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Antioxidants in Plant-Microbe Interaction

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PGPR: The Redeemer of Rice from Abiotic Stress

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Kiruthikalakshmi Parameswaran, Abirami Sitharanjithan, Meenakshi Selvaraj, Usha Chockaiyan, Sreegayathri Subbaraju, Sakthieaswari Pandi, Aarthy Kannan, and Baby Sathaiah

Abstract

Most of the world population relies on rice for their nutritional demand. But unfavorable environmental conditions, population explosion, anthropogenic activities like industrialization, and usage of chemical fertilizers adversely affect the soil structure, plant growth, and yield, which imposed a serious threat to food security worldwide. Abiotic stresses may cause detrimental effect on almost all features of plants like germination, growth, metabolism, gene regulation, and reproduction. Plant growth-promoting rhizobacteria (PGPR) can support as a redeemer of rice from various abiotic stresses promoting its growth and productivity. Diverse group of PGPR can offer multiple abiotic stress tolerance in rice, via direct and indirect mechanisms. Hence, understanding the challenges imposed by each abiotic stress and the mechanism of PGPR-mediated stress adaptation in rice plants becomes an essential one. Advent of multi-omics approach, genetic engineering, plant tissue culture, and seed priming techniques plays a key role in developing a potent PGPR as a sustainable remedy for mitigating abiotic stresses. However, certain pitfalls like establishment of PGPR under field conditions and economical production of PGPR in industrial scale have to be addressed before

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