

Plant Cell Biology

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ARC-LP Program - Polysaccharide synthase genes in agro-industrial applications

Research Fellow

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The ARC Linkage project “Polysaccharide synthase genes in agro-industrial applications” is a collaborative project between The University of Adelaide, The University of Melbourne and DuPont-Pioneer. The overall objective of the project is to gain a better understanding of the synthesis, assembly and structure of plant cell walls and determine how that information can be used to enhance the quality, yield, nutritional value and industrial value of agricultural crop plants.

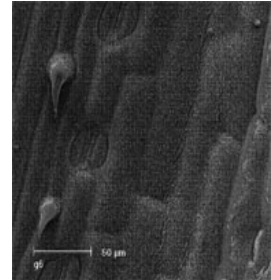
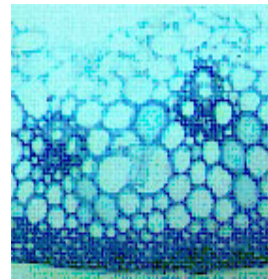
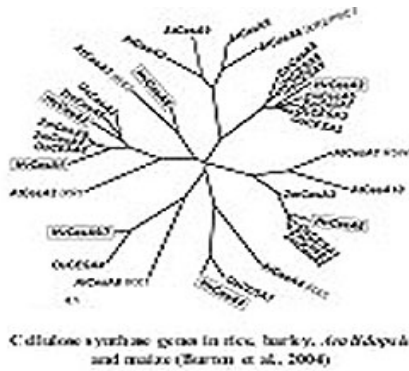
Plant cell walls are important to our way of life as different wall components contribute to various agro-industrial processes, including paper and pulping, food quality and texture, malting and brewing, bioethanol production, dietary fibre and ruminant digestibility.

The plant cell wall determines plant structure and is essential to plant development and survival. It is a complex and dynamic entity that changes throughout plant development and is involved in cell shape and strength, adhesion, cell-cell communication and plant defense. The major components of plant cell walls are polysaccharides. Cellulose forms the basis of the structural network of the wall which is surrounded by, and complexed with, a range of other polysaccharides including pectins, xyloglucans, heteroxylans, heteromannans and (1,3:1,4)-b-D-glucans. The type of polysaccharides and their relative proportions in the wall varies between plant species and developmental stage, and impacts on wall strength. For example, cellulose content is closely correlated with stem strength in maize. As a consequence, cellulose content is expected to affect agronomically important properties such as lodging and digestibility.

The “polysaccharide synthase genes in agro-industrial applications” project focuses on addressing three specific areas using cell wall polysaccharide compositional analyses, microscopy,

mechanical property measurements, transcript analysis and molecular genetic approaches. The three areas are:

1. Molecular mechanisms for synthesis of cellulose and other cell wall components
2. How cellulose and other cell wall components are organized
3. Remodelling of non-cellulosic components and the formation of networks with cellulose



Created: January 2004 by svgdesign.com.au

Last modified: January 22, 2009

Authorised by: Prof. Antony Bacic & Assoc. Prof. Ed Newbigin

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