

Application and Assessment of Artificial Neural Networks for Biodiesel Iodine Value Prediction

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Abstract : Several parameters are established in order to measure biodiesel quality. One of them is the iodine value, which is an important parameter that measures the total unsaturation within a mixture of fatty acids. Limitation of unsaturated fatty acids is necessary since warming of a higher quantity of these ones ends in either formation of deposits inside the motor or damage of lubricant. Determination of iodine value by official procedure tends to be very laborious, with high costs and toxicity of the reagents, this study uses an artificial neural network (ANN) in order to predict the iodine value property as an alternative to these problems. The methodology of development of networks used 13 esters of fatty acids in the input with convergence algorithms of backpropagation type were optimized in order to get an architecture of prediction of iodine value. This study allowed us to demonstrate the neural networks' ability to learn the correlation between biodiesel quality properties, in this case iodine value, and the molecular structures that make it up. The model developed in the study reached a correlation coefficient (R) of 0.99 for both network validation and network simulation, with Levenberg-Maquardt algorithm.

Keywords : artificial neural networks, biodiesel, iodine value, prediction

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