

Title Dual energy X-ray image analysis for classifying vitreousness in durum wheat
Author S. Neethirajan, D.S. Jayas and C. Karunakaran
Citation Postharvest Biology and Technology, Volume 45, Issue 3, September 2007, Pages 381-384
Keywords Dual energy X-ray images; Vitreous kernels; Non-vitreous kernels; Statistical classifiers; Neural network classifiers

Abstract

Dual energy X-ray imaging technique is an alternative to simple transmission X-ray imaging. The former has the ability to reveal the internal density changes of a scanned object by exploiting differences in how the scanned material interacts with X-rays at different energies. The feasibility of dual energy X-ray image analysis to classify vitreousness in durum wheat was assessed at 12, 14 and 16% moisture content (m.c.). Algorithms were developed for the logarithmic subtraction of images and for extraction of features. Histogram groups and total gray values were extracted from the dual energy subtracted images. Statistical and neural network classifiers were used for identifying vitreous and non-vitreous kernels from the sample images. Neural network classifiers correctly classified vitreous and non-vitreous kernels with 93% accuracy. The statistical classifiers provided 89% accuracy for vitreous and non-vitreous kernels. The over all classification accuracy for differentiating vitreous and non-vitreous kernels is higher using dual energy X-ray imaging than the simple transmission X-ray imaging.