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Probiotics Begin to Flex Their Muscle in Sports Nutrition Market" – A Research Perspective of 'Personalized Nutrition' For Endurance Athletes

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Abstract

The potential benefits of probiotic foods in sports nutrition extending beyond immune response and enhancing endurance capacity among athletes up to the mark. Extensive exercise is suppressing the body's immune response in both elite athletes and weekend warriors. Even, nutritional supplementations. Those contain large quantities of protein causing gastrointestinal distress. In this context natural probiotic mixture like VSL#3 or next generation probiotics like clostridia cultures IV is proven to improve abdominal discomfort, promote general immunity and increase endurance capacity in sports persons. Performance based personalized nutrition plan is thus emerging in the field of sports medicine with the goodness of probiotics. The study involves exhaustive research to explore, assimilate and analyse data to derive relevant information on market competence of probiotics in promoting personalized nutrition plan among global athletic groups. According to International Association of Probiotics, the probiotic food market offers a great opportunity to expand \$2.7 billion global probiotic supplement market as probiotics found to be beneficial in several aspects - protecting respiratory tract and maintaining proper breathing function, Maximum utilization of leucine after exercise, utilization of lower amounts of whey protein by the athletes and protection from lactose intolerance. Probiotic strain BC30 can increase absorption of leucine by 23% according to research. Lactobacillus casei has found to reduce incidence of infection among athletes. Personalized & performance specific nutrition plan is getting strategic importance in the area of sports nutrition to bring out actual potential of each athlete. Probiotics are replacing the processed nutritional supplement gradually as a potent functional food and capturing the market of sports medicine to bring optimum goodness from the athletes. Age, gender, life style, phenotype, genetic makeup and epigenetic imprinting are determining the individual nutritional need of the athletes. The future is coming with 'Personal-diet-and-health relationship' concept with a probiotic perspective of nutrition.

Key Words: Probiotics, personalized nutrition, sports medicine, epigenetics, nutrigenomics

Introduction

Probiotic bacteria are defined as live food ingredients that are beneficial to health of the host. Numerous health benefits along with enhancement of endurance activity among athletes are now introduced as an emerging field of sports medicine. Recent studies are suggesting that probiotics, as a potential functional bio-active food are enhancing the immune response of the fatigue athletes, maintain their bowel system, optimizing personal performance level and protecting them from oxidative stress injury (1). 'Tailor-based personalized nutrition' with probiotic supplementation may help athletes in avoiding unwanted gastro- intestinal distress caused by consumption of synthetic nutrition supplements heavy with protein load and may allow the performers to bring their maximum output in the field of sports.

Purpose of The Study

This analysis tries to find out the possible health benefits of probiotics, as a therapeutic preparation for endurance athletes. It finds out the ergogenic effects of probiotics in maintaining fatigue, improving immune response, maintaining healthy GI tract function and cutting-down the side effects of antibiotics and steroids. The study focuses on emerging field of probiotics in sports nutrition

market with an enormous prospect. The study also aims to show market competence of probiotics in capturing the sports medicine market and how 'personalized nutrition' can be advocated to bring out maximum output of each athlete from various dimensions of sports with the help of probiotics

Result

Functional foods as a market term was initiated in Japan in late 1980s and is used to describe foods fortified with ingredients capable of producing health benefits (2). The concept is becoming highly popular with consumers because of highlighted awareness of the link between health, nutrition and diet. In modern era of nutrition science, genetic makeup & epigenetic imprinting is also significantly important in planning a daily diet. Along with this concept our understanding of the gut microbiota has expanded considerably in recent years due to the developments in molecular characterization of the gut microbiota and their metabolic capacity. Recent developments in genome sequence technology, high throughput genomics data and comparative metagenomics have all revolutionized microbiological research. New findings driven by mega projects such as the Human Microbiome Project⁴ and the Meta Hit Projects have allowed high resolution microbial scan of the intestinal microbiota including the uncultivable species that have opened novel perspectives for clinical applications (3). The study thus consolidated with two distinct segments -Potentiality of probiotic foods in athlete diet formulation with a perspective of 'Personalized-diet-plan'. It focuses the molecular insight of how probiotics are interacting with host genome to bring possible positive health benefits from a sports nutrition vision. Increasing popularity and market competence of probiotics along with other functional foods in recent years among athletes.

Lactobacillus and Bifidobacterium species in probiotics modulate gut microbial composition, thereby leading to improved gut health and thus help the athletes from gastro-intestinal discomfort. Extensive exercise results into alter brain-gut interaction that leads to severe to chronic belly pain, diarrhoea etc. Stress has a way in suppressing inflammation which is needed to maintain normal gut microbiota, but, probiotics are found to reverse the effect in animal models (4). Studies have shown that Supplementation with L. fermented Pee® is associated with a reduction of symptoms in clinical indices of lower respiratory illness, GI symptoms at high training loads and cold and flu medication use in well-trained male cyclists. An increase in mild GI symptoms most likely reflects an adaptive response of the GI tract to alteration in the composition of the microflora. The increased recovery of total lactobacillus species in faeces may have underpinned the clinical outcomes. Collectively these studies indicate that L. fermenter (PCC®) may be a useful nutritional adjunct for physically active males in both competitive and recreational settings (5). Now, most recently molecular insight of interaction between IBD and probiotics is in focus and is included in the existing discussion. IBD arises in part from a genetic predisposition, through the inheritance of three polymorphisms. An observation has shown that any of these polymorphisms of the Caspase-Activated-Recruitment Domain (CARD15) gene are more prevalent in IBD. Similar response is observed in Autophagy-Related 16 Like 1 (ATG16L 1) and Human Defensin (HBO -2, 3 and 4) genes. Nutrigenomics help in understanding the particular gene involve in IBD and suggests more strategic approach in choosing Probiotics and prebiotics for intervention. Both these functional foods reduce symptoms of gut inflammation by secreting some omega - 3 fatty acids and polyphenols. But, such approaches require that the gene of interest is functioning normally and is not mutated or down-regulated (6). Several studies are now introducing new ways of treating and managing IBD and Ulcerative Colitis by replacing antibiotics for avoiding unwanted side effects caused by the medicines. Such a therapy is VSL#3, a potent probiotic mixture of *Lactobacillus* and *Bifidobacterium* (7).

The most active area within the functional foods market in Europe has been probiotic dairy products, in particular, probiotic yogurts and milks. In 1997 these products accounted for 65% of the

European functional foods market, valued at US\$320 million and accounting for 23% of the market. Leatherhead Food RA's 1996 report valued the global market for functional foods at US\$6.6 billion in 1994, with Japan accounting for just less than one-half of that. Forecasts suggest that the market will have reached US\$17 billion by 2000, with the long-term potential to become as big as the low-fat and low-calorie markets, which are estimated to be in excess of US\$87 billion. The report's findings show the probiotic market was valued at \$24.23 billion in 2011 and is expected to grow at a CAGR of 6.8% from 2012 to 2017. In 2011, Asia-Pacific led the global market with share of 40.0%, followed by Europe and North America in terms of revenue. Looking ahead, the report shows that probiotic dairy products commanded the highest market share among all the probiotic foodstuffs, accounting for almost 80% in the year 2011, and is expected to reach a market size of almost \$23.93 billion by 2017 (8)

Discussion:

Together, the genomic approaches and health aspect of probiotics have identified several bacterial factors that are involved in modulation of the immune system and mucosa! barrier, and have revealed that a molecular 'band width of human health' could represent a key determinant in an individual's physiological responsiveness to probiotics. Within this scope probiotic based 'personalized nutrition' is approaching the global market of sports nutrition with an enormous competence.

Conclusion:

The study explains the goodwill of probiotics, as a functional food for sports person and how it is getting popularized in the sports medicine market with several health promotional effects. By including probiotics in daily athlete diet immune response, gut health, protein utilization and personal performance can be enhanced. With such promising market competence probiotics are emerging as an alternative of synthetically processed nutritional supplements with an approach to personalized nutrition plan among global athletes.

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