Title : **Cholesterol lowering effect and bile salt hydrolase activity of selected strains of probiotic lactic acid bacteria**

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Introduction:

Hypercholesterolemia is a major public health issue and poses a risk for cardiovascular disease. Various approaches including the use of probiotics have been studied extensively. Cholesterol removal mechanisms of probiotics are attributed to bile salt hydrolase activity and cell surface binding leading to reduced cholesterol absorption in the intestine1.Hence, the cholesterol lowering effect and bile salt hydrolyase (BSH) activity of selected strains of lactic acid bacteria were evaluated in the current study.

Methodology:

Lactobacillus rhamnosus MTCC 1423, Lactobacillus plantarum MTCC 2621 and Lactobacillus fermentum MTCC 903 (Microbial Type Culture Collection, Chandigarh, Haryana, India) were inoculated at 1% level in MRS broth supplemented with 0.2 % bile salts (taurocholic acid or glycocholic acid) and cholesterol (100 µg/ ml broth). The broth was incubated at 37°C for 24 h and the cholesterol was estimated in the supernatant after removal of bacterial cells by centrifugation2. BSH activity was determined by a qualitative plate assay3 and also by measuring the release of amino acids from conjugated bile salts by the lactobacilli strains4.

Results:

All the lactobacilli strains used in the study were effectively able to remove cholesterol from the growth media after 24 h incubation ($p<0.05$). However, the strains showed a greater reduction of cholesterol from MRS media supplemented with sodium glycocholate (81.03-88.32%) as compared to media supplemented with sodium taurocholate (45.29-66.15%). The strains also exhibited BSH activity, with the activity being higher in L. plantarum and L. fermentum as compared to L. rhamnosus. The organisms showed a greater ability to hydrolyze glycine conjugated bile as compared to taurine conjugated bile ($p<0.05$). Higher substrate specificity for glyco-conjugates as compared to tauro-conjugates has been shown previously. Glycocholate predominates in the intestine and is more toxic than taurocholate and hence its deconjugation is a protective mechanism that enables cell survival. Free bile salts co-precipitate cholesterol and are less soluble than conjugated bile salts resulting in lower absorption in the intestinal lumen leading to a hypocholesterolemic effect5.

Conclusion:

The results indicated that the selected strains of lactobacilli may be effective as probiotics with cholesterol lowering properties.

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