






Review

# Value-Added Metabolites from Agricultural Waste and Application of Green Extraction Techniques

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**Abstract:** The agricultural sector generates approximately 1300 million tonnes of waste annually, where up to 50% comprising of raw material are discarded without treatment. Economic development and rising living standards have increased the quantity and complexity of waste generated resulting in environmental, health and economic issues. This calls for a greener waste management system such as valorization or recovery of waste into products. For successful implementation, social acceptance is an essential component with involvement of all local stakeholders including community to learn and understand the process and objective of the implementation. The agricultural waste product manufacturing industry is expected to increase with the growing demand for organic food. Thus, proper livestock and crop waste management is vital for environmental protection. It will be essential to successfully convert waste into a sustainable product that is reusable and circulated in the system in line with the green concept of circular economy. This review identifies the commercially produced crops by-product that have been considered for valorization and implemented green extraction for recovery. We highlight the importance of social acceptance and the economic value to agricultural waste recycling. Successful implementation of these technologies will overcome current waste management problems, reduce environmental impacts of landfills, and sustainability issue for farm owners.

**Keywords:** agriculture wastes; value-added metabolites; green extraction; circular economy

## 1. Introduction

Annually 1300 million tonnes of waste is generated from the agricultural sector. This number is expected to rise due to increase in demand for agricultural products [1]. Agricultural waste comprises of manure, waste from farm, poultry houses, slaughterhouses or harvest waste such as fertilizers and pesticides. These wastes are often discarded without any recovery treatment. Agricultural wastes are regarded as underutilized low-value