## CELLULOSE DEPOSITION AND ORGANIZATION INVESTIGATED BY GEL PERMEATION CHROMATOGRAPHY AND X-RAY DIFFRACTION N. Abidi S. Liyanage E. Hequet Texas Tech University

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## <u>Abstract</u>

Cotton fibers, elongated epidermal cells of a cotton seed having a well-developed secondary cell wall, are composed of more than 95% of cellulose at the maturity. There is a continuous change in cell wall composition and organization throughout the development of cotton fibers leading to cellulose macromolecules formation and deposition. The plant mainly focuses on cellulose synthesis and deposition in the secondary cell wall ash the fiber enters the secondary cell wall synthesis phase. The molecular weight and molecular weight distribution of cellulose have been linked to the quality of cellulose deposited during the secondary cell wall biogenesis, and they play a major role mainly in cotton fiber strength. The main goal of this study was to investigate molecular weight and molecular weight distribution of cellulose at different stages of fiber development. Fibers harvested from two cultivars of *Gossypium hirsutum L.*, (Texas Marker-I and TX 55) at different levels of maturity were used to assess the variability between genotypes during fiber development. Cotton fibers were pre-activated using 23% sodium hydroxide to facilitate the dissolution in DMAc/LiCl solvent system, since the cotton fibers are not readily dissolved due to their high level of crystallinity, especially mature fibers. Finally, the molecular weight and the molecular weight distribution were estimated using Gel Permeation Chromatography (Viscotek, model GPCmax VE-2001).