HAL
open science

Apple cell division and elongation during fruit development is associated with marked changes in hemicelluloses composition, structure and related gene expression

Emmanuelle Dheilly, Sophie Le Gall, Mickaël Delaire, Estelle Bonnin, Jean-Pierre Renou, Mathilde Orsel Baldwin, Marc Lahaye

To cite this version:

Emmanuelle Dheilly, Sophie Le Gall, Mickaël Delaire, Estelle Bonnin, Jean-Pierre Renou, et al.. Apple cell division and elongation during fruit development is associated with marked changes in hemicelluloses composition, structure and related gene expression. 8. International Rosaceae Genomics Conference (RGC8), Institut National de Recherche Agronomique (INRA). UMR Institut de Recherche en Horticulture et Semences (1345)., Jun 2016, Angers, France. hal-02793255

HAL Id: hal-02793255

https://hal.inrae.fr/hal-02793255v1

Submitted on 5 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Apple cell division and elongation during fruit development is associated with marked changes in hemicelluloses composition, structure and related gene expression

Emmanuelle Dheilly[1,2], Sophie Le Gall[1], Mickael Delaire[2], Estelle Bonnin[1], Jean Pierre Renou[2], Mathilde Orsel[2], Marc Lahaye[1]

Topic selected:
Flower and fruit development and quality (primary and secondary metabolism, …)

Type of presentation :
Oral

Affiliation :
1 Biopolymères Interactions Assemblages, INRA, F-44316, Nantes, France
2 Institut de Recherche en Horticulture et Semences, INRA, AGROCAMPUS-Ouest, Université d'Angers, Université Bretagne-Loire, F-49071, Beaucouzé, France.

Fleshy fruit growth and mechanical properties impacting texture quality depend on the close interplay between cellular water partition and cell wall mechanical properties regulating turgor pressure all along fruit development and ripening. Besides known changes in cell wall pectin composition during these events, the fate of hemicelluloses is yet to be studied as these polysaccharides contribute notably to the control of cell wall expansion. In a first study, the cell wall hemicellulose structural profile was assessed in developing and ripening Ariane and Rome Beauty apple by MALDI-TOF MS analysis of cell wall enzymatic digest. The results showed that the major xyloglucan (XgG), the minor galactoglucomannan (GgM) and the trace glucuronoarabinoxylan (GAX) hemicelluloses structures were significantly and differently affected during cell division and expansion phases. The two varieties significantly differed in their hemicellulose structure profile either during early development or during ripening. In a second study, cell wall hemicellulose structural profiling was coupled to gene expression in developing apple hybrids fruit. The results revealed that the shared early expressed genes between the hybrids mainly concern hemicellulose biosynthesis and modifications. In particular, the marked fine structural evolution of GgM was strongly correlated with mannan synthase, glucanase (GH9) and β-galactosidase gene expression.
The results question the function of the remarkable changes in cell wall hemicellulose composition and structure occurring at the cell division/elongation switch. Candidate genes are now available to further assess the role of these hemicelluloses structures on fruit growth and its impact on texture.

Contacts: marc.lahaye@nantes.inra.fr, mathilde.orsel-baldwin@angers.inra.fr