

Use of *Caldicellulosiruptor saccharolyticus* as a biological probe to report on changes in recalcitrance of plant biomass

Background

- Chemical pretreatment and genetic modification of plants both seek to reduce the recalcitrance of lignocellulosic biomass to microbial degradation.
- Chemical and enzymatic assays can report the recalcitrance and composition of substrates, but not the polysaccharides available to a microbe degrading a modified lignocellulosic substrate.

Approach

C. saccharolyticus whole genome microarrays were used to access the transcriptome when grown on purified polysaccharides and chemically pretreated or genetically modified lignocellulosic substrates.

Outcome

- Differential regulation of carbohydrate degradation, transport, and metabolism genes in *C. saccharolyticus* can be used to assess the availability of various plant polysaccharides to the microbe.
- This allows for inferences about the consequences of a chemical pretreatment or genetic modification of lignocellulose with an eye towards biofuels production.

Significance

These results provide a new method for assessing the complexity, recalcitrance, and polysaccharide availability of a chemically or genetically modified plant biomass substrate based on a microbial transcriptomic response.

