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IONOME CHARACTERISATION OF *SOLANUM LYCOPERSICUM* CV. M82 *X S. PENNELLII* INTROGRESSION LINES (ILs)

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The ionome is the mineral nutrient and trace element composition of an organism and represents the inorganic component of cellular and organismal systems. It is a dynamic network of elements that are controlled by the physiology and biochemistry of the plant, which are ultimately controlled by the genome, in response to the environment. Ionomics is the study of elemental accumulation in living systems using high-throughput elemental profiling. A central theme of ionomics is the study of change in the ionome in response to physiological stimuli, environmental conditions and genetic modifications.

Several tomato (*Solanum lycopersicum*) cultivars and breeding lines are coming from interspecific hybridisation with *S. pennellii*, a wild tomato relative bearing useful commercial traits. To study the contribution of the introgression of *S. pennellii* genome on *S. lycopersicum* traits, Eshed et al. (Theor. Appl. Genet. 83:1027-1034, 1992) have developed 76 introgression lines (ILs), each characterised for the location of the introgressed *S. pennellii* chromosome sequences into the *S. lycopersicum* cv M82. Those lines are being extensively studied for several traits, thus giving a wealth of information about genetic and physiology of both species (Gur et al., Theor. Appl. Genet. 122:405-420, 2011). However, until now the contribution of the genome of *S. pennellii* in the tomato cultivated variety for ions biofortification and food safety has not yet been studied. In this regards, our research line is aimed to characterize the ionome of those ILs, in order to find modifications induced by the introgression of the wild tomato genome into the cultivated one.

Fifthy nine ILs, covering all 12-tomato chromosomes, were grown in a greenhouse. Shoot apices from 4 45 days-old plants were harvested and then analysed by inductively coupled plasma (ICP) spectroscopy for the amount of the following elements: Ca, Mg, Fe, Cu, Mn, Mo, Ni, Zn, Al, Na, Co, V, Cr, Sr, As, Cd, Pb, Sn and Ba. Statistic analysis (T-test Student's) carried out on the mean concentration of each element for each ILs compared with the parental line (cv M2) showed that the introgression of S. *pennellii* genome into *S. lycopersicum* cv. M82 modified the ionome of all the 59 ILs. In particular the Na+ concentration in all ILs was significantly lower than in cv M82 and Cd, Cu, Mg, Ca and Zn concentrations decreased in most of them, whereas Co and Mn concentrations increased. It is worthy to note that some ILs accumulated more toxic metals as As, Pb and Cr than the cultivated genotype. Results on PCA analysis will be also reported. Our results showed that the introgression of the wild genome into the cultivated one produced new phenotypes

in which the traits co-related to macro/micronutrients, trace elements and toxic elements accumulation in apical leaves were significantly modified in response to specific introgressions, thus opening the way to a genetic analysis of introgressed gene expression.