Special Issue

Soil Organic Carbon Chemistry and Nutrient Bioavailability: Molecular Mechanisms for Sustainable Agriculture

Message from the Guest Editor

Recent advances in spectroscopic techniques have revealed that specific structural components of organic carbon —particularly aromatic, aliphatic, and carbonyl carbon—play crucial roles in controlling nutrient transformation processes, enzyme activities, and microbial dynamics.

This collection seeks contributions that employ cutting-edge analytical approaches to elucidate the molecular mechanisms underlying carbon–nutrient interactions, with special emphasis placed on papers linking fundamental soil chemistry with practical agricultural applications. Topics include the molecular characterization of soil organic carbon, enzyme-mediated nutrient cycling, microbial community responses, and management practices optimizing carbon chemistry for enhanced nutrient efficiency.

By integrating knowledge from soil chemistry, microbial ecology, plant nutrition, and agricultural management, this Special Issue will provide a comprehensive framework for evidence-based sustainable nutrient management strategies that benefit farmers, consumers, and environmental integrity.

Guest Editor

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