A novel targeted metabolomic approach in plant hormone analysis

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Plant hormones, otherwise known as phytohormones, are highly bioactive compounds which are directly responsible for organized plant growth and development including flowering, seed germination, senescence and various stress responses. Occurrence and levels of these compounds strongly depend on plant organ, plant age, developmental stage and environmental conditions, they are often present only in minute concentrations and thus their direct quantification provides difficult analytical task. Phytohormones as a group of diverse compounds could be divided into several structurally different families. In this study we present a new ultra-high liquid chromatography tandem mass spectrometry (UHPLC-MS/MS) targeted method based on complex extraction and selective SPE purification for profiling of active compounds from cytokinin, auxin, brassinosteroid, gibberellin, jasmonate, abscisic acid and salicylic acid families, including their metabolites and precursors (more than 100 analytes). Their biosynthetic and signaling pathways are very complex, often interacting among themselves thus the regulation of various biological processes in plants is controlled by multiple phytohormones. We believe this generalized analytical screening method to be very useful for preliminary phytohormonal screening and studies dealing with phytohormonal crosstalks.