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Cereal grain cell walls are studied for their nutritional benefits (dietary fibre), their adverse effects on the digestive health of livestock such as poultry and pigs, and their effects on grain usage (bread making, pasta, brewing...). In wheat grain, the two major cell wall polysaccharides, arabinoxylans and β-glucans, have been extensively studied. By contrast, mannan was 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 aimed at deciphering the biochemical structure and the biological function of mannan.

To study the biological function of mannan, we have studied its occurrence during wheat grain development. The detection of mannan using monoclonal antibodies showed that mannan is mainly located in the grain endosperm and that its deposition starts at an intermediate step of endosperm cellularization. We have purified mannan from wheat endosperm to determine its fine structure. Former studies have speculated that the class of mannan present in wheat was glucomannan. Our data suggest that this class of hemicelluloses is only represented by short unsubstituted chains of 1,4 linked D-mannose residues that are weakly acetylated [1].

We identified candidate mannan biosynthetic genes expressed in the endosperm. After unsuccessful attempts to generate wheat lines depleted in mannan, the heterologous expression of our best

candidate genes was carried out in *Pichia pastoris* and Arabidopsis triple mutant depleted in glucomannan. Introducing *TaCslA12* gene in yeast and Arabidopsis led to the production of wheat-like linear mannan lacking glucose residues and with moderate acetylation [2]. Therefore, this gene encodes a mannan synthase and is responsible for the synthesis or wheat endosperm mannan.

1. Verhertbruggen, Y, Falourd, X, Sterner M., Crépeau, M.-J., Le- Gall, S., Anne-Laure Chateigner-Boutin, A.-L.& Saulnier L. (2019) *Carbohydr. Polym*. **302**,110693.
2. Verhertbruggen, Y, Bouder, A., Vigouroux, J., Alvarado, C., Geairon A., Guillon, F., Wilkinson M.D., Stritt F., Pauly M., Lee M.Y., Mortimer J.C., Scheller, H.V., Mitchell R.A.C., Voiniciuc, C., Saulnier, L. & Chateigner-Boutin, A.-L. (2021) *Plant Sci*. **224**,115063.