Metabolomics: Application in Medicinal Plants Crop Improvement

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Abstract:

Plant-derived natural products have long been considered a valuable source of lead compounds for drug development. Natural extracts are usually composed of hundreds to thousands of metabolites. The study of metabolites or small molecules, which are derived from different biochemical or metabolomic pathways is metabolomics. This is an emerging field due to its crucial role in different biological sectors including modern medicine. Metabolites are referred to small-molecules which are of less than 1500Da, such as metabolic intermediates, hormones and signalling molecules found within a cell/tissue of an organism. This chapter introduces metabolomics terminology and the main research contents of metabolomics studies for medicinal plants. It is based on a detailed evaluation of metabolite levels under specific plant ecology to pinpoint the effects on plant adaptation and any modifications in their genetic architecture. It provides a platform to examine environment–organism interactions in order to evaluate plant functions. The ecological metabolomics, deals with the analysis of plant biochemical connections across distinct temporal and spatial systems. Hence, medicinal plant-based metabolomics study is crucial as plants synthesize a vast number of primary and secondary metabolites and some have potential therapeutic importance.

Keywords: Metabolomics, metabolic profiling, crop improvement, abiotic stress, biotic stress, mass spectrometry, metabolomics-assisted breeding.