

ABSTRACT

Halophilic bacteria are microorganisms capable of surviving and growing in high-salt environments and are known to produce secondary metabolites and bioactive compounds with antibacterial potential. The halophilic bacterium *Bacillus clausii* J1G-0%B is one such bacteria with promising potential in the production of secondary metabolites with antibacterial activity. In secondary metabolite production, media composition, particularly NaCl concentration, plays a crucial role in the biosynthesis of active compounds. This study aimed to determine the effect of varying NaCl concentrations on the antibacterial activity of secondary metabolites and to determine the optimum NaCl concentration with maximum antibacterial activity. This study was conducted in several stages, beginning with the rejuvenation and adaptation of the halophilic bacterium *Bacillus clausii* J1G-0%B to varying NaCl concentrations, determining the optimum NaCl concentration through growth curve observations, antibacterial testing and phytochemical screening, secondary metabolite production and extraction, calculating the percentage of secondary metabolite inhibition on pathogenic bacteria, and characterizing the secondary metabolites using the FTIR method. The results showed that the optimal NaCl concentration for producing secondary metabolites was 15% NaCl after an incubation time of 168 hours, with an average clear zone of 9.2 mm for *Escherichia coli* and 10.8 mm for *Staphylococcus aureus*. The secondary metabolite extract, extracted using ethyl acetate with a rotary evaporator, inhibited bacterial growth with an IC₅₀ of 0.689 mg/mL for *Staphylococcus aureus* and 0.789 mg/mL for *Escherichia coli*. Phytochemical results indicated that the halophilic secondary metabolite J1G-0% contained alkaloids, flavonoids, tannins, and terpenoids.

Keywords: Halophilic, *Bacillus clausii*, secondary metabolite, antibacterial