

Diversity, Plasticity, and Role of Specialized Metabolites in Seeds

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Seeds are characterized by great diversity and specificity of specialized metabolites that affect their physiological, agronomic, nutritional or industrial qualities. Moreover, seeds are one of the most important food sources, providing more than half of the world's protein, oil and starch intake. Seeds are therefore interesting models for both the study and production of large quantities of specialized metabolites of interest. The diversity of seed specialized metabolites results from the addition or removal of functional groups by hydroxylation, methylation, glycosylation or acylation, to the basic structures of the metabolites. Besides contributing to the chemical diversity of specialized metabolites, these modifications can affect their chemical properties, transport and storage, thus determining their biological activities. Environmental conditions have a strong impact on specialized seed metabolites, and in particular on their modification by various "decorations". A complete characterization of the regulation, environmental plasticity and diversity of seed metabolism is of major importance for understanding their adaptation to environmental change.

Analysis of current knowledge on the diversity, activity and functions of specialized metabolite modifications highlights their important role in seed biology, physiology and ecology, underlining the interest of studying them for the agricultural, food, pharmaceutical or cosmetics sectors.