

Special Issue

Bio-Based Fertilizers and Soil Health: Innovations for Nutrient Recycling and Environmental Protection

Message from the Guest Editors

Maintaining soil health is crucial to ensuring high-quality food production for a growing global population amid climate change. Sustainable fertilization practices are urgently needed to reduce reliance on mineral fertilizers made from finite resources. Human, agro-food, and livestock activities generate effluents rich in crop nutrients, though they pose challenges like nutrient imbalance and unknown mineralization rates. To address this, approaches such as composting, vermicomposting, algae-based recovery, electro dialysis, precipitation, pyrolysis, and hydrothermal carbonization are being used to create bio-based fertilizers (BBFs). These aim to recycle nutrients from secondary raw materials, promoting sustainable soil management and closing nutrient cycles. This Special Issue focuses on understanding BBFs' roles in enhancing soil health, their biostimulant and phytoprotective potential, carbon sequestration, and the use of rapid, non-destructive tools like vibrational spectroscopy for soil and fertilizer analysis, quality control, and nutrient monitoring.

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