

**THE EFFECT OF VARIATION IN THE MIXTURE ELECTROLYTE
MATERIALS FROM ORANGE PEEL (*Citrus Sinensis*) AND PINEAPPLE
(*Ananas Comosus*) ON THE ELECTTRICAL BIO-BATERRY**

Ir. Azamataufiq Budiprasojo, S.T., M.T. *As Chief Counselor*

Aditya Saka Bumi
Study Program of Automotive Engineering
Departement of Engineering

ABSTRACT

This study aims to analyze the effect of variations in plant-based electrolytes from orange peel (*Citrus sinensis*) and pineapple (*Ananas comosus*) on the electrical characteristics of a bio-battery. The mixture ratios tested were 100:0, 75:25, 50:50, 25:75, and 0:100. The bio-battery used Zn–C electrodes and was tested under a 2000 Ω resistive load. Measurements of pH, voltage, and current were recorded every 30 minutes for 360 minutes, while power output was calculated using the equation $P = V \times I$. The performance of the bio-battery was also compared with a conventional AA battery. The results indicate that a higher proportion of orange peel (lower pH) produces higher initial voltage and current. The 100% orange peel sample generated an initial voltage of 2.477 V and an initial current of 0.749 mA, but experienced a faster decline compared to other variations. Power output showed a decreasing trend over time. Compared to the conventional battery, the bio-battery achieved 56.6% of the initial voltage and 36.5% of the initial current, decreasing to 23.4% and 15.1% at the end of testing. It can be concluded that electrolyte acidity significantly affects bio-battery performance. Lower pH increases electrical output but reduces stability. Fruit peel-based bio-batteries show potential as environmentally friendly alternative energy sources.

Keywords: bio-battery, orange peel, pineapple, pH, voltage, current, power