ABSTRAK

ANALISIS KARAKTER GAYA GERAK LISTRIK, HAMBATAN DALAM BATERAI DAN KAPASITAS PENYIMPANAN ENERGI LISTRIK BATERAI PRIMER BERBANTUAN *SOFTWARE* LOGGER PRO

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Penelitaian ini bertujuan untuk menganalisis karakteristik gaya gerak listrik (*EMF*), hambatan dalam baterai (r) dan kapasitas penyimpanan energi listrik berdasarkan tipe (AAA, AA, C, D) dan bahan material (karbon-seng, alkaline, litium) baterai primer. *EMF* dan r diperoleh dari *intercept* dan gradien grafik linier hubungan antara tegangan dan arus menggunakan *software* Logger Pro. Kapasitas penyimpanan energi listrik baterai diperoleh melalui integral dari kurva di bawah grafik hubungan antara daya terhadap waktu dari pengosongan baterai selama 8 jam. Hasil penelitian menunjukkan *EMF* baterai baru lebih tinggi daripada baterai lama dan hambatan dalam baterai lama lebih besar dari baterai baru. Tipe dan bahan material penyusun baterai mempengaruhi kapasitas penyimpanan energi listrik pada baterai. Baterai litium tipe AAA memiliki *EMF* tertinggi (2,016 ± 0,017 Volt) dan kapasitas energi terbesar (1,163 Wh). Baterai karbon-seng AAA memiliki *EMF* terendah (1,548 ± 0,004) Volt. Bahan aktif material penyusun baterai mempengaruhi nilai gaya gerak listrik, hambatan dalam baterai baterai primer. Bahan material aktif dan ukuran baterai mempengaruhi kapasitas penyimpanan energi listrik baterai. Analisis ekonomi mengungkap baterai karbon-seng C paling ekonomis dengan harga Rp3.927/Wh. Penelitian ini dapat diterapkan dalam pembelajaran fisika di SMA dan Prodi Pendidikan Fisika terkait materi Hukum Ohm.

Kata kunci *: gaya gerak listrik, hambatan dalam, kapasitas penyimpanan energi listrik baterai,* Logger Pro.

ABSTRACT

IDENTIFICATION OF ELECTROMOTIVE FORCE, INTERNAL RESISTANCE, AND ENERGY STORAGE CAPACITY OF PRIMARY BATTERIES USING LOGGER PRO SOFTWARE ANALYSIS

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This study aims to analyze the characteristics of electromotive force (EMF), internal resistance (r), and electrical energy storage capacity based on the type (AAA, AA, C, D) and material composition (carbon-zinc, alkaline, lithium) of primary batteries. EMF and r were obtained from the intercept and slope of the linear graph representing the relationship between voltage and current using Logger Pro *software. The electrical energy storage capacity of the batteries was determined by integrating the area under the curve of the power versus time graph during an 8-hour battery discharge.The results show that the EMF of new batteries is higher than that of old batteries, while the internal resistance of old batteries is greater than that of new ones. The type and material composition of the batteries influence their electrical energy storage capacity. The lithium AAA battery had the highest EMF (2.016 ± 0.017 V) and the largest energy capacity (1.163 Wh), whereas the carbon-zinc AAA battery had the lowest EMF (1.548 ± 0.004 V). The active materials used to make up a battery affect the electromotive force and resistance of a primary battery. The active materials and battery size influence the battery's electrical energy storage capacity. An economic analysis revealed that carbon-zinc C batteries are the most cost-effective, priced at Rp3,927/Wh. This research can be applied in high school physics education and Physics Education programs, particularly in teaching Ohm's Law.*

Keywords: *electromotive force, internal resistance, battery electrical energy storage capacity,* Logger Pro.