Special Issue

Multifunctional Nanoparticles and Nano-Enabled Pesticides, Herbicides and Fertilizers in Agricultural Applications

Message from the Guest Editors

Nanotechnology has revolutionized agricultural sciences, offering innovative solutions to enhance crop productivity, mitigate environmental stress, and reduce chemical inputs. Among these advancements, multifunctional nanoparticles and nano-enabled agrochemicals (pesticides, herbicides, and fertilizers) have emerged as promising tools to increase agricultural sustainability while ensuring food security. These nanomaterials enable the targeted delivery, controlled release, and enhanced bioavailability of active compounds, minimizing unintended environmental impacts. However, challenges related to nanotoxicity, regulatory frameworks, and large-scale implementation still require further investigation. This Special Issue aims to explore recent breakthroughs and future perspectives in the development and application of nanotechnology in agriculture, with a particular focus on nano-enabled agrochemicals and their role in sustainable farming. The development of nano-enabled pesticides, herbicides, and fertilizers presents an opportunity to overcome these challenges by enhancing efficiency, reducing dosage requirements, and ensuring precise delivery mechanisms.

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