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IMMUNITY & GUT MICROBIOME: PROBIOTIC & PREBIOTIC AS COLONIC BIOFERTILIZERS

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The GI tract is described as the body's largest immune organ and the intestinal microbiota has a vital role in the body's defense system. Further the synergy of the probiotic and prebiotic components provides a stable and relatively uniform gut microbiome. In the present study the possibility for development of nutraceuticals using potent probiotic LAB strains isolated & characterized from different natural sources & its enrichment by the addition of suitable prebiotics such as honey, Inulin & accacia gum was investigated. Honey is a natural source of prebiotic fructose oligosaccaride, Acacia gum is also a natural source of prebiotic rich in arabinose,rhamnose and galactose (PRAG). Inulin is a dietary fiber known as fructan. To evaluate the effect of different prebiotics on probiotic, fermented milk samples were prepared by adding honey, acacia gum and Inulin. Bacterial count, acidity and nutritional aspects like protein, fat, and sugar content were determined. All the synbiotic combinations exhibited higher functionability compared to probiotic only. Synbiotic fermented samples, Honey exhibited the highest viability & higher protein content but Acacia gum reduced the sugar and fat content which are advantageous to diabetics & hypercholerstemic conditions. Both Honey & Acacia gum exhibited antimicrobial activity towards selected common pathogens. Invivo study was conducted with selected probiotic & prebiotic Acacia Gum & combination in experimental balb/c Mice during 3 weeks of oral treatment. Results obtained for colonization, persistence and histopathology study indicated significant level of colonization and no sign of infection. Highest colonization was observed in synbiotic treated group suggesting the role of prebiotic in enhanced growth of probiotic. Unlike with probiotic, Acacia gum treatment suggested an anti-obesity role, which substantiates the result of in vitro study. Levels of serum triglyceride and total cholesterol were within control for the synbiotic treated group. The prebiotic treated group recorded highest levels of Phosphorus and Calcium ions in the serum, indicating impact of ion absorption ability. Humoral immunity in probiotic alone treated group was marked by increased Phosphorus and Calcium ions in the serum, indicating impact of ion absorption ability. Humoral immunity in probiotic alone treated group was marked by increased level of serum IgA, IgM. Synbiotic combination exhibited phagocytic activity 3 times higher than individual effect and probiotic could equally activate both T cell & B cell in response to mitogens concanavalin A & lipopolysaccharide. It is a remarkable observation that a probiotic strain could induce both T cell & B cell. Probiotic was able to stimulate TNF α production. Acacia gum down regulated the production, suggesting that it can be recommended as TNF α inhibitor/regulator. Liver cells have antioxidant property and synbiotic group rendered more activity. Probiotic & prebiotics have different mechanisms to prevent colon cancer. Prominent reduction was observed in the level of faecal colon cancer marker enzymes β-glycosidase & β-glucuronidase in treated group but higher reduction was noticed in synbiotic combination. These results suggest that synergy of suitable probiotic and prebiotic can act as colonic biofertilizers.

BIOGRAPHY

Keerthi Thalakattil Raghavan has awarded her PhD from Cochin University of Science and Technology, Cochin, Kerala, India. Currently she is professor in School of Biosciences, Mahatma Gandhi University, Kerala, India. Her areas of interests are probiotics, prebiotic, microbiome and bio prospecting of marine microbe. She is member of number of academic and administrative bodies in her university and other universities. She has Membership in Scientific Societies such as International Probiotics Association (IPA), Zurich, Switzerland; Asian Federation of Biotechnology (AFOB), Korea; Indian Dairy Association (IDA), New Delhi.

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