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Cotton Fiber Chemical Differences and Their Effect on Friction Behavior: A Comparison of Two Crop Years in the ATMI/ARS Leading Cultivars Study

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A comparison of two crop years from the USDA-ATMI Leading Cultivars Study indicated a substantial increase in processing difficulties in CY 2002 compared with CY 2001, but HVI properties were unable to adequately predict these differences. With the goal of complementing HVI with alternative measurements in order to better predict processing performance, this research attempted to determine whether the observed differences in processing between years are attributable to fiber chemical factors. Chemical and physical measurements were performed on 46 cotton (*Gossypium hirsutum* L.) samples with a range in genetic diversities and from different growing locations from two consecutive crop years. Samples from the two crop years exhibited marked differences in moisture and electrolyte content as a result of different environmental conditions subsequent to boll opening and prior to harvest. Infrared spectroscopy was unable to distinguish differences in crystallinity indices within or between the two crop years. Differences in moisture content appear to be related to differences in hygroscopic surface salts and sugars. Micronaire-normalized frictional measurements indicate that fiber friction increases moisture and electrolyte content decreases, indicating that moisture in conjunction with surface salt content affects the surface characteristics of the fiber, possibly through an anti-electrostatic effect.