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IONOME VARIATIONS IN TOMATO INTROGRESSED LINES (*SOLANUM PENNELLII* X *S. LYCOPERSICUM* CV. M82) FOLLOWING METAL TREATEMENTS SHED NEW LIGHT ON FOOD HEALTH

RUOTOLO G.*, DE BIASI M.G.*, CHIAIESE P.*, MARINO M.***, DI PALMA A.**, PALOMBA F.*, LANZILLO C.*, SALLUZZO A.**, FILIPPONE E.*

*) Department of Soil, Plant, Environmental and Animal Production Sciences, School of Biotechnology, University of Naples "Federico II", Via Università 100, 80055 Portici (Italy)
**) Environmental chemistry laboratory, ENEA Portici-Research Centre, Piazzale Enrico Fermi 1, 80055 Portici (Italy)
***) Department of Mathematics and statistics - University of Naples "Federico II", Via Cintia 21, 80126 Naples (Italy)

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The ionome 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 chemical elements accumulation in living systems using high-throughput elemental profiling. Ionomics studies should provide the information necessary, considering crops diversity and potentiality, to select new genotypes with enhanced nutritional value for human safety.

A tomato introgression line population that combines single chromosomal segments introgressed from the wild, green fruited species *Solanum pennelli* in the background of the domesticated tomato, *S. lycopersicum* cv. M82, was used in this study. Our topic was to obtain the ionomic map of ILs as modifyed by response to stressed soil treatment.

Ten plants for each genotype were grown in a greenhouse. Thirty day-old plants were left to grow for 15 days in the presence of not lethal concentration of As, Cd, Cr, Cu, Ni, Pb, and Zn given combined. After forthy five days from emergence, shoot tips of four plants for each ILs and cv. M82 tomato plants were harvested at the same time and stored at -80°C for ionome analyses. Concentrations of Na, Ca, Ba, Mg, Fe, Cu, Mn, Mo, Ni, Zn, Al, Co, V, Cr, Sr, As, Cd and Pb in shoot tip of *S. lycopersicum* cv. M82 and in 59 introgression lines (IL; *S. lycopersicum* x *S. pennellii*) were determined by ICP-MS analysis. Data coming from this analysis were then elaborated in order to study the correlation among elements concentration and the contribution of the introgressed traits of *S. pennellii* into *S. lycopersicum* cv. M82 on the ion accumulation following the treatment. A multiple correlation analysis was performed among the element concentration of each IL and cv. M82. Further, the obtained values from ionomic analysis were elaborate as differences in concentration of elements in the ILs as compared to the cultivated variety M82. Statistic analysis were performed by t-test Student's with a significance threshold set to $P<0.05$. All ILs have shown to modify the ionome in shoot tip compared to the parental line cv. M82, following the treatment. Because all of the phenotypic variation in each IL is associated with a single introgressed segment, the functional genomics tool used here let us to identify trait of *S. pennellii* genes involved in the accumulation of mineral nutrients and trace elements and to draw the ionome map on tomato chromosomes. Results shed light both on the metal accumulation of ILs

tomato plants and on theirs ionome modifications. These results will be of interest to breeders as well as those studying the genetic and biochemical bases of metal accumulation in plant for food health. This study is the first of its kind in tomato aiming to explore the ionome variation following metal treatments in the ILs, used for their valuable genetic and biochemical traits.

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