Exploring the Prebiotic Potential of Glucosamine

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Abstract : Glucosamine (GS) is the most abundant naturally occurring amino monosaccharide and is normally produced in human body via cellular glucose metabolism. It is regarded as the building block of cartilage matrix and is also an essential component of cartilage matrix repair mechanism. Besides that, it can also be explored for its prebiotic potential as many bacterial species are known to utilize the amino sugar by acquiring them to form peptidoglycans and lipopolysaccharides in the bacterial cell wall. Glucosamine can therefore be considered for its fermentation by bacterial species present in the gut. Current study is focused on exploring the potential of glucosamine as prebiotic. The studies were done to optimize considerable concentration of GS to reach GI tract and being fermented by the complex gut microbiota and food grade GS was added to various Simulated Fluids of Gastro-Intestinal Tract (GIT) such as Simulated Saliva, Gastric Fluid (Fast and Fed State), Colonic fluid, etc. to detect its degradation. Since it was showing increase in microbial growth (CFU) with time, GS was Further, encapsulated to increase its residential time in the gut, which exhibited improved resistance to the simulated Gut conditions. Moreover, prepared microspehres were optimized and characterized for their encapsulation efficiency and toxicity. To further substantiate the prebiotic activity of Glucosamine, studies were also performed to determine the effect of Glucosamine on the known probiotic bacterial species, i.e. Lactobacillus delbrueckii (MTCC 911) and Bifidobacteriumbifidum (MTCC 5398). Culture conditions for glucosamine will be added in MRS media in anaerobic tube at 0.20%, 0.40%, 0.60%, 0.80%, and 1.0%, respectively. MRS media without GS was included in this experiment as the control. All samples were autoclaved at 118° C for 15 min. Active culture was added at 5% (v/v) to each anaerobic tube after cooling to room temperature and incubated at 37° C then determined biomass and pH and viable count at incubation 18h. The experiment was completed in triplicate and the results were presented as Mean ± SE (Standard error).The experimental results are conclusive and suggest Glucosamine to hold prebiotic properties.

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