

Exploring the role of biostimulants in sustainable agriculture

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In contemporary agriculture, there is a notable shift towards adopting biostimulants, encompassing both microbial and non-microbial types, as alternatives to traditional chemical fertilizers and pesticides. This transition not only promotes sustainable farming but also reaps substantial benefits for human health, biodiversity, the environment and the economy. Biostimulants, whether microbial or not, are potent forces in bolstering seedling growth, optimizing crop performance, enhancing nutrient utilization, and elevating the quality of agricultural produce. They also confer tolerance and resistance to various abiotic stresses, including salinity, high temperatures, nutrient deficiencies and drought. Crucial to this agricultural transformation is the intricate network within the rhizo-microbiome. Microorganisms, at their core, drive nutrient absorption and assimilation, improve soil texture and regulate the production of key extracellular compounds, such as protein hydrolysates, secondary metabolites and a myriad of signalling molecules. All these factors collectively contribute to enhanced plant growth. These microorganisms and their associated bioactive compounds represent valuable biostimulants, which are crucial in modulating plant responses to stress.

Keywords: Abiotic stresses, arbuscular mycorrhiza, humic substances, nutrient-use efficiency, plant growth-promoting rhizobacteria.