Title Evaluation of the effect of moisture content on cereal grains by digital image analysis

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Abstract

Physical appearance and kernel morphology significantly affect the grade of a harvested crop in addition to other factors such as test weight, percentage of foreign matter and constituent components. Moisture content of grain can potentially affect the physical appearance and kernel morphology. The objective of this study was to evaluate the effect of moisture content on the classification capability of colour, morphology and textural features of imaged grains. Colour images of individual kernels and bulk samples of three grain types, namely Canada Western Amber Durum (CWAD) wheat, Canada Western Red Spring (CWRS) wheat and barley were acquired using a machine vision system. The grain kernels were conditioned to 12%, 14%, 16%, 18% and 20% moisture contents before imaging. Previously developed algorithms were used to extract 123 colour, 56 textural features from bulk sample images and 123 colour, 56 textural, 51 morphological features from individual kernel images. The extracted features were analysed for the effect of moisture content. Statistical classifiers and a back propagation neural network model were used for classifying the grain bulk at different moisture contents. The colour and textural features of bulk grain images were affected by the moisture content more than that of the single kernel images.