LOW-RESOLUTION MID-INFRARED REFLECTION ANALYSIS FOR DISCERNMENT OF CONTAMINANTS IN SEED COTTON

Wenbin Jiang
Department of Chemistry and Biochemistry, New Mexico State University
Las Cruces, NM
Derek Whitelock
USDA-ARS Southwestern Cotton Ginning Research Laboratory
Mesilla Park, NM
Gary Rayson
Department of Chemistry and Biochemistry, New Mexico State University
Las Cruces, NM
Ed Hughs
USDA-ARS Southwestern Cotton Ginning Research Laboratory
Mesilla Park, NM

Abstract

Contaminants often decrease cotton quality, which subsequently decrease cotton profitability. In this research, a low-resolution mid-infrared reflection instrument is designed and constructed by using only four different wavelengths to accomplish good separation of cotton samples from14 contaminants (e.g. binding material and plastic material). The four characteristic wavelengths were determined by applying Principal Component Analysis (PCA), Cluster analysis and Multivariate Curve Resolution (MCR) to the IR spectra of cotton samples and contaminants, which were obtained from attenuated total reflectance (ATR) IR spectroscopy. Then four commercially available band pass IR filters, which centered at the four wavelengths, respectively, were chosen. The data collected from this instrument shows cotton samples were 100% correctly separated from contaminants. This instrument would potentially simplify the design and cost of seed cotton monitoring equipment at a ginning facility.