

## ABSTRAK

*Abstrak* - Penelitian ini bertujuan untuk mempelajari substrat yang paling optimal dalam menghasilkan gas hidrogen dari limbah baggase tebu, tetes tebu dan pencampuran baggase tebu-tetes tebu. Bahan baku yang digunakan dalam penelitian ini adalah limbah baggase tebu dan tetesan tebu. Baggase tebu diolah terlebih dahulu melalui proses pre-treatment secara kimiawi selama 16 jam dengan konsentrasi NaOH 4% (w/v) sehingga diperoleh selulosa dan hemiselulosa. Setelah itu selulosa dan hemiselulosa pada baggase tebu di hidrolisis selama 42 jam, menggunakan buffer sitrat tekanan 1 atm dan pH=3. Setelah itu akan difermentasi menggunakan bakteri *Enterobacter aerogenes* selama 96 jam dengan pH=6-7. Hasil penelitian menunjukkan bahwa puncak produksi gas hidrogen terjadi pada jam ke-48. Selain itu, gas hidrogen yang dihasilkan paling optimal diperoleh dari tetesan tebu sebanyak 62,8837%, sedangkan pada baggase tebu 47,4056% dan pencampuran baggase tebu-tetes tebu 59,4877%.

**Kata Kunci-** *Baggase tebu dan tetesan tebu, Enterobacter aerogenes, Fermentasi, Hidrogen.*

## ABSTRACT

The purpose of this experiment is to study the most optimum substrate to produce hydrogen gas from baggage waste, liquid waste, and the mixing of both. Raw materials used in this experiment is cane baggage waste and cane liquid waste. Cane baggage waste was processed in pretreatment chemically within 16 hours with 4% of NaOH concentration (w/v) so that cellulose and hermicellulose were obtained. After that the cellulose and hermicellulose in baggage waste were being processed in hydrolysis within 42 hours, using citrate buffer with 1 atm pressure and pH=3. After that it was being ferment using enterobacter aerogenesis bacteria within 96 hours with pH=7. The result of the experiment shows that the peak of hydrogen gas production happen in the 48<sup>th</sup> hour. Besides, the most optimum hydrogen gas produced obtained by the 62,8837% of liquid waste, while the baggage waste is in 47,4056% and the mixing of the liquid-baggage waste in 59,4877%

**Keyword-** *cane baggage and cane liquid, Enterobacter Aerogenesis, Fermentation, Hydrogen*