ABSTRACT

Biosurfactants are surface-active compounds produced by microorganisms, including the halophilic bacterium Bacillus clausii J1G-0%B. Lipopeptide biosurfactants have attracted attention as natural antioxidants due to their biodegradability, low toxicity, and environmental friendliness. This study aimed to investigate the effect of NaCl concentration on biosurfactant production and its antioxidant activity. Biosurfactant production was carried out in media containing 5%, 10%, and 15% NaCl and harvested at different growth phases determined from the bacterial growth curve. Biosurfactant activity was evaluated using the oil spreading and emulsification index methods, while characterization was performed using Fourier Transform Infrared (FT-IR) and Ultraviolet-Visible (UV-Vis) spectroscopy. Antioxidant activity was determined using the DPPH radical scavenging assay. The results showed that the highest biosurfactant activity was obtained during the stationary phase (T2), with oil displacement diameters of 0.50 cm, 0.80 cm, and 0.85 cm and emulsification indices of 50%, 60%, and 65% for 5%, 10%, and 15% NaCl, respectively. FT-IR and UV-Vis analyses confirmed that the biosurfactant produced was a lipopeptide containing peptide bonds. The highest antioxidant activity was observed in the biosurfactant produced at 15% NaCl during the stationary phase (T2), with an IC_{50} value of 60.97 ppm. The increase in antioxidant activity was positively correlated with the increase in biosurfactant activity. These findings indicate that the lipopeptide biosurfactant produced by Bacillus clausii J1G-0%B has potential as a natural antioxidant, with optimum production achieved at 15% NaCl during the stationary phase.

Keywords: *biosurfactant, lipopeptide, halophilic bacteria, NaCl, antioxidant activity, DPPH.*