# HPLC AND TGA INVESTIGATIONS OF THE SECONDARY CELL WALL DEVELOPMENT IN COTTON FIBERS

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## Abstract

Two cotton cultivars TX19 and TX55 (*Gossypium hirsutum* L. cv.) were planted in the greenhouse and fibers were harvested at different stages of development starting at 10 days post-anthesis (dpa). The percentage of sugars present on the fibers was determined by High Performance Liquid Chromatography (HPLC) and the cellulose content was determined using the anthrone method. The percentage of sugars (sucrose, glucose, fructose, and galacturonic acid) showed statistically significant changes during fiber development. The decrease in the percentages of these sugars as the secondary cell wall (SCW) develops was associated with an increase in the cellulose content.
Thermogravimetric analysis (TGA) was also used to investigate the structural changes that occur during cotton fiber development. The percent weight losses attributed to water, non-cellulosic materials, and cellulose macromolecules were calculated from the thermograms. Valuable information was obtained related to the composition of the cell wall and the timing of the transition between the primary cell wall and the secondary cell wall. The results indicated that the two cultivars investigated (TX19 and TX55) exhibited different structural evolution. The transition phase between the primary cell wall and the secondary cell wall occurs between 17 dpa and 18 dpa in fibers from the TX19 cultivar, while this transition occurs between 21 dpa and 24 dpa for fibers from the TX55 cultivar. These conclusions are in agreement with the results obtained with Fourier Transform Infrared spectroscopy. It is important to point out that these analyses were done on intact fibers, no cell wall extractions and purifications were performed

Full publications could be found at:

- Thermogravimetric analysis of developing cotton fibers. Thermochimica Acta, 498(1-2) 201027-32.
- Changes in sugar composition and cellulose content during the secondary cell wall biogenesis in cotton fibers. Cellulose, DOI 10.1007/s10570-009-9364-3.

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