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Evidence for probiotic characteristics of Bacillus isolates: In vitro studies

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Abstract

The concept of probiosis has emerged as a new science primarily as dietary supplements as well as therapeutic and prophylactic usage in human and aquaculture. With GRAS status and natural inhabitant of human gastrointestinal tract, lactic acid bacteria are considered mainly for probiotic research. On the other hand, use of *Bacillus* sp as probiotics raises safety issues because few species are known for pathogenic trait. In such connection, the present study has been focused widely on comparative accounts of probiotic qualities of *Bacillus* isolates for safer usage. Initially, heat resistant gram positive rods were isolated from raw milk samples of different animal sources, fermented dairy products and rhizobial soil of various medicinal herbs. Among 170 putative *Bacillus* isolates, the non-haemolytic, lecithinase and gelatinase negative cultures devoid of virulence genes *cyt*K, *hbl*D and *nhe*1 were selected and subsequently identified as *B. megaterium*, *B. subtilis*, *B. licheniformis* and *B. flexus* through biochemical, physiological, molecular techniques and fatty acid profiling. Selected cultures showed 70-80% survival under simulated gastrointestinal condition which was also confirmed through increased branched chain cellular fatty acids and H^+-ATPase production. The cultures exhibited 30-50% adhesion to hydrocarbon, good autoaggregation and mucin binding ability. Antimicrobial activity, antioxidant activity, cholesterol reducing ability, antibiotic susceptibility and production of enzyme viz., protease, cellulase, amylase and lipase contribute to the potentiality of *Bacillus* isolates for probiotic application. Overall the study increases our understanding of functional attributes of *Bacillus* spp and allows both industries and consumers to choose for well-defined probiotic with distinct health benefits.

Biography

Shobharani P was awarded PhD by University of Mysore in the area of Microbiology for her work on "Isolation and characterization of native isolate *Leuconostoc* for its functional attributes". She worked as post doctoral research associate on the topic "Molecular characterization of bioactive compound obtained from lactic acid bacterial fermented seaweed" under DST-JSPS collaborative project. In her credit she has 10 research papers, 1 book chapter and 2 Indian patents. Recently she has been awarded the research grant under SERB Young Scientist scheme by DST, New Delhi for the project entitled "Development and application of *Bacillus* sp as probiotic".

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