

ABSTRACT

Hani Shafirah, 24020222120015. **Analysis of Growth and Expression of the *bglB* Gene in *Lactobacillus plantarum* in Lactic Acid Fermentation of *Caulerpa* sp.** (Supervised by Sri Pujiyanto and Arina Amalia Putri)

Caulerpa sp. is a macroalga with potential to be developed as a functional food through lactic acid fermentation using *Lactobacillus plantarum*. This study aimed to analyze the growth of *L. plantarum* and the expression of the *bglB* gene during the fermentation of *Caulerpa* sp. The study was conducted experimentally using fermentation periods of 24 and 48 hours with *L. plantarum* FNCC 0026, while the control consisted of MRSB medium inoculated with *L. plantarum* without the addition of *Caulerpa* sp. Bacterial growth was analyzed using the Total Plate Count (TPC) method, and *bglB* gene expression was determined by quantitative polymerase chain reaction (qPCR) using the Livak method. The results showed that the population of *L. plantarum* in control was higher than that in the *Caulerpa* sp. fermentation. In the control, the bacterial count increased from 2.4×10^7 CFU/mL to 1.8×10^9 CFU/mL at 24 hours, then decreased to 7.8×10^8 CFU/mL at 48 hours. In the *Caulerpa* sp. fermentation, the bacterial count increased from 2.25×10^7 CFU/mL to 1.3×10^8 CFU/mL at 24 hours and slightly decreased to 1.2×10^8 CFU/mL at 48 hours. The highest *bglB* gene expression was observed in the 48-hour control, reaching 5.21-fold, whereas *bglB* expression in the *Caulerpa* sp. fermentation was considerably lower, at 0.055-fold after 24 hours and 0.012-fold after 48 hours. These findings indicate that the fermentation of *Caulerpa* sp. using *L. plantarum* was successfully carried out and supported bacterial growth throughout the fermentation process. However, the expression level of the *bglB* gene during *Caulerpa* sp. fermentation was lower than that observed in the control.

Keywords: *Caulerpa* sp., fermentation, gene expression, *bglB*