

Predicting the Yield of Biochar with Multivariate Linear Regression and Two-Factor Interaction Models

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Biochar is an energy carrier produced by the heating of biomass in a restricted oxygen environment, through thermochemical conversion processes such as pyrolysis. The demand for biochar, a product of pyrolysis process, is increasing due to its versatility finding applications as soil conditioner, adsorbent and catalyst. Generally, the production of biochar is energy intensive and the biochar yield depends on the production process conditions. In this paper, a model to predict the biochar yield from corn cobs considering critical input variables (temperature, time and particle size) has been developed. The models were developed using Multivariate Linear Regression (MLR), and Two-Factor Interaction (2FI) expression on SCILAB 6.02 computational software. The model was experimentally validated. The relationship between obtained experimental response and the model predicted response were regressed to obtain a coefficient of regression. The 2FI model with a regression coefficient of 0.9561 showed a higher prediction accuracy of biochar yield during the pyrolysis of corncob biomass. The model could be effective for integration into thermochemical models used to predict biochar production from biomass based on production conditions.