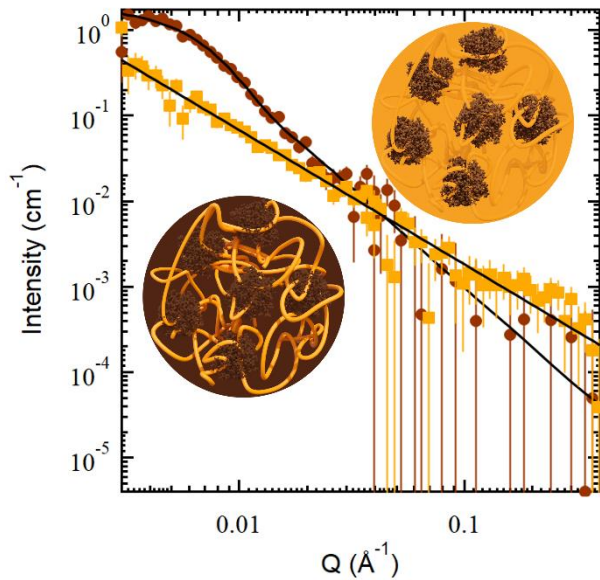


SANS provides evidence for covalent complexes between lignin and pectin in plant cell walls



Scientific Achievement

Evidence for lignin-carbohydrate complexes (LCCs) formed between lignin and pectin was obtained by synthesis and biophysical characterization of deuterated lignin-pectin composites.

Significance and Impact

Engineered plants with reduced pectin exhibit lower recalcitrance towards conversion to biofuels. This work shows that interactions between pectin and lignin may be a previously unidentified contributor to LCCs in plant cell walls, providing insight into pectin knockdown effects.

Research Details

- Partially deuterated d₅-coniferyl alcohol was synthesized at the Center for Nanoscale Material Science at ORNL.
- Coniferyl alcohol was polymerized to lignin *in vitro* in the presence of the pectin homogalacturonan to form composites.
- Composites were characterized by contrast matching SANS and by FTIR, solid-state NMR, and SAXS and compared with native and pectin-deficient switchgrasses.

SANS of a lignin – homogalacturonan (pectin) composite at the contrast match points for pectin (40% D₂O, brown curve) and d₅-lignin (80% D₂O, yellow curve). Inset schematic depictions of match points: lignin-brown particles, pectin-orange chains.

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Visualization of Solvent Disruption
of Biomass and Biomembrane Structures in the
Production of Advanced Biofuels and Bioproducts