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## **Metabolomics: Methodologies and applications in the environmental sciences**

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### **Abstract:**

Environmental metabolomics is an emerging approach for examining metabolic fingerprints, or profiles, in biological systems exposed to environmental stress. In conjunction with other “omics” techniques, such as genomics, transcriptomics, and proteomics, it has been used to study the biochemical impacts of xenobiotics and disease. The approach analyzes changes in the concentrations of metabolites, which are the precursors and products of enzymatic activity, and then attempts to associate these changes with biological function and/or regulation. Environmental scientists have recently applied such techniques to suggest biomarkers for the risk assessment of chemicals and for diagnosing diseases in wild animals. Furthermore, this approach can in principle allow scientists to better understand the underlying mechanisms of action of toxic compounds in the environment. In this review the methodologies used in metabolomics are briefly discussed along with several examples from the environmental sciences, including biomarker development and risk assessment of toxicant exposure, metabolic responses to environmental stressors, and disease diagnosis and monitoring.

### **Keywords:**

metabolomics, environment, toxicity, risk assessment, disease, wildlife



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