

Rhizosphere exo-metabolite profiling of PGPR-treated wheat cultivars (*Triticum aestivum*), and the investigation of the effects rhizosphere PGPR inoculation on the metabolism of above ground tissue

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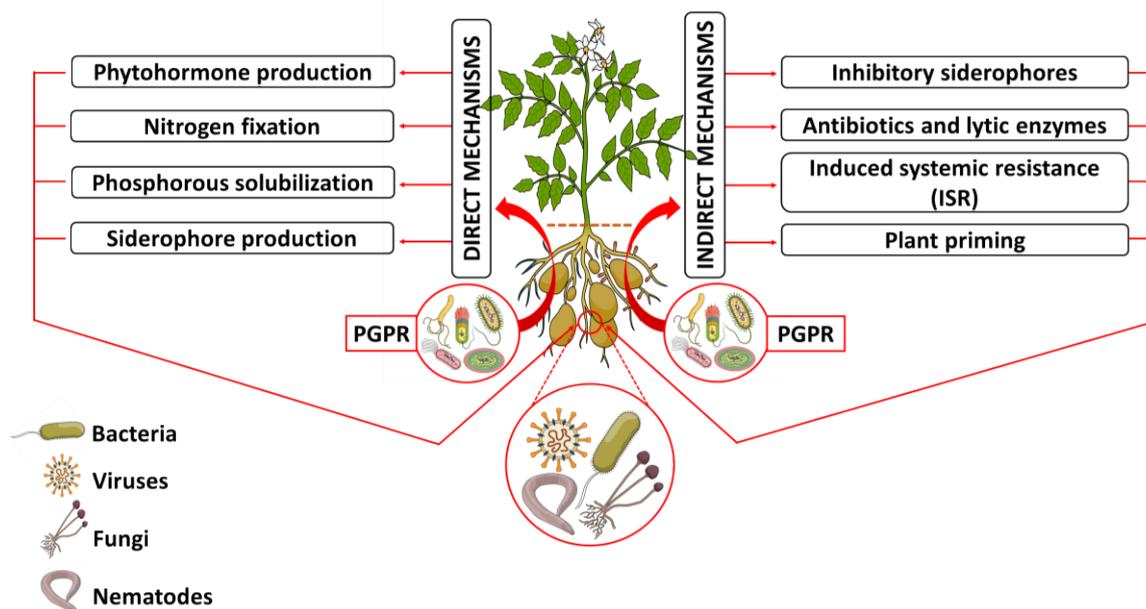


Figure 1: Schematic representation of the direct and indirect mechanisms of action employed by PGPR in plant growth promotion and protection.

Introduction: Plants interact with microbes through chemical communication within the rhizosphere, in the case of plant growth-promoting rhizobacteria (PGPR), resulting in priming of defence, or induced resistance in the plant host (Uzoh and Babalola, 2018). However, the chemical communication is far from being well understood.

Methodology: Here we adopted an experimental method from Petriacq *et al.* (2017), for the collection and analysis of rhizosphere biochemicals (metabolites) with minor modifications. Followed by an untargeted UHPLC-Q-TOF-HDMS metabolomics analysis and molecular networking tools with multivariate data analysis for metabolite classification and identification.

Results: A wide range of classes of metabolites were identified from the rhizosphere extracts in varying quantities and distributions. Metabolite perturbations were also discovered in above ground tissue (leaves) of PGPR-treated plants.

Discussion and conclusion: The chemical space of the rhizosphere consists of a plethora of diverse metabolite classes from both plants and resident microbes, each responsible for specified functions that may still require thorough investigation to understand. Knowledge of these metabolites can be exploited to condition rhizosphere soils in enhancing plant growth and development, as well as preconditioning plant for defence response.

References: Uzoh, I.M. and Babalola, O.O., (2018). Rhizosphere biodiversity as a premise for application in bio-economy. *Agriculture, Ecosystems and Environment*. 265: 524-534.
Pétriacq, P., Williams, A., Cotton, A., McFarlane, A.E., Rolfe, S.A. and Ton, J., (2017). Metabolite profiling of non-sterile rhizosphere soil. *The Plant Journal*. 92: 147-162.

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