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Profiling of metabolites secreted by roots of tetraploid wheats

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Plants roots constantly secrete compounds into the soil to interact with a neighbouring plant and with microorganisms present in the rhizosphere. Rhizosphere interaction are based on complex exchanges that evolve around plant roots. The root exudates influence resistance to pests, support beneficial symbioses, alter the chemical and physical properties of the soil, and inhibit the growth of competing plant species.
The present study was undertaken to explore the metabolic profiling of root secretion of wild emmer (Triticum turgidum ssp. dicoccoides), emmer (Triticum turgidum ssp. dicoccum) and durum wheat (Triticum turgidum ssp. durum) cultivars selected for contrasting root traits.
Fiftheen plants were grown in each pot (ø, 7 cm; height, 26 cm), which contained a soil mixture (soil:sand, 50:50; v/v). The pots were placed in a growth chamber with daily light/dark and temperature cycles that were changed as a function of the plant growth. The plants were taken out of the pots at the 3rd leaf stage and the roots were carefully separated to collect the rhizospheric soil. The experiments were performed using a completely randomised design, with six replicates.
The polar and non-polar metabolites of root exudates were analysed after extraction by GC -MS. The metabolites identified were subjected to statistical analysis to assess comparative similarities between samples thus forming the basis of a metabolic fingerprint. The differences for the metabolite profile of the root exudates and for the plant growth traits, among the three cereal species, are discussed.