Fruit cell culture as a model system to study cell wall changes during strawberry fruit ripening.

Pablo Ric-Varas, Juan A. Rivera, Sergio Cerezo, Sara Posé, Miguel A. Quesada, Antonio J. Matas, José A. Mercado

Instituto de Hortofruticultura Subtropical y Mediterránea "La Mayora" (IHSM-UMA-CSIC), Departamento de Biología Vegetal, Universidad de Málaga, 29071 Málaga, Spain

Strawberry (*Fragaria* x *ananassa*, Duch.) fruit is characterized by its fast ripening and soft texture at the ripen stage, resulting in a short postharvest shelf life and high economic losses. It is generally believed that the disassembly of cell walls, the dissolution of the middle lamella and the reduction of cell turgor are the main factors determining the softening of fleshy fruits. In strawberry, several studies indicate that the solubilisation and depolymerisation of pectins, as well as the depolymerisation of xyloglucans, are the main processes occurring during ripening. Functional analyses of genes encoding pectinases such as polygalacturonase and pectate lyase also point out to the pectin fraction as a key factor involved in textural changes. All these studies have been performed with whole fruits, a complex organ containing different tissues that differ in their cell wall composition and undergo ripening at different rates. Cell cultures derived from fruits have been proposed as model systems for the study of several processes occurring during fruit ripening, such as the production of anthocyanin and its regulation by plant hormones. The main objective of this research was to obtain and characterize strawberry cell cultures to evaluate their potential use as a model for the study of the cell wall disassembly process associate with fruit ripening. Cell cultures were obtained from cortical tissue of strawberry fruits, cv. Chandler, at the stages of unripe-green, white and mature-red. Additionally, a cell culture line derived from strawberry leaves was obtained. All cultures were maintained in solid medium supplemented with 2.5 $mg.l^{-1}$ 2,4-D and incubated in the dark. Cell walls from the different callus lines were extracted and fractionated to obtain CDTA and sodium carbonate soluble pectin fractions, which represent polyuronides located in the middle lamella or the primary cell wall, respectively. The amounts of homogalacturonan in both fractions were estimated by ELISA using LM19 and LM20 antibodies, specific against demethylated and methyl-esterified homogalacturonan, respectively. In the CDTA fraction, the cell line from ripe fruit showed a significant lower amount of demethylated pectins than the rest of lines. By contrast, the content of methylated pectins was similar in green- and red-fruit lines, and lower than in white-fruit and leaf lines. In the sodium carbonate pectin fraction, the line from red fruit also showed the lowest amount of pectins. These preliminary results indicate that cell cultures obtained from fruits at different developmental stages differ in their cell wall composition and these differences resemble to some extent the changes that occur during strawberry softening. Experiments are in progress to further characterize cell wall extracts with monoclonal antibodies against other cell wall epitopes.

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