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Comparative Analysis of Data Mining and Response Surface Methodology Predictive Models for Enzymatic Hydrolysis of Preatreated Olive Tree Biomass

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Abstract

The production of biofuels is a process that requires the adjustment of multiple parameters. Performing experiments in which these parameters are changed and the outputs are analyzed is imperative, but the cost of these tests limits their number. For this reason, it is important to design models that can predict the different outputs with changing inputs, reducing the number of actual experiments to be completed. Response Surface Methodology (RSM) is one of the most common methods for this task, but machine learning algorithms represent an interesting alternative. In the present study the predictive performance of multiple models built from the same problem data are compared: the production of bioethanol from lignocellulosic materials. Four machine learning algorithms, including two neural networks, a support vector machine and a fuzzy system, together with the RSM method, are analyzed. Results show that Reg-CO²RBFN, the method designed by the authors, improves the results of all other alternatives.

Keywords: Predictive models, Data Mining, Enzymatic hydrolysis, Olive Tree Biomass

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