Effect of Banana Peel Waste Substrate Ratio and pH on Biohydrogen Production Volume Using the Natural Consortium of Microorganisms Method

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ABSTRACT

The use of fossil fuels as an energy source has resulted in various problems such as water and air pollution which are dangerous for living creatures. Alternative energy is needed that can overcome the problems of fossil fuels. Biohydrogen can be produced from renewable, environmentally friendly materials, the combustion results in the form of water vapor which does not cause the greenhouse effect, acid rain and damage the ozone layer. Biohydrogen will be produced using organic waste in the form of banana peels as a substrate and tofu water waste with cow dung as a starter. In this research, biohydrogen production was carried out using a natural consortium of microorganisms technique. Biohydrogen production is carried out with 2 variables, namely variations in the ratio of substrate to tofu waste and cow dung, namely 1:1:1, 2:1:1, 3:1:1 and variations in pH, namely pH 6, pH 7, pH 8. Variations mixing the substrate with the starter and varying the pH affect the volume produced from biohydrogen production because the more carbohydrates available, the more optimal bacterial metabolism will be. Meanwhile changes in environmental pH will affect the effectiveness of enzymes. When the enzyme activity process decreases, it results in a decrease in the number of bacterial growth. The optimum conditions obtained from data processing with RSM are at a ratio of 3:1:1 with a pH of 6, namely witha total gas volume produced of 17.78 ml.H_2/$L_{reactor}$.

Keywords: *Biohydrogen, Consortium, Banana Peel Waste, Biohydrogen Volume*