ABSTRACT

Dinda Sakinah Putri. 24020120140171. **The Effect of Incubation Temperature Variation and pH on Cellulase Enzyme Activity from Endophytic Bacteria of Red Seaweed (*Eucheuma cottonii* Doty).** Biotechnology Laboratory, Departmen of Biology, Faculty of Science and Mathematics, Diponegoro University, under the guidance of Arina Tri Lunggani and Sri Pujiyanto.

The cellulase enzyme is an enzyme that degrades cellulose and can be produced from cellulolytic bacteria. *Eucheuma cottonii* Doty is one of the algae that contains endophytic bacteria that produce cellulase enzymes. This research aims to determine the effect of variations in incubation temperature and pH on cellulase enzyme activity from red seaweed endophytic bacteria (*Eucheuma cottonii* Doty). The research was conducted at the Biotechnology Laboratory, Faculty of Science and Mathematics, Diponegoro University, Semarang. Bacterial rejuvenation using MA media. Screening for cellulolytic bacteria uses *Carboxymethyl Cellulose* (CMC) agar media. Characterization was carried out macroscopically and microscopically. Qualitative enzyme activity testing uses *Congo red* to see the cellulolytic index. Production of enzyme crude extract by centrifugation. Enzyme activity testing uses the DNS method with a UV-Vis spectrophotometer. Measurement of protein levels using the Lowry method. This research used a Completely Randomized Design (CRD). The first factor is incubation temperature (T), namely 35^{o}C (T_1), 40^{o}C (T_2), and 45^{o}C (T_3), while the second factor is pH treatment (P), namely pH 6 (P_1), pH 7 (P_2), and pH 8 (P_3) with repetition 3 times. Research data was analyzed using analysis of variance (ANOVA). If the difference is significant then proceed with the *Post Hoc* test using the *Tukey* test. The results showed that red seaweed endophytic bacteria produced a clear zone in the CMC cellulolytic medium of 1,53 cm. The highest cellulase enzyme activity of red seaweed endophytic bacteria was obtained at a temperature of 45^{o}C with an enzyme activity value of 0.898 U/mL, and at pH 6 treatment with an enzyme activity value of 3,139 U/mL. The highest spesific enzyme activity was obtained of 45^{o}C at 0,141 U/mg, and of pH 6 treatment it was 0,794 U/mg.

Keywords: *Cellulase, DNS, temperature, pH medium*