Isolation, characterisation and in vitro evaluation of bacteriocins-producing lactiv acid bacteria from fermented products of Northern Borneo for their beneficial roles in food industry

ABSTRACT

In this study, lactic acid bacteria (LAB) isolated from traditional fermented foods namely coco bean, fermented cabbage, salted vegetable, tempeh, tempoyak, tapai ubi and tapai nasi were screened for production of bacteriocin. Characterisation and in vitro evaluation of them were carried out to assess their potential use in food industry. Towards these objectives, the inhibitory spectra of the isolates against Listeria monocytogenes ATCC13932, resistance to phenol, amylolytic and proteolytic activities, ability to produce acid and coagulate milk, antibiotic susceptibility and tolerance in the presence of various concentration of NaCl and at different temperatures were evaluated. Two out of 15 LAB strains were able to inhibit the growth of food-borne pathogen, L. monocytogenes ATCC 13932 and produce bacteriocin-like inhibitory substances. The strains were identified as Pediococcus acidilactici TN1 (from tapai nasi) and Lactobacillus farciminis TY1 (from tempoyak). Biochemical and physiological tests demonstrated that, both strains were able to grow at wide range of NaCl concentrations (0.5 - 5.0 %, w/v) and temperatures (28 - 70 ˚C), and capable to degrade protein. They lowered the pH level and coagulate milk after 24 h of incubation. Both strains showed intrinsic mechanisms of antibiotic resistance towards streptomycin, norfloxacin, erythromycin, amikacin and nalidixic acid. They also were able to grow in 0.3% (w/v) of bile salts and tolerate up to 0.5% (w/v) phenol. The findings from this study revealed the presence of LAB strains in fermented foods of Northern Borneo which have an antimicrobial activity towards the food-borne pathogen. Even though this study had generated extensive information to validate Pediococcus acidilactici TN1 and Lactobacillus farciminis TY1 as potential probiotic strains for application in the food industry, the study is by no means comprehensive nor complete. More laboratory, particularly in vivo studies, are needed before this product could be accepted by the food industry and most importantly to explore its novel health promoting functions as well as its colonization behaviour in the gut.

Keyword: Lactic acid bacteria; Isolation; Characterisation; Fermented foods; Bacteriocins