Characterization of dietary fiber in stone cells and parenchyma cells in pear

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UMR408 Sécurité et Qualité des Produits d'Origine Végétale, INRA, Avignon University, 84000 Avignon France

Fruit fiber is composed primarily by structural components of cell-walls such as polysaccharides and lignin. Cell-walls are important features of plant cells and are implicated in evolution of fruit firmness and texture during ripeness. In most species, fruit flesh is predominantly composed of parenchyma cells. In pears (*Pyrus communis* L.), however, the cortical tissues also contain stone cells, which are sclerenchyma cells formed by secondary deposition of lignin on the primary walls of parenchyma cells (Cai *et al.*, 2010). They are also known as sclereids and are a determinant of pear quality. The deposition of stone cells in pear plays an important role in fresh fruit texture and in post harvest processing. Therefore, the composition and ultrastructure of cell-walls in pear was characterized, differentiating skin and flesh tissue, and in the flesh differentiating parenchyma and stone cells.

Skin and flesh were separated manually be peeling, and stone cells were separated from parenchyma cells by decantation. Cell Walls Material (CWM) were prepared using one perry pear variety "De Cloche" by a phenol: buffer method with acetone treatment as described in Renard (2005). Neutral sugars, uronic acids and methanol were determinated by GC and colorimetry. Aspect and distribution of CWM were examined using scanning electron microscopy SEM.

Yields were much higher from skin, followed by stone cells and parenchyma cells. Calculating back to a typical pear fruit, 35% of dietary fiber came from the skin, 51% from the stone cells and 14 % from the parenchyma cells. Cell-walls from flesh and stone cells had high contents of glucose, xylose and galacturonic acid. Stone cells were characterized by higher xylose and less arabinose, as well as higher lignin content. Cell-walls from the skin cells were richer in xylose and had low amount of uronic acid. The degree of methylation of pectins was > 50 %, reaching 80 % in stone cells. Stone cells were observed in SEM as aggregates surrounded by parenchyma cells. Lignified cells were anatomically characterized by the presence of simple pits.

In conclusion, stone cells and parenchyma cells present a different composition of neutral sugars and lignin. This difference may influence differently the evolution of cell-walls during ripening.

Keys words: *Pyrus communis* L., cell-walls, sclereids, neutral sugars, lignin.

References

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