ABSTRACT

Amalia Adiningsih. 24020120130056. Molecular Identification Based on *tuf*A Marker and Evaluation of *Dunaliella* sp. Potential as a Copper (Cu) Heavy Metal Bioremediator in Aquatic Environments. Under the supervision of Hermin Pancasakti Kusumaningrum and Agung Suprihadi.

Dunaliella sp. is a microalgae that has the potential to be a bioremediator of heavy metals, especially copper (Cu), which is known as a hazardous contaminant for the aquatic environment and human health. Copper can cause negative impacts on the ecosystem, so bioremediation efforts using effective microalgae are needed. To ensure the ability of *Dunaliella* sp. as a bioremediator, molecular identification is needed first. This study aims to identify the *Dunaliella* sp. species molecularly using the *tuf*A genetic marker and test its ability to absorb copper heavy metals. The research process began with DNA isolation, concentration measurement, PCR, electrophoresis, and sequence analysis. The bioremediation test was carried out with a completely randomized design using 4 Cu concentrations (0 ppm, 1 ppm, 3 ppm, and 5 ppm) with 3 repetitions. After five days of culture, cell density was analyzed using ANOVA, and if significant differences were found between treatments, the Tukey test was carried out. Cu metal absorption was analyzed using ICP-OES, while morphological changes were observed under a microscope. The results of molecular identification with *tuf*A showed that *Dunaliella* sp. has 67.38% homology with *Dunaliella salina* strain SQ. Although changes in cell shape are seen under a microscope, the results of the one-way ANOVA test showed that variations in Cu concentration did not provide significant differences in the growth of *Dunaliella* sp. cell density. However, at a concentration of 3 ppm, *Dunaliella* sp. was able to absorb Cu metal up to 66%. This finding shows the great potential of *Dunaliella* sp. as a Cu bioremediator.

Keywords: *Dunaliella* sp., *tuf*A marker, bioremediation, copper, heavy metal pollution