

New approach allows resolution of xylan polymers in plant cell wall

Background

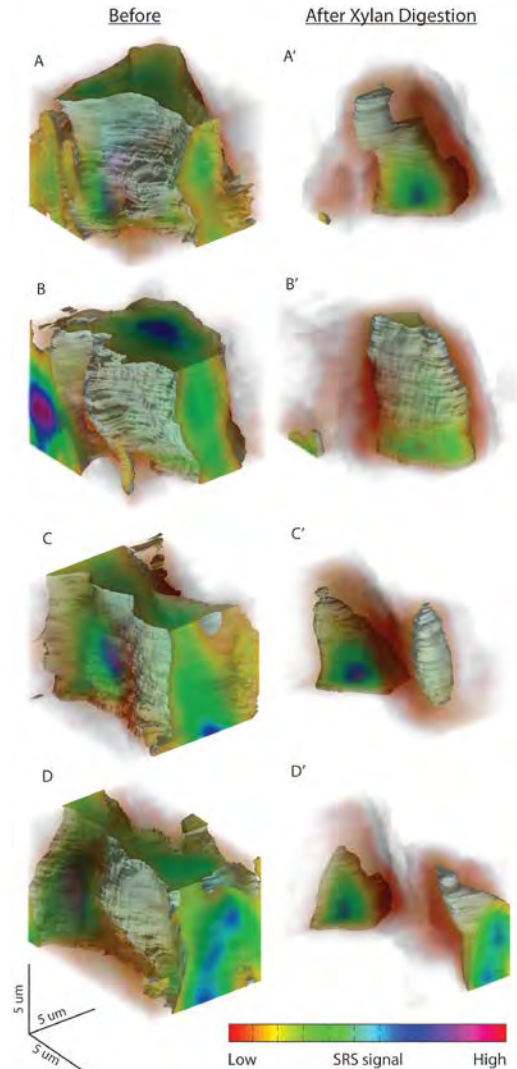
- Xylan is an important plant polymer source suitable for renewable and biodegradable substitutes for materials derived from oil-based polymers.
- Effective detection of xylan, particularly by *in situ* imaging of xylan in the presence of other biopolymers, would provide critical information for understanding the role of xylan in cell wall assembly and enhance the ability to separate it from other plant polymers.

Approach

Spectroscopic analysis and chemical/enzymatic xylan removal from corn stover cell walls were combined to identify several Raman peaks associated with xylan content in cell walls that were then used in label-free *in situ* imaging of xylan in the plant cell wall.

Significance

- Demonstrated that xylan can be resolved from cellulose and lignin *in situ* using enzymatic digestion and label-free SRS microscopy in both 2D and 3D.
- This approach can be used to map xylan in plant cell walls which will enhance our understanding of the role played by xylan in cell wall biosynthesis and deconstruction.
- More effective methodologies to identify and chemically, or biologically, separate xylan from other plant cell wall materials facilitates use of xylan for development of renewable, bio-derived materials.



In situ 3D SRS imaging to track xylan distribution in deacetylated corn stover cell wall before and after xylan digestion.