Probiotic potential of lactic acid bacteria isolated from mulberry silage

ABSTRACT

Lactic acid bacteria are the most important bacteria that have been used as probiotic in food and feed industries. Due to their beneficial probiotic properties, research for new lactic acid bacterial strains is still continued; the new strains which are more tolerate to the stress conditions of the GIT, and have better probiotic properties than existing strains. In the present study, a total of 50 isolates were isolated from mulberry silage as a potential source for isolation of lactic acid bacteria. Based on the initial identification using catalase test, gram staining and colony and cell morphology, 38 isolates which were most probably lactic acid bacteria were selected for in vitro acid and bile tolerance tests. Of the 38 isolates, 34 were acid tolerance and 21 were bile tolerance. Identification of 10 selected isolates, which exhibited better acid and bile tolerance than the others, using 16S rRNA gene sequence analysis showed that all 10 isolates belonged to the genus Lactobacillus including one L. pentosus, two L. farraginis, two L. brevis and five L. acidipiscis. Results of studies on reduction of pH in the growth medium and organic acid production profiles of the strains revealed that four selected Lactobacillus strains (one strain from each species, namely L. farraginis ITA22, L. pentosus ITA23, L. brevis ITA33 and L. acidipiscis ITA44) reduced the pH of their growth medium to the levels of 3.2 to 4.1 during 24 h of incubation by production of organic acids, mainly lactic acid (production of 187.27 to 433.41 mM) and acetic acid (production of 86.79 to 106.21 mM). Generally, the four isolated Lactobacillus strains showed good tolerance to acid and bile salts, so they would probably be able to survive in the GIT, and they could be considered as potential probiotic candidates for humans and animals. They produced considerable amounts of organic acids, which could be a positive point toward their antagonistic activity against pathogenic strains. However, further studies are needed to investigate their probiotic properties including antimicrobial activity.

Keyword: Lactic acid bacteria; Lactobacillus; Probiotic; Mulberry silage