

## **IN SILICO CHARACTERIZATION AND EXPRESSION ANALYSIS OF CLASS 1 DXS, A CANDIDATE GENE FOR MONOTERPENE ACCUMULATION IN GRAPE BERRIES**

BATTILANA J.\*, EMANUELLI F.\*, MOSER S.\*\*, GASPERI F.\*\*, COSTANTINI L.\*, GRANDO M.S.\*

Fondazione Edmund Mach, IASMA Research Center, Via Mach 1, 38010 San Michele all'Adige (TN) (Italy)

\*) Molecular Genetics Research Unit, Genetics and Molecular Biology Department

\*\*\*) Quality and Nutrition Research Unit, Agro-Food Quality Department

*DXS, aroma, HRGC-MS metabolic profile, grape*

In *Vitis vinifera* monoterpenoids, sesquiterpenoids and C13-norisoprenoids are among the most important fruit aroma and flavour components and give a significant contribute to the quality of both table grapes and wines. Plant-derived volatile terpenoid compounds occurring in wines are mainly stored as non-volatile, water-soluble glycoside derivatives in exocarp cell vacuoles, although some terpenoids may also be present as free volatiles. Two independent pathways, the cytosolic mevalonate (MVA) and the plastidial mevalonate-independent 1-deoxy-D-xylulose 5-phosphate/2-C-methyl-D-erythritol 4-phosphate (DOXP/MEP) pathway, form the C5-units IPP (isopentenyl diphosphate) and DMAPP (dimethylallyl diphosphate), the initial substrates for the biosynthesis of the ca 22.000 different terpenes known in higher plants.

From two mapping experiments in grape, based on Italia x Big Perlon and Moscato bianco x V. riparia segregating populations, we found that class 1 *dxs* gene encoding 1-deoxy-D-xylulose 5-phosphate synthase, the first committed enzyme of the DOXP/MEP pathway, co-localized with a stable major QTL for berry content of monoterpenes linalool, geraniol and nerol. Sequence alignment showed that VvDXS1 had high homology to known DXS proteins from other plant species and contained the conserved N-terminal plastid transit peptide. Phylogenetic analysis confirmed that VvDXS1 belonged to the plant DXS1 cluster.

Here we present 1) the first *in silico* analysis of grape DXS genes based on the whole genomic sequence and 2) the first investigation of the relationship existing between VvDXS1 mRNA expression level and monoterpenoids accumulation as detected by HRGC-MS (high resolution gas chromatography-mass spectrometry) analysis of berries sampled from pre-veraison to over-ripening, in aromatic and non-aromatic grapevine varieties.