Probiotic Potentials of different Lactobacillus Isolates from the Ethnic Fermented Foods of Garo Hills, Meghalaya, India

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Abstract

Background and Objective: Probiotics are the health promoting viable microorganisms that exhibit a beneficial effect on the health of human being by improving the intestinal microflora. The probiotics are generally consumed as a part of the fermented foods. Traditional fermented foods of Garo Hills, Meghalaya, India contain lots of friendly bacteria. This study aimed to evaluate the probiotic properties of Lactobacillus cultures isolated from the traditional fermented foods of the Garo Hills of Meghalaya.

Methods: The Lactobacillus isolated were analysed for their tolerance to low pH, bile salts, antimicrobial potential, auto-aggregation ability, microbial adhesion to hydrocarbons, antioxidative potential, antibiotic susceptibility, proteolytic activity and cholesterol assimilation.

Results: Out of eight Lactobacillus isolates, Lactobacillus rhamnosus (K4) and Lactobacillus helveticus (K14) was found to tolerate pH 2 and pH 3 for 1.5 and 3 hours. Lactobacillus fermentum (K16) could survive efficiently at 0.5% bile salts after 1.5 and 3 h and it was also able to reduce cholesterol efficiently (60.64%) as compared to the other isolates. Lactobacillus rhamnosus (K4) strain displayed highest antioxidant activity (49.13, 62.89, 73.97 and 82.17% at 0, 2, 6 and 24 hours respectively) and also exhibited the highest cell surface hydrophobicity (69.95%). Lactobacillus helveticus (K14) also exhibited the highest aggregation (81.32%) and proteolytic activity (0.67 O.D.) justifying their capability to self-aggregate easily which is a prerequisite for colonization and protection of gastrointestinal tract. Antibiotic susceptibility pattern of selected isolates were also observed and antimicrobial activity was demonstrated against E. coli, S. aureus, S. typhi, P. aeruginosa and Bacillus subtilis. Further, the evolutionary relatedness between the Lactobacillus isolates was signified by a DNA alignment program, MAFFT v6.864.

Conclusion: The present study confirmed the potentials of the Lactobacillus cultures as probiotics for exploitation in the development of novel functional fermented foods for the betterment of human health in North-Eastern region of India and the other parts as well. Further, clinical investigations are required to validate the health claims against these Lactobacillus cultures.

Keywords: Probiotics, antioxidative, Lactobacillus helveticus, Meghalaya