

Sulfahri. 2012. Optimization of the Bioconversion of Algae *Spirogyra hyalina* which has been Hydrolyzed to Become Ethanol Using *Zymomonas mobilis* and *Saccharomyces cerevisiae*. This study was written under guided by Dr. Ni'matuzahroh and Dr.Yosephine Sri Wulan Manuhara, M.Si. Departement of Biology, Faculty of Science and Technology, Airlangga University, Surabaya.

▪

ABSTRACT

Fuel demand increased along with increasing population and human activity. Bioethanol is a renewable energy source, and whereby the base ingredients widely available in Indonesia and untapped. The study was conducted to determine the effect of different types of gases, initial pH, and the fermentation duration to cell biomass, pH, total reducing sugar, and total ethanol produced from fermentation of the algae *Spirogyra hyalina* which has been hydrolyzed to become ethanol using *Zymomonas mobilis* and *Saccharomyces cerevisiae*. Fermentation of the algae *Spirogyra hyalina* which has been hydrolyzed performed under anaerobic conditions with the variations of Nitrogen and Hydrogen gas in the space fermentor, variation of pH (pH 4, 5 and 6), and the variation of fermentation duration (0 hours, 24 hours, 48 hours and 72 hours). The results showed that different types of gases, pH, and the fermentation duration give an effect on the cell biomass, pH, total reducing sugar, and total ethanol produced from fermentation of the algae *Spirogyra hyalina* wich has been hydrolysis using *Zymomonas mobilis* and *Saccharomyces cerevisiae*. The highest levels of ethanol and biomass achieved by *Zymomonas mobilis* and *Saccharomyces cerevisiae* in the presence of Hydrogen gas. It means that the Hydrogen gas that was injected into the fermentor space can act as a reducing agent for the formation of NADH. NADH in the cell metabolism of *Zymomonas mobilis* and *Saccharomyces cerevisiae* has a function in the formation of ethanol.

Key words : Ethanol, Fermentation, Hydrogen, Nitrogen, *Saccharomyces cerevisiae*, *Spirogyra hyalina*, *Zymomonas mobilis*