

ABSTRACT

Ivan Reinaldo, 24020222130046. **Analysis of Light Intensity on Metabolite Compound and Antidiabetic Activity from Red Microalgae *Porphyridium purpureum* Methanol Extract** under the guidance of Endang Kusdiyantini and Asep Bayu.

The incidence of type 2 diabetes mellitus (T2DM) in Indonesia continue to rise annually, driving up the demand for effective management therapeutics. *Porphyridium purpureum* offers a promising solution due to its ability to inhibit α -amylase and α -glucosidase, key enzymes responsible for starch breakdown in the digestive system. The metabolite content of *P. purpureum*—including polysaccharides, proteins, lipids, pigments, and bioactive compounds—can be influenced by light intensity. This study analyzed the effects of normal (1600 lux) and high (3200 lux) light intensities on the metabolite profile and antidiabetic activity of *P. purpureum*. Biomass and exopolysaccharide (EPS) production increased significantly ($p \leq 0.05$) under high light intensity. Conversely, all pigment contents, particularly phycoerythrin, decreased significantly ($p \leq 0.05$) under the same condition. Carbohydrate content increased significantly ($p \leq 0.05$) under normal intensity, while protein and lipid contents showed no significant differences between the two light intensities. The levels of bioactive compounds—such as alkaloids, flavonoids, saponins, tannins, phenols, steroids, and terpenoids—in the methanol extract of *P. purpureum* decreased when cultivated under high light intensity. LC-HRMS analysis revealed a higher abundance of pigments, phenols, and terpenoids in the normal intensity culture, whereas the high-intensity culture produced more lipids. The *in vitro* antidiabetic activity of the *P. purpureum* methanol extract was evaluated spectrophotometrically using a Varioskan Lux multimode microplate reader via α -amylase ($\lambda = 660$ nm) and α -glucosidase ($\lambda = 405$ nm) inhibition assays. The best results were obtained from the methanol extract cultivated under normal light intensity, exhibiting inhibition rates of $9.63 \pm 1.04\%$ against α -amylase and $27.95 \pm 0.92\%$ against α -glucosidase.

Keywords: Light intensity, metabolite, *Porphyridium purpureum*, Type 2 diabetes mellitus, α -amylase, α -glucosidase