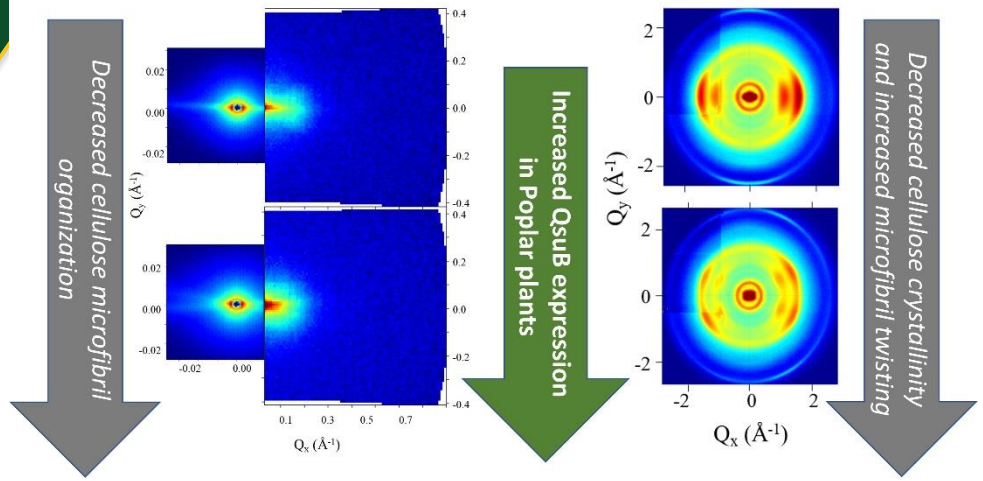
# 3,4-dihydroxybenzoate production *in planta* affects cellulose structure and organization




Graphic shows changes in Poplar cell wall structure with increased expression of 3-dehydroshikimate dehydratase (QsuB). Left panel shows 2D Small angle neutron scattering (SANS) detector images of wild-type (top) and QsuB1 mutant bottom. Right panel shows the corresponding wide angle X-ray scattering (WAXS) images.

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Work performed at HFIR using Bio-SANS

## Scientific Achievement

Transgenic poplar that produces 3,4-dihydroxybenzoic acid (DHBA) is known to have decreased lignin content and altered lignin composition. This work shows that the cellulose organization is disrupted and that cellulose crystalline structure is changed significantly in these plants.

## Significance and Impact

The nano- and atomic-scale changes in cell wall structure in transgenic poplar with elevated DHBA show how elevated metabolites that disrupt cell wall formation can be an attractive strategy to reduce biomass recalcitrance for production of biofuels and bioproducts.

## Research Details

- Poplar QsuB transgenic lines grown at JBEI provided 6-month-old stems.
- SANS of stem pieces provided nanoscale structural features.
- WAXS of freeze-dried stems provided atomic level details cellulose structure.
- Cellulose producing Acetobacter sp. cultures grown with DHBA showed its incorporation into cellulose structure.