

ABSTRACT

**OPTIMIZATION OF pH AND TEMPERATURE FOR
ANTIBACTERIAL METABOLITES PRODUCTION BY *Bacillus
tequilensis* BSM-F SYMBIOSIS SPONGE *Halichondria panicea* FROM
CABBIYA MADURA SEAWATER IN SCA MEDIA**

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Production of antibacterial metabolites is influenced by growth media, fermentation condition, and nutrition sources such as carbon, nitrogen, and mineral and environmental factors such as incubation time, pH, and temperature. This research aims to determine optimum media pH and incubation temperature on the inhibitory activity of metabolites produced by *Bacillus tequilensis* BSM-F symbiosis sponge *Halichondria panicea*. This optimization study needs to be done because the media pH and incubation temperature affect the stability of PKS (Polyketide Synthetase) and NRPS (Non-Ribosomal Peptide Synthase) enzymes which acted as a biocatalyst to produce antibacterial metabolites. This study was done by using solid fermentation in Starch Casein Agar (SCA) media and the inhibitory activity against *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922. The antibacterial activity was stated by inhibition zones (mm). Various pH and incubation temperatures tested were pH 5 – 8 and temperature 28 °C, 32 °C and 37 °C. *Bacillus tequilensis* BSM-F could produce antibacterial metabolites in 48 hours. The largest inhibition zone against *Staphylococcus aureus* ATCC 25923 was obtained in 72 hours, pH $7,0 \pm 0,5$ and incubated at 37 °C with inhibition zones of $15,37 \pm 0,153$ mm (Sig. $0,00 < 0,05$). While antibacterial activity against *Escherichia coli* ATCC 25922 was obtained in 72 hours, pH $6,0 \pm 0,5$ and incubated at 37 °C with inhibition zones of $11,17 \pm 0,208$ mm (Sig. $0,00 < 0,05$).

Keyword : Antibacterial activity, *Bacillus tequilensis* BSM-F, *Halichondria panicea*, Optimization of pH and temperature