Bacillus amylo liquefaciens ssp. plantarum strains as potential protective starter cultures for the production of Bikalga, an alkaline fermented food

Aims: To identify and screen dominant Bacillus spp. strains isolated from Bikalga, fermented seeds of Hibiscus sabdariffa for their antimicrobial activities in brain heart infusion (BHI) medium and in a H. sabdariffa seed-based medium. Further, to characterize the antimicrobial substances produced. Methods and Results: The strains were identified by gyrB gene sequencing and phenotypic tests as B. amylo liquefaciens ssp. plantarum. Their antimicrobial activity was determined by the agar spot and well assay, being inhibitory to a wide range of Gram-positive and Gram-negative pathogenic bacteria and fungi. Antimicrobial activity against Bacillus cereus was produced in H. sabdariffa seed-based medium. PCR results revealed that the isolates have potential for the lipopeptides iturin, fengycin, surfactin, the polyketides difficidin, macrolactin, bacillaoe and the dipeptide bacilysin production. Ultra-high performance liquid chromatography-time of flight mass spectrometry analysis of antimicrobial substance produced in BHI broth allowed identification of iturin, fengycin and surfactin. Conclusions: The Bacillus amylo liquefaciens ssp. plantarum exhibited broad spectrum antifungal and antibacterial properties. They produced several lipopeptide antibiotics and showed good potential for biological control of Bikalga. Significance and Impact of the Study: Pathogenic bacteria often occur in spontaneous food fermentations. This is the first report to identify indigenous B. amylo liquefaciens ssp. plantarum strains as potential protective starter cultures for safeguarding Bikalga.