Esteve Agelet, L., D. D. Ellis, S. Duvick, A. S. Goggi, C. R. Hurburgh, and C. A. Gardner. 2012. Feasibility of Near Infrared Spectroscopy for analyzing corn kernel damage and viability of soybean and corn kernels. **Journal of Cereal Science xxx: 1-6.**

Abstract:

The current US corn grading system accounts for the portion of damaged kernels, measured by time consuming and inaccurate visual inspection. Near infrared spectroscopy (NIRS), a non-destructive and fast analytical method, was tested as a tool for discriminating corn kernels with heat and frost damage. Four classification algorithms were utilized: Partial least squares discriminant analysis (PLS-DA), soft independent modeling of class analogy (SIMCA), k-nearest neighbors (K-NN), and least-squares support vector machines (LS-SVM). The feasibility of NIRS for discriminating normal or viable-germinating corn kernels and soybean seeds from abnormal or dead seeds was also tested. This application could be highly valuable for seed breeders and germplasm-preservation managers because current viability tests are based on a destructive method where the seed is germinated. Heat-damaged corn kernels were best discriminated by PLS-DA, with 99% accuracy. The discrimination of frost-damaged corn kernels was not possible. Discrimination of non-viable seeds from viable also was not possible. Since previous results in the literature contradict the current damage-discrimination results, the threshold of seed damage necessary for NIRS detection should be analyzed in the future. NIRS may accurately classify seeds based on changes due to damage, without any correlation with germination.

URL

http://www.sciencedirect.com/science/article/pii/S0733521011002001