Title:
Evaluation and mechanism of glucose production through acid hydrolysis process: Statistical approach

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Abstract:
This study investigated glucose production through the hydrolysis process of centipede grass (Eremochloa ophiuroides) using dilute hydrochloric acid. The centipede grass was characterized for moisture content, volatile matter, and fixed carbon before using it in the hydrolysis process for glucose production. Two statistical designs were used to optimize the hydrolysis process variables. The model validation was studied through the first-order two-level factorial design and independent variable optimization through response surface methodology's second-order face-centered central composite design (FCCD). Twenty experiments obtained from FCCD were analyzed, and graphs are plotted for the main effect and significant interactions. The results showed that maximum (optimum) absorbance of glucose (0.36 equivalent to 17.24 mg glucose/10 g centipede grass) was achieved after 108 min of hydrolysis time at temperature 50.5 °C with the hydrochloric acid concentration of 8.94%. The analysis of variance results revealed that incubation time, reaction temperature, and hydrochloric acid concentration significantly affect glucose absorbance. The regression model showed that there are two options to achieve maximum absorbance of glucose. Glucose extraction from grass will be the future source of energy. The benefit of turning grass biomass into a value-added product is not only economical beneficial but also help in waste management and pollution remediation.