

**Damiran, D.**, Yu, P. 2009. Comparison of molecular structural chemical make-up of two varieties of corn using synchrotron radiation based fourier transform infrared (SRFTIR) microspectroscopy [abstract]. In: Abstracts for the 12th CLS Annual Meeting. June 17-18, 2009. Saskatoon, Saskatchewan, Canada [in press].

## **Comparison of Molecular Structure (Chemical Make-up) of Two Varieties of Corn Using Synchrotron Radiation Based Fourier Transform Infrared (SRFTIR) Microspectroscopy**

**Daalkhaijav Damiran and Peiqiang Yu**

Department of Animal and Poultry Science,  
University of Saskatchewan, 51 Campus Drive,  
Saskatoon, SK S7N 5A8

### **Abstract**

The study was conducted to determine the differences in molecular structure (chemical make-up) of biological components (such as protein, aromatic lignin, cellulosic compounds, and carbohydrate) between two varieties of corn (high oil corn and conventional corn) using synchrotron sourced FTIR microscopy. In grain aleurone region, high oil corn had higher infrared absorbed intensity unit (IU) ( $P < 0.05$ ) in protein amide I (13.8 vs. 8.8 IU; ca. 1716 – 1568  $\text{cm}^{-1}$ ) and amide II (4.1 vs. 2.9 IU; ca. 1567 – 1479  $\text{cm}^{-1}$ ), but lower ( $P < 0.05$ ) in cellulosic compounds (1.9 vs. 2.7 IU; ca. 1288 – 1189  $\text{cm}^{-1}$ ), whereas, in pericarp region, high oil corn was lower ( $P < 0.05$ ) in aromatic lignin (0.5 vs. 0.9 IU; ca. 1540 - 1487  $\text{cm}^{-1}$ ), cellulosic compounds (2.3 vs. 5.2 IU; ca. 1292 - 1192  $\text{cm}^{-1}$ ), and total carbohydrate (31.0 vs. 82.0 IU; ca. 1191 – 811  $\text{cm}^{-1}$ ). In summary, protein, lignin, and carbohydrate molecular structure (chemical make-up) differed significantly between the two varieties of corn in grain aleurone and pericarp regions.

**Key Words:** synchrotron, molecular structure, protein conformation, carbohydrate conformation, corn variety