Optimization of Ferulic Acid Production from Banana Stem Waste Using Central Composite Design

Nurul Shareena Aqmar Mohd Sharif, Ee Su Thor, Norazwina Zainol , and Mohd Faizan Jamaluddin
Faculty of Chemical Engineering and Natural Resources, University Malaysia Pahang, Lebuhraya Tun Razak, Gambang, Pahang,

ABSTRACT
Abandoning banana stem waste (BSW) seems a loss since it is a good source of lignocelluloses to produce ferulic acid (FA). This study was conducted to optimize the production of FA via feruloyl polysaccharide hydrolysis from BSW by fermentation with a soil mixed culture. The optimization used response surface methodology (RSM) based on a five level-two factor central composite design (CCD). Parameters studied were the ratio of water to BSW (v/v) and incubation time (hours). Range values for each factor were 0.5:1 to 1.5:1 ratio and 12–36 h, respectively. Interaction between these factors revealed that effect of time was greater than ratio of water to BSW, since a sufficient time is important for the mixed culture to fully use BSW during inoculation. The optimum condition was determined as 1:1 water to BSW ratio and 27 h incubation time. Under this optimized condition, the maximum FA produced was 1.17 mg FA/g BSW, which was in close agreement with predicted values (30%). This indicates that the suitability of the models was successfully developed by RSM-CCD in optimizing the hydrolysis conditions for maximum FA production. That being said, BSW is proven useful and highly feasible for producing quality goods naturally.

KEYWORDS:
ferulic acid, central composite design, banana stem waste, soil mixed culture

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