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Cassava grates processing wastes as source of electrical energy

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ABSTRACT

The study aimed to generate electricity from cassava (*Manihot esculenta*) extract using an improvised microbial fuel cell (MFC). In the development of the MFC, screening experiment using 8-run Plackett-Burman (PB) technique and optimization procedure following response surface methodology (RSM) were employed. More cassava extract concentration significantly increased the generated voltage and the significance exhibited by salt ratio was inversely proportional to the voltage generated. One of the treatments in the 3x3 factorial experiment reached the maximum voltage of 546 mV.

Response surface regression analysis of all the response studied revealed that linear, quadratic, and cross product regression of cassava extract concentration and salt ratio in the salt bridge significantly affected the voltage which further developed a regression model represented as $\triangle E=106+1318x-4829y-850x^2-787xy+18032y^2$.

The canonical analysis of the voltage showed minimum response at the stationary point inside the factor level space equal to 211 mV. Salt ratio level lower than 15% and cassava extract concentration not less than 60% generated a higher voltage value. T-test showed no significant difference of voltage between days, and between the predicted mean and the observed mean, which had % accuracy of 92.54, and 93.28%.

Key words: Cassava grates processing waste, microbial fuel cell, electricity, response surface methodology

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