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Review Article

Know of the Cured food Nutritional Value, Digestibility and High Quality with Special Reference to Their Role on Public Health

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Abstract:

The human beings are a unique host of heterogeneous and vivacious group of microbes, which together forms the human-microbiome superorganism types. The Human being gut serves as a home to over 100–1000 microbial species types, which primarily modulate the host internal environment and thereby, play a major role in public health types. The spectacular symbiotic relationship has attracted extensive research in the field types. More specifically, the microorganisms play key roles in defense activity, eupepsia along with catabolism and anabolism, and impact brain-gut responses types. The emergence of microbial with resistance and the tolerance to existing conventional drugs and antibiotics has decreased the drug efficacies on pathogenic microorganisms. The new biotechnology mediated nano-encapsulated multiplex supplements appear to be high cost and inconvenient. low-cost, receptive and intrinsic approach to achieve health benefits is vital in the present era types. The Supplementation with the food probiotics, the food prebiotics, and the food synbiotics has shown promising results against various enteric pathogenic microorganisms due to their unique ability to compete with pathogenic microbiale for adhesion sites, to alienate pathogenic microorganisms or to stimulate, modulate and regulate the host's immune response by initiating the activation of specific genes in and outside the host intestinal tract. The Probiotics have been shown to regulate fat storage and stimulate intestinal angiogenesis. The investigations aim to underline the possible beneficial impact of the food probiotics for the public health and the medical importance and for the good lifestyle types.

Key words: food probiotics; food prebiotics; food synbiotics; new biotechnology mediated nano-encapsulated multiplex supplements

Introduction

The food Probiotic is a phrase of the new era, denotation “for life” and is in use to name bacterial association with beneficial effects on the human beings and animal health. The food probiotics as modification of the floral/microbial diversity in the human beings’ bodies and replaces the harmful microbes with useful ones. The microbial concentration of a particular type of the bacteria in the stool samples of the infected diarrhea in young children were significantly lower in comparison to healthy young children. The oral administration of the live microorganisms to the patients with diarrhea and help restore a healthy gut flora type. The new definition of food probiotic was put forward as a viable mono or mixed culture of bacteria types which, when applied to animal or man, affects the host beneficially by improving the properties of the indigenous flora types. The specific food probiotic cultures along with substantial health benefits upon consumption types. The ecological consideration of the gut flora is necessary to understand their relevance in the human being’s health, as well as the probiotic food products types concept importance. Each individual has a unique signature of more than one hundred to one thousand microbial species in the gastrointestinal tract in human. The Bacterial cells comprise half of the wet weight of colonic material and their numbers exceed by tenfold the number of tissue cells forming the human beings body. The stomach contains 103 different bacterial species, and the total microbial population of the colon comprises of about 1011–1012 cfu/g. The Bacterial colonization of the gut begins at birth when newborns are first exposed to a non-sterile environment. It evolves and transforms over a lifetime, depending on a complex and dynamic interplay between the diet, genome, and lifestyle of the host, as well as antibiotic use. Notable age-specific compositional shifts reported in gut microbiota composition include a decrease in the Bacteroidetes/Firmicutes ratio and a marked decrease in bifidobacteria in people aged > 60 years, around the time that the immune system starts to decline. The composition of the core intestinal microflora is considered to be essentially stable throughout adulthood time. The beneficial usage of intestinal microflora, referred to as “colonization resistance” or the “barrier effect” is an important mechanism used by the indigenous gut bacteria to maintain their presence and confer niche protection against freshly ingested microorganisms, including pathogenic microorganisms. It could be assumed that manipulation of the gut microflora to improve the relative numbers of “beneficial bacteria”, which have certain impacts on immune activity, digestion, metabolism, and brain-gut communication mechanism. The alterations in their diversity may result in several

disorders and diseases, for which conventional medicines provide very limited efficacy mainly due to the emergence of antibiotic-resistant and tolerant pathogenic microbes. Attempts to avoid such critical issue by increasing the drug delivery system to the target sites using nano-encapsulated multiplex supplements have been reported to as a possible solution, although, such approaches appear to be cost-effective, and inconvenient for common use. A simple, low-cost, receptive and intrinsic means to improve host health has become a critical issue in the present era. In this context, the food probiotics tends to serve as supplement to the host microflora and provide protection against various enteric pathogenic microorganisms. The food Probiotics are known to demonstrate promising results like improved gut barrier activity; adding to the unique ability to compete with pathogenic microbiota for adhesion to the gut and improve their colonization method. The food Probiotics stimulate, modulate and regulate the host's immune response by initiating the activation of specific genes of localized host cells. The gastrointestinal hormone release and regulate brain behavior through bidirectional neuronal signaling, as part of the gut–brain axis mechanism so mush. The food Probiotics plays a significant role in inducing intestinal angiogenesis by vascular endothelial growth factor receptor signaling that, in turn, regulates acute and chronic inflammation in intestinal mucosal tissue caused by the progression of the inflammatory bowel disease types. The food Probiotics have physiological activities that contribute to the health of the host environment regulating microbes and are helpful in combating overweight and obesity so mush. The food probiotics have considerable potential in nutritional and clinical applications, the implementation of the food probiotics into the human beings health, nutrition and regulation of different abnormalities types. The investigations emphasize the possible benefaction of the food probiotics for improving the human being's health, nutrition optimization and regulation of common metabolic disorders or abnormalities action types [1,2,3,4,5,6 and 7].

The meanings for the food probiotics, the food prebiotics, and the food synbiotics, they can be best explained as microbe or a group of microbes that inhabits within the gut and nourishes the host body internally. They are commonly consumed as preparations with active live cultures and contain bacteria, such as lactobacilli, lactococci or bifidobacteria that has been isolated from natural environments. The food probiotics have been recognized as key health promoters to humans, investigating the culture conditions and viability of the food probiotic strains during processing and storage; sensitivity to low pH values, gastric fluid, bile, pancreatic and intestinal fluids and intestinal or respiratory mucus; adherence to isolated cells or cell cultures and interactions with other pathogenic microorganisms' types [8,9,10,11,12,13 and 14].

The Postbiotics

The bacterial products, in the absence of life microorganisms, may have similar effects on signaling pathways and barrier activity. The bacterial products are broadly characterized as postbiotics and can be defined as dead bacterial products or metabolic byproducts from food probiotic microorganisms that have biologic activity in the host. The postbiotics include bacterial metabolic byproducts, such as bacteriocins, organic acids, ethanol, diacetyl, acetaldehydes and hydrogen peroxide, but it is found that certain heat-dead food probiotics can retain important bacterial structures that may exert biological activity in the host body. The metabolic products have a broad inhibitory property toward pathogenic microbes and can be used as an alternative to antibiotics. The Postbiotics are non-toxic, non-pathogenic and resistance to hydrolysis by mammalian enzymes, as these are non-viable bacterial products or metabolic byproducts from the food probiotics. In some instances, postbiotics can increase barrier activity against species like Saccharomyces boulardii, and improve angiogenesis in vitro and in vivo in epithelial cells by activation of $\alpha 2\beta 1$ integrin collagen receptors types. The species of Bifidobacterium breve, Bifidobacterium lactis, Bifidobacterium infantis, Bacteroides fragilis, Lactobacillus, Escherichia coli and Faecalibacterium prausnitzii types [15,16,17,18,19,20 and 21].

The food Prebiotics

The exploration of the food probiotics have led to the development of the food prebiotics, which are certain nutrients that modify the gut microbial flora although not easily digested by human beings but have a selective role in stimulation of growth or activity of beneficial bacterial species in the gut. The food prebiotics includes bifidogenic properties of insulin, oligofructose, and fructo-oligosaccharides compounds synthetically produced from sucrose, as well as the galactose-containing and xylose-containing oligosaccharides compounds types [22,23,24,25,26,27 and 28]. The fermentation of carbohydrates represents a major source of energy for epithelial cells in the colon and food prebiotics can readily fulfill these requirements as a result of their fermentation by gut microbiota, as bifidobacteria bacteria. The bifidobacteria, several other gut microorganisms that play a significant role in fermenting these non-digestible oligosaccharides compounds types. The food Prebiotics can be obtained naturally from sources like vegetables, fruits, and grains consumed in our daily life span. The food Prebiotics not only serve as an energy source but have several health benefits such as reducing the prevalence and duration of diarrhea, providing relief from inflammation and other symptoms associated with intestinal bowel disorders, and exerting protective effects to prevent colon cancer types [29,30,31,32,33,34 and 35]. The food Prebiotics are implicated in enhancing the bioavailability and uptake of minerals, lowering of some risk factors for cardiovascular disease, and promoting satiety and weight loss conditions. The vast nutritional and medicinal benefits, research regarding screening new versatile food prebiotics is scarce mechanism [36,37,38,39,40,41 and 42].

The food Synbiotics

The Development in microbial investigation has led to formation of food synbiotics which is a fusion of the food probiotics and the food prebiotics products and helps in enhancing the survival and the implantation of live microbial dietary supplements in the gut of human. The synergistic benefits are more efficiently promoted when both the food probiotic and food prebiotic work together in the living system body. The food symbiotic relationship between the food prebiotics and the food probiotics contributes significantly to health of human beings. The Commercial interest in the active foods products types containing the food synbiotics has improved due to the awareness of the benefits for gut health of human beings, disease prevention and therapy of diseases. The development of new health-promoting foods products types. The selection of new cultures demonstrating an increased ability to colonize the human being's gut, along with their ability to digest new forms of the food prebiotics. The Conventional trials and investigation have shown that the various beneficiary effects of the food probiotics, the food prebiotics, and the food synbiotics are much more effective than their unitary use known till date now [43,44,45,46,47,48 and 49].

The Clinical significance of the food probiotics and its potential applications

The use of the food probiotics for the clinical health benefits is a fascinating area of research that the present era has yet to explore. Some of the elite properties of the probiotics types, such as the anti-pathogenicity, anti-diabetic, anti-obesity, anti-inflammatory, anti-cancer, anti-allergic, and angiogenic activities and their effect on the brain and the central nervous system of the body. The Anti-pathogenic activity of

the probiotic's types, The Anti-pathogenic activity is regarded as one of the most beneficial effects of the probiotics because unlike classic antibiotics, disturbance or alteration in the composition of the complex population of the gut microbiota is inhibited. The anti-pathogenic activity of the probiotics or a probiotic mixture. The influence of the probiotics on the survival of Salmonella enterica, Serovar typhimurium and Clostridium difficile in an in vitro model and postulated that the probiotics inhibit pathogenic microorganisms by the production of the short-chain fatty acids , as the acetic, the propionic, the butyric and the lactic acids. The short-chain fatty acids help to maintain an appropriate pH in the colonic lumen, which is imperative in the expression of numerous bacterial enzymes and in metabolism of foreign compounds and carcinogens in the gut suggested that a wide variety of anti-pathogenic compounds, like the bacteriocins, ethanol, organic acids, diacetyl, acetaldehydes, hydrogen peroxide (H2O2) and peptides are produced by many probiotics' types. The peptides and the bacteriocins, in particular are mostly involved in increasing the membrane permeability of the target cells, which leads to the depolarization of the membrane potential and, ultimately, cell death of the body. The production of the H2O2 by the bacterial groups causes the oxidation of sulfhydryl groups, resulting in the denaturation of several enzymes results in the peroxidation of membrane lipids, thus, increasing membrane permeability of the pathogenic microorganism and consequently, cell death of the body [50,51,52,53,54,55 and 56]. The compounds may act by lowering pH by organic acids like lactic and acetic acids also. The production of the anti-pathogenic bioactive compounds that directly affect pathogenic microorganisms, the probiotics stimulate host anti-pathogenic defense pathways, such as stimulating or activating the pathway involved in the production of defensins that are cationic anti-microbial peptides produced in several cell types including Paneth cells in the crypts of the small intestine and intestinal epithelial cells of the body. The mechanism by which the probiotics exert anti-pathogenic activity is by competing for pathogen binding and receptor sites, as well as for available nutrients and growth inside human beings [57,58,59 ,60,61,63 and 64].

The Urogenital health care

Over one billion women around the world suffer from non-sexually transmitted urogenital infections, such as bacterial vaginosis, urinary tract infection and several other yeast infections to human beings. The species typically associated with BV include Gardnerella vaginalis, Ureaplasma urealyticum, and Mycoplasma hominis Sexually transmitted diseases are significant cause of morbidity in the world. The two most commonly documented bacterial STDs in some developed countries in the world are gonorrhea and Chlamydia, which are caused by Neisseria gonorrhoeae and Chlamydia trachomatis, respectively The pathogenic microbes, among others, are concurrently becoming resistance to the present medicines in the world. The development of new medicines, developing new live supplements, like non-pathogenic microbes that act against the pathogenic microorganisms [65,66,67,68,69,70 and 71]. There is an association between abnormal vaginal microbial flora and an improved incidence of urinary tract infection. About 50 different species inhabiting the vagina, like Lactobacillus species, Lactobacillus brevis, Lactobacillus casei, Lactobacillus vaginalis, Lactobacillus delbrueckii, Lactobacillus salivarius, Lactobacillus reuteri, and Lactobacillus rhamnosus that are regarded as the main regulators of the vaginal micro-environment. Imbalance in the microbial composition greatly influences the health of the vaginal microenvironment, potentially leading to compromised state of bacterial vaginosis in the world. The compromised states in the world can be reassured by balancing the number of the Lactobacillus sp. through the supplementation of the probiotics types [72,73,74,75,76,77 and 78].

The Anti-diabetic activities of the probiotics

The International Diabetes Federation (IDF) of Southeast Asia in the world, 425 million people have diabetes disease worldwide including 78 million people in the Southeast Asian region in the world. This number is expected to rise to 629 million by 2045 if nothing is done. The management of this disorder includes multiple medications although there is no definitive cure for diabetes disease. Nonetheless, bimolecular and pharmacological researchers have made progress in understanding the importance of food synbiotics in curing the disorder. The large-scale 16 S rRNA gene sequencing, quantitative real-time PCR and fluorescent in situ hybridization, the connection between the composition of the intestinal microbiota and metabolic diseases, like obesity and diabetes disease, enhancing the beneficial microbial by the use of the probiotics is expected to play a significant role in neutralization of the disorder Gram-negative bacteroidetes and the Gram-positive firmicutes are two specific bacterial phyla that dominant the gut microenvironment [79,80,81,82,83,84,85 and 86]. Recent research has proven that obesity is associated with improved bacteroidetes over time, concurrent with a reduction in firmicutes More specifically, patients with type-2 diabetes disease have significantly reduced numbers of firmicutes species, such that the bacteroidetes/firmicutes ratio has improved, which positively correlates with plasma glucose concentration. The development of auto-immune diseases, such as type-1 diabetes disease. Alterations in the microbiome improve invasion of opportunistic pathogenic microorganisms, which are resistant to oxidative stress and simultaneously capable of reducing sulfates and inhibiting the growth of butyrate-producing bacteria [87,88,89,90,91,92 and 93].

Management of type-2 diabetes disease by modulating gut hormones, such as gastric inhibitory polypeptide and glucagon-like peptide-1, through probiotic and food prebiotic interventions is another convincing strategy. In this context, hormones play an implicated role in glucose homeostasis, which results in neutralizing the disorder caused by peripheral insulin resistance or failure of β-cells to produce insulin Currently, research is focused on production new food prebiotics, as arabinoxylan and arabinoxylan oligosaccharides compounds, which show promising results in counteracting related metabolic disorders, because both carbohydrates have been linked to adiposity reduction [94,95,96,97,98,99 and 100].

The Anti-obesity activity of the probiotics

The Abnormal or excessive fat (obesity) accumulation that directly impairs health is linked to an improve in energy availability, sedentariness and a greater control of ambient temperature, leading to an imbalance in energy intake and expenditure It has been evident that transplantation of the intestinal microflora from obese mice into germ-free mice could replicate the obese phenotype and may lead to more efficient at extracting energy from food products types and stimulating lipogenesis.

The Probiotics have physiological activities that contribute to the health of host environment regulating microbes. In most instances, weight loss is facilitated by thermogenic and lipolytic responses through stimulating the sympathetic nervous system. Probiotic strains, Lactobacillus gasseri BNR17 have shown properties of inhibiting the improve in adipocyte tissue that are the main source of leptin and adiponectin and thereby, limiting leptin secretion. Other probiotic microbes such as L. casei, Lactobacillus acidophilus and Bifidobacterium longum have been mentioned to have hypocholesterolemic effects [101,102,103,104,105,106 and 107].

The Anti-inflammatory activity of the probiotics

Crohn's disease (CD) and ulcerative colitis (UC) are among the most chronic inflammatory diseases of the gastrointestinal tract and are

collectively called the inflammatory bowel disease. CD can affect any part of the gastrointestinal tract like the mucosa, submucosa, and serosa, and the inflammation can even spread to the whole gastrointestinal tract. In contrast, UC characteristically involves the large bowel; specifically the mucosa and submucosa of the colon Research has shown that an imbalance in the gut microbiota plays an important pathophysiological role in the positive regulation of the inflammatory bowel disease. The disorder could possibly be altered by supplementation with the probiotics, the prebiotics, and the food synbiotics. The inflammatory bowel disease is being associated with impaired production of the short-chain fatty acids, particularly, acetate, butyrate, and propionate. The short-chain fatty acids have been known to play a key role in maintaining colonic homeostasis in the body [108,109,110,111,112,113 and 114]. The probiotics have anti-inflammatory effects and improve the propulsive colonic activity. It is reasonable to consider that supplementation with indigestible carbohydrates and fiber (food prebiotic) alone, or in combination with the food probiotics to improve the production of the short-chain fatty acids could be useful therapeutic approaches. Developing genetically engineered food probiotic bacterial strains that are able to produce and discharge immunomodulators, such as interleukin-10, trefoil factors (compact proteins co-expressed with mucins in the gastrointestinal tract, or lipoteichoic acid (a major constituent of the cell wall of Gram-positive bacteria that can impact the host immune system, resulting in the restoration of the level of protective commensal bacterial species. Lactobacillus, Bifidobacterium, Enterobacter and E. coli are the most widely used the probiotics in foods products types. Apart from these microorganisms, new or genetically modified should be developed to counteract the inflammatory bowel disease [115,116,117,118, 119, 120 and 121].

The Anti-cancer activity of the probiotics

The natural sources that have anti-carcinogenic effects, as the probiotics have been receiving prime focus in recent years. Thus have attracted intense interest from clinical nutritionists, scientists, and industrialists to work in a collaborative manner to bring down the disease and develop an effective drug with minimal or no side-effects types. The probiotic strains, The Lactobacillus fermentum, are highly potent in suppressing colorectal cancer cells and promoting normal epithelial colon cell growth through the production of the ferulic acid type [122,123,124,125,126,127 and 128]. This ability was compared with other probiotics namely the L. acidophilus and the L. rhamnosus both of which were previously characterized with–tumorigenic activity. Again, two different probiotic strains the L. acidophilus and the L. case I have been found to show pronounced cytotoxic activities, with in vitro anti-proliferative activity against two colorectal cancer cell lines types. The probiotics could play a significant role in neutralizing cancer, the investigations are limited only to in vitro tests types. The anti-cancer potential of the probiotics must be proven in vivo models and proceed towards animal and clinical trials types [129, 130, 131, 132,133,134 and 135].

The Anti-allergic activity of the probiotics

The increasing prevalence of the allergic diseases caused by immune disorders is a serious economic and social burden worldwide. Comprehending the fundamental molecular mechanism that contributes to the etiology of allergic diseases, as well as new treatment approaches is vital for the follow-up and prevention of these diseases. In recent times, the beneficial role of the probiotics in the protection and the management of the allergic diseases had advanced the understanding of their cause and prevention techniques. The Lactobacillus plantarum, the potential to prevent the allergy-associated disorders with the production of interleukin-12 and interferon-γ in the host types. The L. plantarum significantly alleviated allergic symptoms and reduced the levels of total immunoglobulin E, ovalbumin-specific immunoglobulin E, and histamine in the sera of ovalbumin-sensitized mice. In spleen cells of the mice, the L. plantarum is known to significantly increase the secretions of interferon-γ and interleukin-4, which are responsible for alleviating allergic symptoms. To evaluate the anti-allergic activity of the probiotics and the mode of the action types [136,137, 138, 139,140,141 and 142].

The Angiogenic activity of the probiotics

The Angiogenesis mechanism has been an important phenomenon and is necessary for wound recovery process mechanism through delineated cellular responses to regenerate damaged tissues in humans. The angiogenic program consists of a deliberately orchestrated series of cellular events by which new vessels arise from pre-existing ones by promoting recruitment of inflammatory cells and producing cytokines, matrix-degrading enzymes, and the chemokines. Deregulated angiogenesis has a prominent impact on the major human beings diseases, such as cancer, diabetic retinopathy, and the inflammatory bowel disease mechanism including CD and UC. The Non-pathogenic probiotic yeast types, S. boulardii, has been mentioned to protect against intestinal injury and inflammation. The molecular mechanisms by which the probiotics mediate these beneficial effects remain unclear. The potential mechanisms of the probiotics in angiogenesis process mechanism may include alteration of inflammatory cytokine profiles, down-regulation of pro-inflammatory cascades or induction of regulatory mechanisms in a strain-specific manner, epithelial barrier activity increased, visceral hypersensitivity reduction, spinal afferent traffic, and stress response [143,144,145,146,147,148 and 149].

The Effect of the probiotics on the brain and the central nervous system

The colonization of the microbiota in the gastrointestinal tract is well-associated with both the gastrointestinal tract and gastrointestinal diseases of human. The investigations have been devoted towards elucidating the influence of gut microbiota on the brain and the central nervous system of human. The “microbiota-gut-brain axis” is an interactive, bi-directional communication established by the exchange of regulatory signals between the gastrointestinal tract and the brain and the central nervous system of human. The effect of the probiotics on the brain and the central nervous system has been mainly studied in clinical trials, where it has been evident that gut microbiota influences the human beings brain development activity of human. In young children with autism spectrum disorder, a daily dose of the L. plantarum WCFS1 led to an improvement in their school records and attitude towards food products types, reduced psychological distress in a randomized trial involving healthy peoples treated with oral administration of the Lactobacillus helveticus and the B. longum types. The decrease in anxiety symptoms by administration of the L. casei strain Shirota to patients suffering from chronic fatigue syndrome of human. Despite an improvement in the Lactobacillus and Bifidobacteria levels, the bowel activities were under investigations [150,151,152,153,154,155 and 156]. The reduced anxiety was due to improved bowel activity of human. Autism spectrum and attention-deficit/hyperactivity disorders in young children could be inhibited by the L. rhamnosus administration to the mother at four four weeks from expected delivery. It has been observed that many gut bacteria synthesize to neuroactive compounds similar to those produced in the host brain. The human beings intestinally derived strains of the L. brevis and Bifidobacterium dentium were mentioned to produce large amounts of γ-aminobutyric acid, a brain neurotransmitter that helps the human beings beings to suppress anxiety and depression types. Uses of a multispecies probiotic containing the L. brevis, B. lactis, the L. acidophilus, the

Bifidobacterium bifidum, the L. salivarius, the L. casei, and Lactococcus lactis to healthy human beings revealed a significant overall reduction in the cognitive reactivity to sad mood types. The Probiotic trials involving patients suffering from anxiety and clinical depression are lacking and require more time and work to validate this effect. The Oral intake of the L. acidophilus has been shown to assist people to regulate their mood towards rewards and addictive behavior types [157,158,159, 160,161,162 and 163].

The Commercial significance of the probiotics

The development to avoid the barriers related to their successful administration and minimal side effects several forms of the probiotics are available commercially and are in use in large amount types [160,161,162,163,164 and 165].

The Recent advancements and utility the food prebiotics

As food probiotics, food prebiotics is being widely explored for their utility in the various fields of applied science types, more specifically as nutrients and supplements. The food prebiotics are a collection of nutritionally enriched compounds grouped together with the efficiency to increase and support the growth and sustenance of specific beneficial gut microflora types. The food prebiotics is those compounds that are non-digestible and able to specifically modulate the sustenance of health-promoting gut bacteria.

Presently the idea on the complexity as well as the usability of these non-digestible compounds has improved to a greater extent because of the development of various 'omic' tools such as the proteomics, the genomics, the metabolomics, the transcriptomics types. The investigations based on the various mode of synthesis has become the current focus of the present era types [165,166,167,168,169,170 and 171]. The food products types industries of the present decade require simple, sustainable, cost-effective and highly efficient methods for large-scale production and application. Food prebiotic oligosaccharides compounds could be obtained from food products types; otherwise, could be synthesized chemically or enzymatically from disaccharides or other substrates as well as by hydrolysis of the polysaccharides compounds. The food prebiotics of natural origin have already been evaluated for their beneficiary role types. The Enzymes (the β-galactosidase, the fructosyltransferase etc.) from various sources such as microbes and plants are being utilized for their synthesis. The Enzymes are engineered to better regulate regioselectivity and the increase in the yield of reaction which increase the glycodiversification and the quality of the products attained types [172,173,174,175,176,177 and 178]. The emergence of genetically engineered microorganisms resulted in boosting the production of oligosaccharides compounds by fermentation process for large-scale industrial production Due to the tangible association of food prebiotics oligosaccharides compounds with the gut microbiome as well as maintenance and restoration of the microbial homeostasis which is again keenly associated with positive health outcome of the host, the investigations regarding food prebiotics are given much emphasis in the investigations types. The food Prebiotic compounds are food-grade substances from which beneficial short-chain fatty acid could be produced as a result of degradation by microbes such as bifidobacteria and lactobacilli within the host appeal for their utilization as nutrient supplements types. The biomedical benefaction not only covers gastrointestinal system but systems located away. Recent investigations several rat models have demonstrated calcium absorption types, retention bone density and strength is increased due to the intake of the galacto-oligosaccharides compounds specifically types. Gut microbes influence the expression of gamma-aminobutyric acid receptor in the brain, food prebiotics such as fructo-oligosaccharides compounds and the galacto-oligosaccharides compound is likely to exploit this connection to tune the brain-derived neurotrophic factors, D-serine, and other synaptic proteins such as the synaptophysin and the N-methyl-D-aspartate receptor subunit . The food prebiotics such as the oligofructose, the β-fructan, the oligofructose/inulin mix have immunomodulatory benefits in the case of pathogenic attack, atopic dermatitis, allergic prevention, chronic inflammation and up-regulated responses against the vaccinations types [179,180,181,182,183,184 and 185]. Benefactions of this non-digestible compound have emerged for a variety of skin related-conditions. Improve water retention and prevention of erythema was observed in a hairless mice skin on the galacto-oligosaccharides compounds supplementation types. The investigations prove that skin's barrier properties are improved by the improved dermal expression of cell adhesion and matrix formation markers CD44, and type 1 collagen on the galacto-oligosaccharides compounds treatment Again, the Galacto-oligosaccharides compound alone or with B. breve is found to impede water and keratin depletion effectuated by phenolic compounds types . Food prebiotics are widely being explored for their usefulness in the treatment of various types of disorder and diseases types [186,187, 188, 189, 190,191 and 192].

Conclusion

The Probiotics have important active attributes that could fulfill most of our basic nutritional and clinical supplementation requirements types. The microbes have shown positive responses to clinical treatment against several diseases and disorders, such as diarrhea associated with rotavirus, the IBS and food allergies types. The contribution of the probiotics in preventing and treatment of diabetes disease, obesity, cancer and diseases related to the pathogenic microbes is an exciting and rapidly advancing the investigations types. The dietary probiotic supplementation generally involves dairy products but the probiotics can be incorporated into non-dairy fermented food products types, presenting an alternative and more advantageous source in the process of evaluating the new probiotic strains types. Present clinical and nutritional evaluations have been successful in exposing some remarkable activities of particular probiotic strains. Specifically, regulation of energy in various catabolic and anabolic processes, acid and bile tolerance, ability to adhere to gut epithelial cells, to combat against pathogenic microorganisms, along with certain other properties, like their safety-enhancing property, serviceability as diet and beneficial supplements for the human being's health. The evaluation of new strains of the probiotics and their applicability in biomedical/clinical investigations, paving a new direction for exploration and exploitation of the probiotics aimed at improving the human being's health.

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