

ABSTRAK

Biobaterai Berbasis Limbah Kulit Lemon dengan Variasi Komposisi Ekstrak Kulit Lemon dan Natrium Klorida Menggunakan Bonggol Pisang sebagai Matriks

(Muhammad Albar Aryansyah, 2026, 54 Halaman, 5 Tabel, 8 Gambar, 4 Lampiran)

Perkembangan energi terbarukan mendorong pengembangan sumber energi alternatif seperti halnya biobaterai berbahan alami. Limbah organik seperti bonggol pisang sebagai matriks dan kulit lemon sebagai elektrolit alami dapat dimanfaatkan sebagai bahan dasar yang disertai penambahan NaCl untuk meningkatkan kestabilannya. Bonggol pisang setelah dijemur dan dihaluskan kemudian dicampur dengan larutan elektrolit yang terdiri dari ekstrak kulit lemon yang memiliki kandungan asam sitratnya ditambah NaCl, kemudian dimasukkan ke dalam wadah baterai untuk selanjutnya di analisa. Performa biobaterai di analisa berdasarkan pengukuran pH, tegangan dan durasi nyala lampu LED. Berdasarkan hasil penelitian, kombinasi bonggol pisang dan campuran elektrolit berpotensi mampu menghasilkan listrik yang baik. Pada penelitian ini biobaterai yang terbaik didapatkan pada variasi elektrolit ekstrak kulit lemon 50 ml dan NaCl 1M sebanyak 50 ml, dengan hasil pH 2,80, tegangan maksimum 1,51 V dan waktu nyala selama 77 jam 3 menit. Berdasarkan hasil penelitian menunjukkan bahwa bonggol pisang dan kulit lemon dengan penambahan NaCl berpotensi untuk dimanfaatkan dalam pembuatan biobaterai ramah lingkungan.

Kata kunci: *bio-baterai, elektrolit alami, bonggol pisang, kulit lemon, NaCl.*

ABSTRACT

Biobattery Based on Waste Lemon Peel with Varying Lemon Peel Extract and Sodium Chloride Compositions Using Banana Corm as Matrix

(Muhammad Albar Aryansyah, 2026, 54 Pages, 5 Tables, 8 Figures, 4 Appendices)

The development of renewable energy has encouraged the exploration of alternative energy sources, including bio-batteries made from natural materials. Organic waste such as banana corm waste can be utilized as a matrix material, while lemon peel can serve as a natural electrolyte. The addition of sodium chloride (NaCl) is expected to improve the stability and performance of the bio-battery. In this study, banana corms were dried and ground into powder, then mixed with an electrolyte solution consisting of lemon peel extract containing citric acid and NaCl. The mixture was subsequently placed into a battery container and analyzed. The performance of the bio-battery was evaluated based on pH, voltage output, and LED illumination duration. The results showed that the combination of banana corm and the electrolyte mixture had the potential to generate electrical energy effectively. The best bio-battery performance was obtained from the electrolyte variation consisting of 50 mL lemon peel extract and 50 mL of 1 M NaCl solution, producing a pH value of 2.80, a maximum voltage of 1.51 V, and an LED illumination duration of 77 hours and 3 minutes. These findings indicate that banana corm waste and lemon peel with the addition of NaCl have considerable potential for use in the development of environmentally friendly bio-batteries.

Keywords: *bio-battery, natural electrolyte, banana corm, lemon peel, sodium chloride (NaCl).*