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STATISTICAL OPTIMISATION OF ETHANOL PRODUCTION FROM A CELLULOSIC MIXTURE BASED ON PAPER RESIDUES

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Abstract

Lignocellulosic biomass can be used to produce ethanol. The bioconversion process of waste cellulosic materials to ethanol involves two steps: hydrolysis of cellulose to produce reducing sugars, and the fermentation of sugars to ethanol. The response surface methodology (RSM) based on the 2^3 factorial Central Composite Design (CCD) was applied to optimize the biotechnological conditions of the enzymatic saccharification of the substrate and ethanol production from a mixture of three waste cellulosic materials, i.e. office paper, newspaper and cardboard in ration of 1:1:1 (w/w). The control sample yielded 4.3 kg ethanol from 100 kg cellulosic waste materials and subsequent to the statistical optimization, the efficiency of the bioprocess was increased almost 2.65-fold, obtaining 11.04 kg ethanol from 100 kg cellulosic waste materials.

Key words: bioconversion, cellulosic waste materials, central composite design (CCD), ethanol production, response surface methodology (RSM)

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