

**THE EFFECT OF WET-DRY CYCLES ON COTTON FIBER FRICTION**

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**Abstract**

Observations from the 2001 and 2002 crop years (CY2001 and CY 2002, respectively) of the USDA-ATMI Leading Varieties Study indicate that samples from CY2002 exhibit decreased moisture levels relative to CY2001. In addition, CY2001 samples also exhibit decreased moisture levels after storage for two years. This study attempts to address the cause of the observed moisture decreases as well as to determine whether these moisture differences have an affect upon fiber processing. Cottons from CY2001, stored for two years, were subjected to a series of wet-dry cycles, dried at either 35C or 105C, and subsequently reconditioned at 65% RH and 21C. The effect upon processing was then determined by friction measurements performed on the Rotor Ring. Results indicate that cotton subjected to wet-dry treatment, regardless of drying temperature, exhibit a decrease in fiber friction. This behavior, together with the fact that no measurable changes in cellulose crystallinity occur, suggests that a factor other than modification of cellulose structure is responsible. When samples were subjected to wet-dry treatment in salt solutions, fiber friction decreased proportionately with the concentration of salt, while moisture content of the treated fibers increased with increasing salt concentration. It is concluded that the frictional behavior displayed by the CY2002 samples relative to CY2001 is due in part to decreased surface electrolytes as a result of heavy rainfall. Rain washes the outer surface of the fiber free of electrolytes which function as anti-electrostatic agents, resulting in higher frictional measurements and leading to difficulties in processing.