Classification of Barley Varieties by Artificial Neural Networks

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Abstract : In this study, an Artificial Neural Network (ANN) was developed in order to classify barley varieties. For this purpose, physical properties of barley varieties were determined and ANN techniques were used. The physical properties of 8 barley varieties grown in Turkey, namely thousand kernel weight, geometric mean diameter, sphericity, kernel volume, surface area, bulk density, true density, porosity and colour parameters of grain, were determined and it was found that these properties were statistically significant with respect to varieties. As ANN model, three models, N-l, N-2 and N-3 were constructed. The performances of these models were compared. It was determined that the best-fit model was N-1. In the N-1 model, the structure of the model was designed to be 11 input layers, 2 hidden layers and 1 output layer. Thousand kernel weight, geometric mean diameter, sphericity, kernel volume, surface area, bulk density, true density, porosity and colour parameters of grain were used as input parameter; and varieties as output parameter. R2, Root Mean Square Error and Mean Error for the N-l model were found as 99.99%, 0.00074 and 0.009%, respectively. All results obtained by the N-l model were observed to have been quite consistent with real data. By this model, it would be possible to construct automation systems for classification and cleaning in flourmills.

Keywords : physical properties, artificial neural networks, barley, classification
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