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## Enhancing Probiotic Efficiency Through Optimum Designing of Food Matrices

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### Abstract

The interactions between phenolic compounds and probiotics are an emerging key factor in achieving the health promoting effects induced by both these components. However, systematic studies documenting the evidence on the beneficial effects of phenolic and probiotics combinations of on host are limited. In our study, two food matrices were designed based on sea buckthorn and apple juice, supplemented with malt extract (M) and whey protein concentrate (WPC). Results indicated that antipathogenic potential of probiotics was strongly influenced by the composition of matrices. Among the matrices evaluated, malt supplemented sea buckthorn juice fortified with *L. rhamnosus* GG (LGG) was a superior matrix comparatively and could suppress *E. coli*, *S. enteritidis* and *S. dysenteriae* within an hour of co-incubation. Scanning electron microscopy used to study the structural changes and biocidal action of cell-free extract of probiotic–fortified matrices on pathogens revealed multiple pores and complete disintegration of pathogens. Also, the anti-inflammatory potential, of the mutual interactions between LGG and phenolic compounds from sea buckthorn was evaluated on TNBS induced enterocolitis and LPS induced inflammation in a zebrafish model (*Danio rerio*). Histological data and gene expression studies depicted a higher protection against inflammation in case of sea buckthorn matrix suggesting the positive influence of matrix components on the probiotic functionality. Finally, the impact of beverage matrix on other functionalities of LGG was also evaluated during storage conditions. The protective effects of the matrix components were observed, where the adhesion properties, cell surface hydrophobicity, GI tolerance and anti-spoilage potential of LGG strain remained unaffected during the entire storage period. Overall results suggest that probiotic strain may behave differently in different food matrices. Furthermore, enhanced sustainable functionality of the probiotic strain may be achieved by optimum designing of the food matrices.

### Biography: Srijita Sireswar

Srijita Sireswar is a PhD student from School of Biotechnology, KIIT Deemed to be University, Bhubaneswar, India. Her research work focuses on studying the role of food matrices in novel functional beverages. She has published her research work in highly regarded, peer reviewed journals like Food and Function, Food Research International and Food Bioscience. She has also attended several international conferences and was awarded the best oral presenter at the International Conference on Probiotic and Food Sustainability (ICPFS 2018) held at Johor Bahru, Malaysia.