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Phosphorus (P) is an essential macronutrient required by plants, as it plays a vital role in major metabolic processes and is a structural component of a broad pool of cellular molecules. Plants take up P from the soil solution mainly in the form of phosphate. However, only a small fraction of total P can be dissolved due to abiotic processes (e.g. adsorption on mineral surfaces and precipitation as insoluble salts) that reduce its mobility and limit the fertilizer diffusion to a short distance from the point of application.

Plants deploy strategies to exploit localized sources of P to cope with low P conditions and to optimize their growth and productivity. Such strategies include alterations in root architecture, root hair density and length. This implies a larger soil volume explored by roots, higher production of organic acid anions competing with P for the same adsorption sites, exudation of electron-rich species that can release P by reductive dissolution of Fe oxides, production of phosphatases and phytases able to hydrolyse organic P-compounds. In addition, a new emerging class of phytohormones named strigolactones (SL) has been suggested to be involved in plants response to P availability. SL are involved in a number of physiological processes in plants, such as regulation of plant architecture, responses to osmotic stress, reproduction and establishment of nutritional root symbioses with arbuscular mycorrhizal fungi and nodulating bacteria. Several studies also demonstrated a role of SLs in root responses to low P conditions, but no attention has been paid to their effects on the root exudate composition.

To test plant responses to low P conditions, we grew both wild-type (WT, cv M82) tomato plants and SL-depleted plants in which the SL-biosynthetic gene *CCD7* had been knocked out. After a period of growth in normal nutrient conditions, plants were kept in P stress regimen for 15 days. The root solution was collected and analysed for inorganic P, total C, N and P, organic acid anions, polyphenols and SL contents and tested for hormone-like activity. Plants biomass-associated parameters were measured, and plant material (roots and shoots) was analysed for total C, N and P content.

Preliminary results show differences in WT and SL- plants biomass, P distribution between roots and shoots, and in exudate composition. In particular, the main diversities were spotted in the organic acids and polyphenols amount and composition. Some of the tested exudates also displayed gibberellic-like or indolacetic-like activity. These results highlight that the gene for SL synthesis under investigation may modify not only the root architecture but also the exudate composition with important consequences on P bioavailability to plants.

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