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SIGNIFICANCE OF PROBIOTICS, PREBIOTICS AND SYNBIOTICS IN SIDDHA SYSTEM OF MEDICINE: A REVIEW

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ABSTRACT

The Siddha system of medicine, a traditional Indian medical system, emphasizes the importance of maintaining a healthy gut for overall well-being. Probiotics, prebiotics and synbiotics, have gained significant attention in recent years for their potential health benefits, particularly in promoting gut health. This review aims to explore the significance of Synbiotics, Probiotics and Prebiotics in the context of the Siddha system of medicine. The objective of this review is to examine the traditional knowledge and scientific evidence supporting the utilization of Probiotics, Prebiotics and Synbiotics, in Siddha medicine and their potential therapeutic applications. A comprehensive literature search was conducted using various databases and traditional Siddha medicine texts. The review demonstrates that the Siddha system of medicine recognized the importance of gut health in maintaining overall health and preventing diseases. It identified several animals, plants and fermented-based probiotics, prebiotics and synbiotics, that were traditionally used to promote gut health and strengthen the immune system.

KEYWORDS: Siddha medicine, Probiotics, prebiotics, Synbiotics, Gut health.

INTRODUCTION

The utilization of probiotics, prebiotics and synbiotics, in Siddha medicine aligns with the principles of maintaining a balanced gut microbiota. Scientific studies have shown that these microorganisms and dietary fibres can modulate the gut microbiome, enhance digestion, and improve nutrient absorption. Incorporating Probiotics, Prebiotics and Synbiotics into the

Siddha system of medicine provides a scientific rationale for their traditional use in promoting gut health and overall well-being.

IMPORTANCE OF GUT MICROBIOTA

The gut microbiota is a diverse community of microorganisms residing in the gastrointestinal tract that plays a crucial role in digestion, nutrient absorption, immune system regulation, and metabolism.

BALANCE WITHIN THE GUT MICROBIOTA

Maintaining a balanced gut microbiota is vital for overall health. Overgrowth of harmful microorganisms can lead to digestive disorders, inflammation, and systemic health issues. The abundance of beneficial microorganisms supports better digestion, nutrient absorption, and a strong immune system.

PROBIOTICS: BENEFICIAL MICROORGANISMS

Probiotics are live microorganisms that offer health benefits when consumed in adequate amounts. Strains like Lactobacillus and Bifidobacterium positively influence the gut flora. Benefits include improved digestion, reduced inflammation, and enhanced natural defence mechanisms.

SYNBIOTIC: SYNERGISTIC APPROACH TO GUT HEALTH

Synbiotics combine probiotics and prebiotics for a synergistic effect on gut health. Probiotics provide beneficial microorganisms, and prebiotics supply nourishment to support their growth. This combined approach optimizes digestion, maintains microbial balance, and enhances overall health.

IMPLICATIONS FOR OVERALL WELLNESS

A healthy gut microbiota has far-reaching effects beyond digestion. It impacts mental health, and immune system function, and may even influence chronic diseases. Ongoing research explores the intricate connections between the gut and various aspects of wellness.

EVOLVING FIELD OF MICROBIOTA RESEARCH

Advances in technology have revolutionized microbiota research. Scientists are uncovering the complex interactions between gut microbes and host physiology. Personalized approaches to gut health management are emerging based on individual microbial profiles.

RELATIONSHIP BETWEEN MILK AND IT'S BY-PRODUCT WITH FIVE ETERNAL FORCES

Prithivi – Butter

Appu – Buttermilk

Theyu. – Ghee

Vaayu – Curd

Aagayam - Milk.

MILK

ETHNIC BENEFITS OF MILK IN SIDDHA LITERATURE

Taken by children and old age people for strength and debility. Likewise in cows, many types are there.

"*Paal unbom" -Pinianugavidhi – Patharatha guna sinthamani*

• *Kaaram cow's milk -. Debility;*

• *Red cow's milk - TB;*

• *Dotted Cow's milk - STD;*

• *White cow's milk - Pitha kobam;*

• *Black cow's milk- Kaba diseases*

• *Kamala nira cow's milk- Tridhosam;*

• *Night cow's milk- Pathiyathirku aagum;*

• *White goat's milk - BA, Mucous diarrhoea, Kaba dhosam and*

• *Mother's milk - 7 types of thodam.*

Cow's milk is also used for many herbal purifications eg. Amukkra kizhangu, Kodiveli

Ver, Thettran kottai, Parangipattai....etc.

PROTEIN CONTENT ND AMINO ACIDS IN MILK

Milk contains approximately 18% whey proteins and 82% casein. Both whey proteins and casein are rich sources of essential amino acids. Essential amino acids are necessary for various bodily functions, including muscle growth, repair, and hormone synthesis.

MICRONUTRIENTS IN MILK FOR BONE HEALTH

Milk is a significant source of essential minerals like calcium, phosphorus, magnesium, and potassium. These minerals contribute to maintaining bone health, nerve function, and muscle contractions. Calcium absorption is aided by Vitamin D, which is present in milk, promoting overall bone health.

ROLE OF MILK IN SKIN AND EYE HEALTH

Milk is a valuable source of riboflavin, also known as Vitamin B2. Riboflavin plays a crucial role in promoting healthy skin and eyes. This vitamin is involved in cellular processes and supports energy metabolism.

OVERALL NUTRITIONAL VALUE OF MILK

In addition to proteins and minerals, milk contains various other essential nutrients. These components collectively contribute to the nutritional value of both milk and dairy products.

HEALTH BENEFITS OF DAIRY PRODUCT CONSUMPTION

Regular consumption of dairy products has been associated with multiple health benefits. Decreased risk of conditions such as osteoporosis, hypertension, colon cancer, obesity, and insulin resistance syndrome. Dairy products' nutrient profile supports diverse bodily functions and contributes to overall health.

MILK AS A NUTRIENT-RICH CHOICE

Milk offers a combination of proteins, minerals, vitamins, and other essential nutrients. It provides a well-rounded nutrient profile that benefits various aspects of health. Including milk and dairy products in a balanced diet can contribute to overall nutritional well-being.

“Pagarpaal sisukatkum pakkuvamen raalum”-pathatha guna sinthamani

-Gunapadam jeevam “PAALUM PAAL PORUTKALUM”

BUTTERMILK

SIDDHA ASPECT OF BUTTERMILK IN HEALTH

Buttermilk, a byproduct of milk, has historical use in Siddha medicine. Specifically used for conditions like Ascites, abdominal pain, *Tridhosam*, *Edumarunthu*, and thirst. Differentiates between cow's and buffalo's buttermilk for specific purposes.

• Buffalos buttermilk expressed as "*Maanidaruku Kedatha Amutham*". *pathartha guna sinthamani.*

It is also used in purifications of *Herbominerals eg. Ezhumbugal, Poonagam, Manosilai, Karpoora silasathu* etc.

CHEMICAL COMPONENTS AND COMPOSITION

Buttermilk comprises fat globules surrounded by milk fat globule membranes (MFGMs). MFGMs prevent coalescence and enzymatic degradation of fat globules. Agitation disrupts fat globules, releasing polar lipids, and MFGM fragments with high functional potential.

PRODUCTION AND QUANTITY

Global production of buttermilk correlates with butter production. About 6.5-7.0% of total milk yields buttermilk as a by-product. MFGM contains polar and neutral lipids, phospho- and sphingolipids, mono-, di-, and triglycerides, and cholesterol.

HEALTH BENEFITS AND EFFECTS

Buttermilk components have technological and biological properties. Phospholipids in buttermilk linked to hypo-cholesterolemic effects. Anti-proliferative effects observed on colon and ovary cancer cells due to specific fractions.

HOLISTIC POTENTIAL OF BUTTERMILK

Buttermilk holds holistic potential in traditional medicine and modern research. Its composition offers benefits for cholesterol, cancer, antioxidants, and emulsification. Bridging traditional wisdom and scientific exploration for better health outcomes.

ANTICANCER POTENTIAL

Some authors studied the antiproliferative effect of several isolated fractions of buttermilk obtained from food and non-food solvents on some types of human cancer cells. Fractions, rich in phospho- and sphingolipids, have strong antiproliferative action on colon and ovary cancer cells. These observations allow us to hypothesize the use of these phospho- and sphingolipids as functional food additives addition, buttermilk has emulsifying properties that aid in encapsulation. This emulsifying property is due to the presence of, for example, phospholipids and proteins and other components such as liposomes that can be obtained from MFGM from buttermilk.

ANTIOXIDANT PROPERTY

Peptides released during the enzymatic or thermal hydrolysis of buttermilk proteins have known antioxidant properties.

CURD

PROBIOTIC EFFECTS OF CURD IN TRADITIONAL MEDICINE

"*Mootha thayir unbom***"-** *Pinianugavidhi-Pathartha guna sinthamani*

Cow's curd increases the appetite and cures cough, debility, and thirst; • Skimmed curd is used for Urethritis, Vatham kiraani, and STD;

• Buffalos curd is used for Pitha diseases, Kaba karappan, mental disorders, and eye diseases;

• Camel's curd is used for beautiness and worm infestation.

- pathartha guna sinthamani paadal 130-135.

POTENTIAL USES OF CURD

The homemade curds that were evaluated possessed a spectrum of Lactic Acid Bacteria that had the potential to exert probiotic effects in individuals consuming the curd. These microbes had properties that predicted their ability to survive passage in the upper gut and to modulate gut mucosal innate immune reactions and, therefore, it is likely they have the potential to significantly influence health status. Curd fermented milk), freshly made by inoculation with

starter curd, is a good source of bioavailable vitamins, minerals and folate, and has less lactose and galactose than milk. Consumption of curd may enhance the immune response in the elderly LAB present in home-made curd has the potential to confer health benefits. Traditional product is prepared fresh every day providing live microbes and is a potential source of probiotics in the diet. The prepared curd is consumed fresh or stored in the refrigerator for about 24h the presence of Lb. casei, Lb. brevis, Lb. fermentum, Lb. plantarum, Lb. helveticus, Lb. rhamnosus, Lb. viridiscence, Lac. lactis and Lb. acidophilus, where L. acidophilus was the most prevalent.

GHEE

NUTRITIONAL FOCUS OF GHEE IN SIDDHA TEXT

• *Cow's ghee* is used for

1. GI disorders,
2. haemorrhoids,
3. diseases of bone

• *Goat's ghee* helps for *pathiyam*.

- *pathartha guna sinthamani 144 – 167,*

ESSENTIAL COMPONENTS OF GHEE

Ghee, a processed form of milk fat, is a complex lipid with various constituents such as glycerides, free fatty acids, phospholipids, sterols, fat-soluble vitamins, and more. It also contains traces of minerals like calcium, phosphorus, and iron. One of its unique characteristics is its low moisture content (around 0.3%), with glycerides constituting the major part (~98% of the total matter). The flavour of ghee plays a crucial role in its overall acceptability making it a sought-after fat in culinary applications. The flavour is influenced by factors like cream or butter fermentation and the heat treatments employed during processing. Key flavouring compounds in ghee include carbonyls, lactones, and free fatty acids. Ghee boasts good shelf stability due to its low moisture content, which is controlled by the duration and intensity of the heat treatment during processing. Additionally, it is believed to possess antioxidative properties that contribute to its stability by preventing oxidation. Apart from its culinary benefits, ghee may also contain conjugated linoleic acids, which have been reported as potential anti-cancer agents. The presence of such compounds further adds to the nutritional value of ghee. In conclusion, ghee stands out as a unique and widely appreciated fat due to its distinct flavour profile, high shelf stability, and potential health

benefits. Daily consumption of ghee in an adequate amount, imparts various health benefits such as binds toxins, enhancing the complexion and glow of the face and body, being a great rejuvenator for the eyes, increasing physical and mental stamina etc. in addition to providing sustaining energy.

NUTRITIONAL VALUES OF FERMENTED RICE WATER

According to traditional Siddha systems of medicine, fermented rice provides energy and also helps in controlling stomach issues like bloating, constipation, ulcers and diarrhoea. It prevents dehydration by acting as an effective electrolyte solution. In addition, it regulates the body temperature and also protects the skin by its cooling effect and cures acne and red blisters on the face. The optimal pH upon application helps in providing shiny, long hair, improves skin elasticity, reduces surface friction and prevents grey hair.

IDLY: FOCUS ON FERMENTED RICE PRODUCTS

Additionally, apart from its organoleptic properties, idli is highly nutritive and a significant source of calories, proteins and micronutrients. Idli is an important dietary source of vitamins, especially B complex vitamins, compared to the raw unfermented ingredients. Fermentation of the batter causes an increase in the protein efficiency ratio, essential amino acids and vitamins such as niacin, riboflavin and thiamine, together with a decrease in antinutrient content (such as phytic acid), enzyme inhibitors and flatus sugars, over the unfermented counterpart and health point, idli appears to be an ideal human food for all ages and at all times. Moreover, for infants, it is used as a weaning food owing to its pre-digested components from fermentation with the fermented batter of idli and dosa containing higher amounts of available lysine, cysteine and methionine. After processing, maximum retention of lysine, methionine and cysteine was observed in steamed idli. From the nutritional additional benefit of sterilization during steam cooking.

ANTICANCER ACTIVITY OF FERMENTED RICE WATER

In diet, the phenolic compounds are essential non-nutrients with poor solubility and less bioavailability. During consumption, these insoluble phenolic compounds are transformed by various enzymes in the human intestinal tract and the microflora in the gut also enhances the production of phenols. Phenol compounds inhibit oncogenic signalling and reduce cell proliferation and death. They also enhance the ROS levels, and tumour suppressor proteins and differentiate and transform the cancerous into normal cells. Epidemiological evidence suggests that human consumption of whole grains foods reduces the incidence of cancer one

of the most consumed grains is rice (Oryza sativa) and various types of microorganisms, known as gut microbiota, are inhabitants of the human gastrointestinal tract. It has been reported that there are 10^{10}–10^{12} live microorganisms per gram in the human colon. The resident microbial groups in the stomach, and small, and large intestines are crucial for human health. The majority of these microorganisms, which are mostly anaerobes, live in the large intestine.

THERAPEUTIC VALUES OF KOOZH

Rice is consumed extensively during festival seasons and religious functions and ceremonies. Consumers have stated they feel satiated and energized after consumption and perceive. In Tamil Nadu, especially in rural areas, the traditional fermented millet porridge *koozh* is widely consumed. *Koozh* is made with pearl or finger millet flour and it gives stamina over an extended period. It is also believed to help manage diabetes mellitus. The food is also said to have a prebiotic effect because of the presence of oligosaccharides and non-starch polysaccharides (dietary fibre).

PREBIOTICS

The following criteria are used to classify a compound as a prebiotic.

It should be resistant to the acidic pH of the stomach, cannot be hydrolysed by mammalian enzymes, and should not be absorbed in the gastrointestinal tract,

i) It can be fermented by intestinal microbiota,

ii) The growth and/or activity of the intestinal bacteria can be selectively stimulated by this compound and this process improves the host's health.

Prebiotics exert a remarkable influence on human health, which makes them alluring attractive agents to improve the quality of human life against cancer, vascular diseases, obesity, and mental disorders. There are many studies on the positive effects of prebiotics on human health However, accurately designed long-term clinical trials and genomics investigations are needed to confirm the health claims. By determining the fundamental mechanisms of prebiotics, scientists would be able to formulate enhanced food supplements to ameliorate human health. The ability to normalize the composition of the gut microbiota by prebiotic dietary substances is an appealing procedure in the control and healing of some foremost disorders. In other words, the gut microbiota as a major body organ can be fed properly with prebiotics to become stronger and healthier, which in turn can impact overall health.

Santana Ooral kudineer - White discharge, UTI, Body odour. 644

Alsivithai (Linum usitatissimum) Ooral kudineer - Treatment of TB, UTI, and leucorrhea. P.83

Azhavanam (Lawsonia inermis) Ooral kudineer - Used externally for Sprain, Inflammation, and Small wounds as a hot fomentation. 93

Aligil pattai (Alangium salvifolium) Ooral kudineer - used for Snake bites and related inflammation. 98

Aaduthenda palai (Aristalochia bracteolata) dry leaf Ooral kudineer - used as Anthelmintic. 118

Arasam pattai (Ficus bengalensis) pattai Ooral kudineer - Treatment of Diabetes.73

Uruthirasadai (Ocimum basilicum) seeds Ooral kudineer - Taken along with sugar for GI tract Diseases, Mucous diarrhoea, and STD.

CONCLUSION

In the Siddha system of medicine, which is an ancient traditional system of medicine practised in South India, the concepts of probiotics, prebiotics, and synbiotics may not have been explicitly recognized as in modern Western medicine. Probiotics are live beneficial microorganisms that are believed to have a positive impact on gut health when consumed in adequate amounts. Prebiotics, on the other hand, are non-digestible fibres that promote the growth and activity of beneficial gut bacteria. Synbiotics refer to supplements that combine both probiotics and prebiotics. While the Siddha system of medicine has its principles of maintaining health and treating diseases, it may not explicitly refer to these terms or concepts as described in modern scientific research. Instead, Siddha medicine may focus on the

balance of and the use of herbal remedies, diet, and lifestyle practices to promote overall well-being. It's important to note that traditional systems of medicine can have their unique approach to health and healing.

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