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FUNCTIONAL GENOMICS APPROACHES FOR THE STUDY OF AROMA DETERMINATION IN PEACH

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In order to understand and improve the organoleptic quality of peach fruit (palatability, taste and aroma), the dissection of biochemical and genetic regulatory cascade of ripening is being conducted. Peach has been chosen as a model species for Rosaceae for the analysis of the fruit ripening because of its small genome (2n=16, 260Mb). Two varieties of peach Bolero and OroA (melting and non-melting respectively) have been selected. Contrasting gene expression patterns, occurring during fruit ripening within and across the two varieties, has been studied by microarray analysis. A microarrayed set of 4806 70mers (µPEACH 1.0) derived from EST sequences (PTP, University of Padova and Clemson University) has been generated. In order to investigate the gene expression profile within a variety RNA from four ripening stages (S1, S2, S3 and S4) has been extracted and used for microarray hybridisation in "reference" type of experiments.

Peach flavour consists of a huge variety of volatile compounds: esters, alcohols, aldehydes, terpens, lactones, C6 compounds are the main components of the peach aroma and their relative abundance is a fingerprint of a particular variety. According to SPME-GC/MS chromatograms of ripe peach fruit shikimic acid derivates (eugenol, isoeugenol, chavicol, methyl benzoate) are present at high concentrations. Among them eugenol reaches a concentration of 1.2mg/kg peach fruit FW and, as reported in rose, it is an important component of volatile aroma. An enzyme involved in eugenol biosynthesis belongs to the family of O-methyl transferases. O-methyl transferase (OMT) enzymes catalyse the transfer of a methyl group to an hydroxyl group of an acceptor molecule with the formation of its methyl ether derivates. Esters are also quantitatively important part of the peach aroma. A wide range of esters are produced from alcohols and acyl-CoAs. The last step in ester production is catalysed by alcohol acyltransferase (AAT) enzymes. Here we report the cloning of two genes coding for OMT and ATT in peach.