could promote our health by many different mechanisms. In Ayurveda, there are many Ahara Kalpana are mentioned, which are prepared by using Dadhi and Takra and those Kalpana are ensured as healthy microbiome.

Keywords: *Ayurveda,* Gut-microbiota, Microbiome, Probiotics.

Introduction

The concept of functional foods has gradually evolved in recent years to include dietary supplements that may have an impact on the composition and activity of gut microbes. For thousands of years, milk and dairy products have been a staple of human diets, contributing significantly to global human population growth and nutrition. (1) Probiotic bacteria, prebiotic fibres and synbiotic are the most widely used basic concepts in the creation of functional dairy products which are beneficial for the gut health.(2)

Probiotics (i.e. bacteria and yeast) are live microorganisms are beneficial for the health and studies has been found its role in the treatment of various diseases. (3,2) They have the potential to improve or prevent intestinal or systemic disease traits such as gut inflammation by restoring the composition of the gut microbiome and introducing advantageous functionalities to gut microbial communities. (3) Probiotics have been the subject of extensive study in the last few years, and numerous studies have demonstrated their critical function in preserving human health.

In Ayurveda, concept of microbiome and its importance in gut health is mentioned. Many Ahara Kalpana and Dravya described in Ayurvedic classical texts related to dadhi (Curd) or fermented product may provide maintain good health due to good bacteria. According to Acharya Charak, takra (buttermilk) is beneficial for the IBD (Inflammatory Bowel Disease). (4,5).

Probiotics in Modern Nutrition

The term of Probiotic is derived from Greek, which means “for life.” A probiotic is a live microbial feed supplement that exerts beneficial effects for the host via improvement of the microbiological balance in the intestine (Fuller, 1992,1997). (6,7) The most often used probiotics are lactic acid excretors, such as bifidobacteria and lactobacilli, which are added to fermented milk products or administered in lyophilized forms. Although, the traditional definition of probiotics states unequivocally that they are supplements containing living microorganisms. But there is conflict about whether dead microorganisms or even fragments of bacteria should be included. A non-viable dietary ingredient with selective fermentation that moves to the colon is called a prebiotic. The targeted stimulation of

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one or a small number of colonic bacteria's growth and/ or activity provides the benefit to the host. Prebiotic food ingredients have to be able to withstand hydrolysis or absorption in the upper gastrointestinal tract, act as a selective substrate for one or a small number of colonic bacteria, change the composition of the colon's microbiota to a healthier state, and have luminal or systemic effects that improve host health.(7,8) Good target species are lactobacilli and/or bifidobacteria. subsequently, probiotic and prebiotic combinations are known as synbiotics.(8) The combination would help the host by enhancing the microbial supplements implantation and survival. Foods serve as the primary delivery system for probiotic, prebiotic and synbiotics due to the nutritional advantages of microbiota management strategies. There might, however, also be some medicinal uses, albeit the majority of the study supporting this is speculative at this time.

Probiotics in Ayurveda

The production of medications using herbal, mineral, metallic, marine, and other substances is the focus of Ayurvedic pharmaceutics.(9) Dietetic preparations are another area of focus. Pathya plays a crucial role in preserving health. Ayurvedic pharmaceutics include a lot of dietary preparations, but not many fermentation products. Sandhana kalpanas are a type of preparation that has a hydroalcoholic quality. (10) These preparations provides both nutritional benefits and medicinal effects. These dietary supplements and formulations function as prebiotics and probiotics.(7)

Therapeutic preparations known as Asava-Arishtas (fermentation preparations) and a few pathya kalpanas (dietary preparations) are fermented products used in Ayurvedic pharmaceuticals. These preparations most likely have prebiotic and probiotic effects. (11) It mentions about sandhana kalpana, fermentation preparation made by using dravya (liquid ingredients) and other therapeutic medications placed in a closed, inert vessel and allowed to carry out fermentation for a predetermined amount of time (11).

Fermented beverages made with Curd (Dadhi) and butter milk (Takra) consist various probiotic properties and in Ayurvedic classical text books, it is mentioned that they are beneficial for the treatment of various diseases such as constipation (vishtambha) or malabsorption problems (Grahini), haemorrhoids (Arsha) etc. as well as in Ayurveda the properties of the curd are described as it is appetiser (deepan), ruchikarak (tatse enhancer). Studies reveals that Dadhi have probiotic effect due to presence of lactic acid bacteria which is beneficial for gut health and helpful in the treatment of diarrhoea(11,12).

Classification of Dadhi according to Ayurveda

1	Pranija Dravya (animal source) (13)
2	Gorasa varga or Ksheera vikruti (milk products) (14)
3	Sneha varga (fats)
4	Dadhi varga (fermented milk)

Types of Dadhi according to Taste by Acharya Susruta (15)

1. Madhura (Sweet)
2. Amla (Sour)
3. Atyamla (Excessive Sour)

Properties of Dadhi

Dadhi cures chronic coryza, Visham Jwara (irregular fever), diarrhoea, Aruchi (anorexia), Mutrakrichha (dysuria), and Krishta (emaciation). It is snigdha (unctuous), ushna (hot) & taste is kasaya (astringent). It is a revitalizer, aphrodisiac, and beneficial. According to Acharya Susruta, curd prepared from boiling milk is of high quality, alleviates Pitta and Vata, and enhances Dhatu, Agni, and strength. It is also appetising. (16)

Dadhimastu is a liquid part of a dadhi (curd) is amla (sour), kasaya (astringent), madhura (sweet) in properties. It diminishes Kapha and Vata, Laghu (easy to digest) and having Prinan (nourishment), Sadhya Balavardhan (instant strength booster), Pralhadankarmas (exhilirating). It removes trishna (thirst), Klama (exhaution) and works as a Strotovishodhana (purification of all the channels) and Ruchikarak (taste enhancer)(17). Curd's residual fatty layer is thick, aphrodistiac, vatapacifying, helps to increase semen and Kapha while decreasing Agni. (18)

Curd without the supernatant layer is Ruksha (rough), Grahi (absorbant), gas-forming, aggravates Vata, and easy to digest. On the other hand, Laghu (easy to digest) increases digestive power and is relishing. Jaggery and curd together are unctuous, wholesome, hridya (good for heart) and Vata pacifying.

Properties and Mode of Action of various types of Dadhi (19)

S. No.	Types of Dadhi	Properties	Mode of Action
1	Gavya dadhi (cow curd)	Sneegdha (unctuous), Madhur vipaki (sweet in final transformation),	Deepan (stimulates digestive power), promotes strength, alleviate Vata, relishing
2	Mahish dadhi (Buffalo Milk)	Madhur vipaki (sweet in final transformation), aphrodisiac	Pacifies Vata and Pitta, increases Kapha
3	Aajya dadhi (Goat curd)	Laghu (easy to digest), pacifies Kapha and Pitta, alleviates Vata, useful in Kshaya	Swasa (dyspnoea), Arsha (piles), Kasa (cough)

Effects of Dadhi (20)

Types of Dadhi	Effect on Dosha
Madhura	Vatashamana, Pittashaman, Kaphakar
Amla	Vatashamana, Pittakarak, Kaphakar
Atyamla	Vatashamana, Pittakarak, Raktadushtikar

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Effect of Dadhi on Dhatu, Mala, Strotas, Agni

Effects on Dhatus	Dhatuvardhan
Effects on Mala	Mutravardhan
Effect on Strotas	Abhishyandi
Effect on Agni	Deepan

Various types of Curd and its mode of Action (21)

S.No.	Type of Dadhi	Properties and Mode of Actions of Dadhi
1	Gavya dadhi (cow curd)	Sneegdha (unctuous), Madhur vipak (sweet in final transformation), Deepan (stimulates digestive power), promotes strength, alleviate Vata, relishing
2	Mahish dadhi	Madhur vipak (sweet in final transformation), aphrodisiac, pacifies Vata and Pitta, increases Kapha
3	Aajya dadhi (goat curd)	Laghu (easy to digest), pacifies Kapha and Pitta, alleviates Vata, useful in Kshaya, Swasa, Arsha, Kasa

Impact of Probiotics on Human Health

Probiotics have been defined by The Food Agricultural Organization/World Health Organization (FAO/WHO) as "live microorganisms which when administered in adequate amounts confer a health benefit to the host." They have been used for centuries in the form of dairy-based fermented products, but the potential use of probiotics as a form of medical nutrition therapy has not received formal recognition.

Additionally, there continues to be more to learn about the relationship between colonic bacteria populations and health. So as much as possible, pre- and probiotic applications require an understanding of the impact of colonic bacteria on host health. Particularly when it comes to the microbiota, the colon can be an organ of both health and sickness.

It has been suggested that disrupting the delicate balance in the gastrointestinal tract can contribute to diarrhoea (antibiotic-associated diarrhoea, traveler's diarrhoea, intestinal infections), gastroenteritis, constipation, irritable bowel syndrome, inflammatory bowel disease (Crohn's disease and ulcerative colitis), food allergies, and certain cancers. On the contrary, a balanced or "normal" enteric flora may competitively exclude possible pathogenic organisms, stimulate the intestinal immune system, and produce nutrients and other substances such as short-chain fatty acids, vitamins, amino acids (arginine, cysteine, and glutamine), polyamines, growth factors, and antioxidants.

There are some studies which claims the impact of probiotic in immune enhancement, intestinal health, lowering of cholesterol, prevention of cancer, diabetes control, diarrhoeal disease but the dosages requirement and its evidence related to probiotic treatment is still about to further study.[22,23]

Discussion & Conclusion

According to the study by Martin R et.,al. (2003)[24] and Marin ML et.,al.(2016)[25] LAB (Lactic Acid Bacteria) are naturally present in cow milk as well as human milk. They used for the fermentation of milk since a hundred of years and they increase the durability of the milk (25). Study by Elie Metchnikoff has shown the benefit of fermented dairy products to balance the microbes in gut (26).

Probiotics are a beneficial microorganism, which maintain flora intestine and thus enhances immunity. By protecting the intestinal surface against pathogen adhesion, preserving the epithelial barrier, and regulating and maturing the immune system appropriately, probiotics can enhance host protection. Additionally, by altering intestinal flora, probiotics can heal specific illnesses by enhancing host immunity. Probiotics, intestinal flora, and immunity have all been shown to be closely related in recent times (27).

Scientific research demonstrates that adding probiotics to diet can have positive effects on health. For the treatment and prevention of some disorders, this article appears sufficient, but for others, it is only encouraging or even debatable. Bowel diseases such as diarrhoea caused by antibiotics, lactose intolerance, allergies, and viral diarrhoea, among others, have the best documented side effects. These products are growing in popularity and are starting to represent one of the biggest functional food sectors at the same time that consumer awareness is rising. The non-dairy market is constantly changing due to advancements in food technology and rising consumer demand, but dairy products especially curd or yoghurt remain the most significant means of delivering probiotic bacteria to consumers. However, probiotic product development is still in its early stages.

Many Ayurvedic medications are said to have excellent Aupanam and Pathya in fermented milk. Takra and dadhi are considered natural probiotic diets since they are rich in beneficial bacteria that are good for the body overall, including the intestines. Other examples of fermented milk dosage forms are Takrarhista etc., Human gut microbiota is crucial to health, and a variety of disorders can be treated and prevented by modifying the gut microbiota. Recent cutting-edge studies demonstrate that the bacteria present in fermented milk can treat a wide range of digestive illnesses. While probiotics are an emerging area in the treatment of obesity and cancer, Takra was also utilised in ancient medicine to cure Gulma, Madoroga, Mandagani, and other conditions. It can also be said that traditional Indian medical science has contributed to the field of medicine by developing the idea of symbiotic relationships and using them to cure chronic illnesses. It is also urgently necessary in the present to ensure that the health claims and guidelines around the use of fermented milk are solidly established through carefully planned large-scale clinical investigations.

Probiotics hold tremendous potential for treating or preventing a variety of intestinal diseases. Probiotics help restock our digestive tract with beneficial microbes

to counterbalance the harmful ones. Moreover, the efficacy demonstrated for a particular strain of bacteria may not necessarily transfer to other probiotic species. Furthermore, there is still much to learn about the fundamental mechanisms behind the activity of probiotics. The research on explain how human health and well-being are impacted by native microbiomes and develop accurate models to anticipate how probiotic strains and native gut microbiota still needs to thoroughly explore.

Thus, a search of both modern and ancient literature and research articles about the probiotic qualities of curds has been carried out in relation to their usage in treating digestive diseases.

To ascertain which probiotics and dosages are most effective for certain patients, as well as to show their safety and limitations, but more research in the form of controlled human studies is required. Probiotics have a lot of potential as therapeutic or preventive treatments for diferent intestinal illness

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