Does mannan interact with arabinogalactan proteins and impact wheat endosperm development?

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In wheat endosperm, the two major cell wall polysaccharides, arabinoxylans and beta-glucans, have been extensively studied. By contrast, mannan, the third most abundant polysaccharide, is still poorly documented. Nevertheless, this hemicellulosic polysaccharide might have a determinant role in wheat grain development since, in *Arabidopsis thaliana*, mutants with a reduced amount of mannan show an altered seed development. Our project aims to decipher the biochemical structure and the biological function of mannan. Currently, we are purifying this polysaccharide to determine its fine structure. Former studies have speculated that the class of mannan present in wheat endosperm was glucomannan. However, our preliminary data suggest that, in mature wheat endosperm, this class of hemicelluloses is only represented by short unsubstituted chains of 1,4 linked D-mannose residues. Co-precipitations and co-elutions of mannan with arabinogalactan-proteins (AGPs) suggest the two cell wall components might interact together in the cell walls of wheat endosperm. To confirm this, we are examining the possible presence of linkages in between mannan and AGPs. To study the biological function of mannan, we have studied its occurrence during wheat grain development. The detection of mannan using monoclonal antibodies show that the deposition of this hemicellulosic polysaccharide starts at an intermediate step of endosperm cellularization. Mutant lines targeting genes involved in the mannan synthesis are being generated to further investigate the biological function of mannan. Our current results raise questions regarding the structure of mannan in wheat endosperm, its possible interactions with other cell wall components and its contribution to cell wall formation.

Mots-clés

Mannan, Arabinogalactan-proteins, Wheat Endosperm