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Poster Abstract – F.05

REGULATION OF CAROTENOID GENE EXPRESSION AND VOLATILE COMPOUND EMISSION IN WHITE- AND YELLOW-FLESHED PEACH GENOTYPES

BRANDI F.*, BAR E.**, MOURGUES F.***, LIVERANI A.*, GIULIANO G.****, LEWINSOHN E.**, ROSATI C.***

*) CRA-Unità di Ricerca per la Frutticoltura-Forlì, Via la Canapona 1 bis, 47100 Forlì (Italy)
**) Dept. of Vegetable Crops, Newe Ya'ar Research Center, ARO, P.O. Box 1021, 30095 Ramat Yishay (Israel)
***) ENEA C.R. Trisaia, BAS-BIOTEC-GEN, S.S. 106 km 419+500, 75026 Rotondella (Italy)
****) ENEA C.R. Casaccia, BAS-BIOTEC-GEN, Via Anguillarese 301, 00123 Roma (Italy)

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Carotenoids are ubiquitous plant pigments present in all plant tissues playing a dual role, both as essential metabolites in photosynthetic tissues and as dispensable colorants in flowers and fruits. Several breeding programs aim at increasing and modifying the carotenoid content of many flowers and fruits for ornamental and nutritional purposes. Carotenoids are also precursors of many volatile organic compounds (VOCs), which provide peculiar flavours in peach fruits, an important criterion of fruit quality.

The aim of this study is to unravel the regulation mechanisms of carotenoid biosynthesis in peach genotypes with different mesocarp colour (white *vs* yellow flesh), by studying gene expression and metabolite patterns during fruit development in white and yellow cultivars.

This study was performed on the yellow-fleshed 'Redhaven' and its white-fleshed mutant 'Redhaven Bianca'. We investigated by qRT-PCR the expression patterns of fifteen genes involved in the synthesis of isoprenoids (*Dxs*, *IspE*, *LytB*) and the synthesis/degradation of carotenoids (*Psy*, *Pds*, *Zds*, *Lcy-b*, *Lcy-e*, *Chy-b*, *Chy-e*, *Zep*, *Nced1*, *Nced2*, *Ccd1*), as well as two genes involved in the ethylene emission (*AccS*, *AccO*) at four stages of late fruit ripening (S3, Breaker 1, Breaker 2, S4). In parallel, the emission patterns of major volatile compounds (VOCs) was also carried out by GC-MS.

Main results show a differential temporal regulation of gene expression between the two genotypes, and quantitative and qualitative differences in transcript levels for key genes involved in carotenoid synthesis and degradation. The two genotypes also displayed quantitative and qualitative differences in VOC emission patterns, with higher levels of carotenoid-derived volatiles in 'Redhaven Bianca'. This result is consistent with a higher activity of carotenoid-specific dioxygenase enzymes which are likely to contribute to the white-fleshed fruit phenotype.