

Potensi limbah susu sebagai substrat pada reaktor Microbial Fuel Cell (MFC) = Dairy wastewater potential as a substrate in Microbial Fuel Cell (MFC)

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Abstrak

[Parameter COD dan TDS merupakan dua parameter yang nilainya paling tinggi pada limbah susu yaitu dengan kisaran 1.000-8.000 mg/L untuk COD dan 1.000-4.000 mg/L untuk TDS. Penelitian ini dilakukan untuk menurunkan kedua nilai parameter tersebut menggunakan bioreaktor Microbial Fuel Cell (MFC) yaitu merupakan sebuah teknologi alternatif pengolahan limbah yang dapat mendegradasi kandungan organik limbah serta menghasilkan energi listrik secara langsung tanpa membutuhkan konversi dan untuk melihat potensi limbah susu secara teoritis dalam menghasilkan energi listrik Penelitian dilakukan selama 2 bulan dengan membuat reaktor. MFC skala laboratorium dengan jenis single chamber tanpa membran berukuran 16/L dengan dimensi 40/20/20 cm Terdapat penambahan bakteri *Escherichia coli* untuk meningkatkan degradasi kandungan organik limbah. Penelitian yang dilakukan secara batch ini menunjukkan efisiensi penurunan COD sebesar 51 pada waktu tinggal 13 hari sedangkan TDS mengalami peningkatan karena adanya penambahan larutan elektrolit. Dengan konsentrasi COD influen sebesar 3.853 mg/L penurunan rata rata COD dari total yang tersisihkan adalah 7.7 setiap harinya Limbah susu ini memiliki potensi untuk dijadikan substrat dalam reaktor MFC karena secara teoritis dapat menghasilkan arus maksimum sebesar 340 mA dengan efisiensi Coulomb sebesar 13 Hasil ini lebih besar dibandingkan dengan penelitian lain yang menggunakan limbah domestik sebagai substrat.

.....COD and TDS are two parameters that have the highest value in dairy wastewater with a COD ranging between 1.000 and 8.000 mg/L and a TDS ranging between 1.000 and 4.000 mg/L. The aim of this study is to reduce the value of these parameters by using a Microbial Fuel Cell (MFC) bioreactor an alternative wastewater treatment technology that can degrade the organic content of the wastewater and produce electrical energy directly without the need of conversion and to see theoretically the dairy wastewater potential in power generation Research is done for 2 months by creating a laboratory scale MFC reactor with single chamber type without a membrane and has reactor volume of 16/L with dimensions of 40/20/20 cm. There is an addition of *Escherichia coli* bacteria to increase the degradation of the organic content of the wastewater Research which carried out in batch shows COD removal efficiency of 51 at the HRT of 13 days while TDS has increased due to the addition of an electrolyte solution As influent COD concentration is 3.853 mg/L the average decrease of the total excluded COD was 7.7 per day Therefore dairy wastewater has the potential to be used as a substrate in MFC reactor because theoretically it can produce a maximum current of 340 mA with Coulomb efficiency of 13. These result is greater than other research that use domestic wastewater as a substrate., COD and TDS are two parameters that have the highest value in dairy wastewater with a COD ranging between 1 000 and 8 000 mg L and a TDS ranging between 1 000 and 4 000 mg L The aim of this study is to reduce the value of these parameters by using a Microbial Fuel Cell MFC bioreactor an alternative wastewater treatment technology that can degrade the organic content of the wastewater and produce electrical energy directly without the need of conversion and to see theoretically the dairy wastewater potential in power generation Research is done for 2 months by creating a laboratory scale

MFC reactor with single chamber type without a membrane and has reactor volume of 16 L with dimensions of 40 20 20 cm There is an addition of Escherichia coli bacteria to increase the degradation of the organic content of the wastewater Research which carried out in batch shows COD removal efficiency of 51 at the HRT of 13 days while TDS has increased due to the addition of an electrolyte solution As influent COD concentration is 3 853 mg L the average decrease of the total excluded COD was 7 7 per day Therefore dairy wastewater has the potential to be used as a substrate in MFC reactor because theoretically it can produce a maximum current of 340 mA with Coulomb efficiency of 13 These result is greater than other research that use domestic wastewater as a substrate]