

Pengaruh jenis larutan elektrolit dan penambahan jumlah bakteri terhadap produksi listrik pada microbial fuel cell

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Abstrak

[ABSTRAK

Kebutuhan akan listrik telah menjadi kebutuhan krusial masyarakat Indonesia. Akan tetapi, sumber daya untuk menghasilkan energi listrik saat ini, bahan bakar fosil, diprediksi akan habis dalam waktu belasan tahun ke depan. Dengan sebuah pengembangan teknologi terkini, Microbial Fuel Cell yang menggunakan mikroba untuk memecah suatu substrat yang akan menimbulkan beda potensial dan menghasilkan listrik. Variasi yang dilakukan adalah variasi elektrolit dan penambahan jumlah bakteri. Eksperimen menggunakan elektrolit Kalium Persulfat (K₂S₂O₈) menghasilkan densitas daya lebih tinggi dibanding menggunakan Kalium Permanganat (KMnO₄) yaitu 3,01 mW/m². Sedangkan, penambahan jumlah bakteri sebanyak 1% medium adalah kondisi yang mampu menghasilkan densitas daya optimum yaitu 66,33 mW/m² dengan efisiensi coulombicnya 4,48%. Selain memproduksi listrik, Microbial Fuel Cell juga terbukti menurunkan kadar COD jika substrat yang digunakan adalah limbah cair seperti limbah cair tempe pada penelitian ini yang dapat penurunan terbesarnya mencapai 42,97% pada variasi penambahan jumlah bakteri sebanyak 10% medium

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ABSTRACT

Demand for electricity has become a crucial requirement of Indonesian society. Resources to generate electrical energy, fossil fuels, is predicted to run out within the next dozen years. With a development of the latest technology, Microbial Fuel Cell that uses microbes to break down a substrate which will cause electric potential difference and generate electricity. This experiment conducted two variations : electrolyte solution and number of bacteria. Experiments using potassium persulphate electrolyte (K₂S₂O₈) resulted in a higher power density than using potassium permanganate (KMnO₄) is 3,01 mW/m². Meanwhile, the addition of as much as 1% of bacteria medium is a condition that can produce optimum power density is 66.33 mW/m² with coulombic efficiency of 4.48%. Beside that, Microbial Fuel Cell is also shown to reduce levels of COD if the substrate used is wastewater such as tempe wastewater in this study were able to achieve a 42.97% decline in its biggest increase in the number of bacteria on the variation of as much as 10% of medium, Demand for electricity has become a crucial requirement of Indonesian society. Resources to generate electrical energy, fossil fuels, is predicted to run out within the next dozen years. With a development of the latest technology, Microbial Fuel Cell that uses microbes to break down a substrate which will cause electric potential difference and generate electricity. This experiment conducted two variations : electrolyte solution and number of bacteria. Experiments using potassium persulphate electrolyte (K₂S₂O₈) resulted in a higher power density than using potassium permanganate (KMnO₄) is 3,01 mW/m². Meanwhile, the addition of as much as 1% of bacteria medium is a condition that can produce optimum power density is 66.33 mW/m² with coulombic efficiency of 4.48%. Beside that, Microbial Fuel Cell is also shown to reduce levels of COD

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