POTENTIAL OF PALM OIL MILL EFFLUENT IN PRODUCING BIOHYDROGEN USING ANAEROBIC MICROBIAL

UNDERGRADUATE THESIS

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ABSTRACT

Research on "Potential of Palm Oil Mill Effluent in Producing Biohydrogen Using Anaerobic Microbial " was conducted from March to May 2023 at the Microbiology Laboratory and Baso Veterinary Center. This study aims to determine the production of Biohydrogen that can be generated from the fermentation that utilizes the metabolic activity of microbes in degrading substrates in the form of Palm Oil Mill Effluent (POME). The treatment is the addition of NaOH 1%, 1.5%, and 2%, addition of H_3PO_4 2.5%, 5% and 7.5%, addition of Molasses 2%, 4% and 6%. The results showed that biohydrogen production reached 5.817 ml/L, which was obtained with the addition of H_3PO_4 2.5%, with the addition of NaOH 1.5% showed that biohydrogen production reached 3.717 ml/L and the addition of molasses 6% showed that biohydrogen production reached 5.117 ml/L, meanwhile without treatment is reached 3.050 ml/L. In this study there was also analyze in wastewater loads such as BOD, COD, pH, sugar level and temperature which indicated the role of microorganisms in fermentation. The results of isolation and identification found three types of bacterial isolates from fermentation, namely *Bacillus* sp.$_1$, *Bacillus* sp.$_2$ and *Proteus* spp.

Keywords: Biohydrogen, Palm Oil Mill Effluent, Renewable Energy, Microorganism

ABSTRAK

Penelitian tentang “Potential of Palm Oil Mill Effluent in Producing Biohydrogen Using Anaerobic Microbial” telah dilaksanakan pada bulan Maret hingga Mei 2023 di Laboratorium Mikrobiologi dan Balai Veteriner Baso. Tujuan penelitian adalah untuk mengetahui produksi biohidrogen yang dihasilkan dari fermentasi dengan memanfaatkan aktivitas metabolisme mikroba dalam mendegradasi substrat berupa Palm Oil Mill Effluent. Perlakuan penelitian adalah penambahan of NaOH 1%, 1.5%, dan 2%, penambahan H_3PO_4 2.5%, 5% dan 7.5%, penambahan Molase 2%, 4% dan 6%. Hasil penelitian menunjukkan produksi biohidrogen 5.817 ml/L, yang diperoleh dengan penambahan H_3PO_4 sebesar 2.5%, penambahan NaOH 1.5% menunjukkan produksi biohidrogen 3.717 ml/L dan penambahan molase 6% menunjukkan produksi biohidrogen 5.117 ml/L, sedangkan tanpa perlakuan dapat dihasilkan biohidrogen mencapai 3.050 ml/L. Pada penelitian ini dianalisis beban limbah seperti BOD, COD, pH, kadar gula and suhu yang mengindikasikan peran mikroorganisme pada fermentasi. Hasil isolasi dan identifikasi ditemukan tiga jenis isolat bakteri dari proses fermentasi, yaitu *Bacillus* sp.$_1$, *Bacillus* sp.$_2$ dan *Proteus* spp.

Kata Kunci: Biohidrogen, Palm Oil Mill Effluent, Energi Terbarukan, Mikroorganisme