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Poster Communication Abstract – 4.06

BEIJERINCKIA FLUMINENSIS INCREASES SALT STRESS TOLERANCE IN TOMATO PLANTS

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Salinity is considered the most limiting abiotic stress affecting global agricultural production and hampers plants growth and development, seriously limiting crop productivity and challenging food security. Tomato is an essential annual crop providing human food worldwide and among all vegetables, tomato plants are highly sensitive to salt stress. At this purpose, halo-tolerant plant growth promoting rhizobacteria (PGPR) used as biofertilisers are considered potential solutions to increase tomato salt stress tolerance and to enhance tomato productivity in saline soils (Giannelli et al., 2023). In this work we tested the capacity to increase salt stress tolerance in *Solanum lycopersicum* (var. Riccio di Parma) by the bacterial strain Pvr_9, homologous to *Beijerinckia fluminensis* which has been previously shown to possess PGPR activities in *Arabidopsis thaliana* (Antenozio et al., 2020; Giannelli et al., 2022). Morphological and molecular markers such as primary root length, number of secondary roots, biomass and expression pattern of salt stress responsive genes were analysed in plants grown in vitro on MS ½ X + 1% sucrose, inoculated or not with Pvr_9 and treated for 56h and 72h with 150 mM NaCl. Both in control and in salt stress conditions, plants inoculated with Pvr_9 showed a significant increase in primary root length, in the number of secondary roots and in fresh weight compared with not inoculated ones. SOS1 and NHX1 salt tolerant gene markers were found to be over-expressed in Pvr_9-treated plants under salt stress while in the same condition SOD1 oxidative stress gene marker was under-expressed. In the roots, MYB1 gene transcription factor and PIP1 gene coding for an aquaporin were also found to be over-expressed in Pvr_9-treated plants under salt stress respect to not inoculated ones. An

experiment was also conducted on tomato plants grown in a sterilised soil and inoculated or not with Pvr_9. After one months of growth plants were subjected to a 1- week salt stress treatment by watering them with 150 mM of NaCl. Plants inoculated with Pvr_9 showed a significant increase in biomass, in chlorophyll and proline contents under salt stress treatment respect to not inoculated ones. Overall, the results obtained in this study revealed the positive effects exerted by Pvr_9 in conferring salt stress tolerance in tomato plants. Studies are in progress aiming at evaluating possible positive effects of Pvr_9 inoculum on the nutritional and organoleptic characteristics of the tomato fruit.