EKSTRAKSI SENYAWA BIOAKTIF MENGGUNAKAN PELARUT AIR DAN METANOL DARI MIKROALGA *Chlorella vulgaris* YANG MEMILIKI KAPASITAS SEBAGAI ANTIOKSIDAN DAN ANTIBAKTERI

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ABSTRACT

EXTRACTION OF BIOACTIVE COMPOUNDS USING WATER AND METHANOL SOLVENTS FROM MICROALGAE *Chlorella vulgaris* WITH ANTIOXIDANT AND ANTIBACTERIAL CAPACITIES

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Microalgae are a potential biological resource that has not been extensively explored. Microalgae contain active components such as antimicrobial, antifungal, antiviral activities as well as antioxidant and general antibacterial activities that can be utilized in various fields. *Chlorella vulgaris* is commonly found in various freshwater environments. This study aims to investigate the potential of *Chlorella vulgaris* extract for antioxidant and antibacterial activities.The extraction process was carried out by maceration using two types of solvents with different polarity levels, namely methanol and water. Quantitative testing was conducted by determining the chlorophyll and carotenoid content using spectrophotometry methods and total phenolics using the *Folin-Ciocalteu* method. Antioxidant activity was assessed by the ABTS radical scavenging method, and antibacterial activity was tested using the disc diffusion method.The results showed that the chlorophyll a, chlorophyll b, and carotenoid contents in the methanol extract were 5.398, 1.496, and 2.563 mg/L, respectively, while in the water extract they were 0.368, 0.096, and 0.340 mg/L, respectively. The total phenolic content was 2,048 ± 0.003 mg GAE/g sample for the methanol extract and 3,905 ± 0.002 mg GAE/g sample for the water extract. The ABTS antioxidant activity was expressed as IC_{50} values, where the methanol extract showed the best ABTS radical inhibition with an IC_{50} value of 59.12 ± 0.54 mg/L. The Trolox standard had an IC_{50} value of 4.92 ± 0.06 mg/L. For antibacterial activity testing of the 70% methanol extract showed inhibition zones of 10.5 mm and 14.5 mm against *Escherichia coli* and *Staphylococcus aureus*, respectively, categorized as strong antibacterial activity. The positive control showed inhibition zones of 31.8 ± 0.5 mm and 37.2 ± 0.5 mm, respectively. In conclusion, the bioactive compounds from the microalga *Chlorella vulgaris* possess antioxidant and antibacterial capacities.

Keywords: Microalgae; chlorophyll; total phenolics; antioxidant activity; antibacterial activity