



Antisense expression of *Gossypium hirsutum* UDP-glucuronate decarboxylase in *Arabidopsis* leads to changes in cell wall components

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Genet. Mol. Res. 15 (1): gmr.15017409

Received August 11, 2015

Accepted November 9, 2015

Published February 5, 2016

DOI <http://dx.doi.org/10.4238/gmr.15017409>

ABSTRACT. UDP-glucuronate decarboxylase (UDP-xylose synthase; UXS, EC 4.1.1.35) is an essential enzyme of the non-cellulosic polysaccharide biosynthetic pathway. In the present study, using transient expression of fluorescently labeled *Gossypium hirsutum* UXS (GhUXS3) protein in onion epidermal cells, we observed that this protein was distributed in the cytoplasm. The GhUXS3 cDNA of cotton was expressed in an antisense orientation in *Arabidopsis thaliana* by *Agrobacterium tumefaciens*-mediated transformation. Homozygous plants showing down-regulation of UXS were analyzed with northern blots. Compared to the untransformed control, transgenic plant showed shorter roots, earlier blossom formation, and delayed senescence. Biochemical analysis indicated that levels of rhamnose, mannose, galactose, glucose, xylose, and cellulose

were reduced in some of the down-regulated antisense plants. These results suggest that *GhUXS3* regulates the conversion of non-cellulosic polysaccharides and modulates their composition in plant cell walls. We also discuss a possible cellular function for *GhUXS* in determining the quality of cotton fibers.

Key words: *Gossypium hirsutum*; UDP-glucuronate decarboxylase; Transgenic *Arabidopsis*, Down-regulation; Cell wall changes