



Emerging Plant Growth Regulators in Agriculture

Roles in Stress Tolerance

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Chapter 1 - Emerging roles of plant growth regulators for plants adaptation to abiotic stress–induced oxidative stress

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Abstract

Major abiotic stresses such as heat, drought, salinity, heavy metal, light, pesticide, and cold are considered the great threat for the food and environmental security of the increasing population. During abiotic stresses, reactive oxygen species (ROS) is produced in the plants' cell that leads to inhabit physio-biochemical process of affected plants, which ultimately hampers the usual growth and development of plants. To avert the abiotic stresses–induced oxidative stress by hindering the production of harmful ROS (i.e., hydroxyl ions, superoxide ions, hydrogen peroxide, and other free radicals), tolerant plants generally enhance/accumulate various growth regulators (i.e., jasmonates, salicylates, brassinosteroids (BRs), nitric oxide, hydrogen sulfide, polyamines, glycine-betaine, oligosaccharides, strigolactones (SLs), melatonin, karrikins, sugars, serotonin, turgorins, system in myo-inositol, etc.) in plant cells. Among them, proline, glycine-betaine, polyamines, and sugars (i.e., mannitol, sorbitol, galactinol, trehalose, etc.) are known as osmolytes that have significant role for plant adaptation against abiotic stresses. Earlier studies revealed that during abiotic stresses several phytohormones (i.e., abscisic acid (ABA), BRs, cytokinins, ethylene, jasmonates, salicylic acid and SLs, melatonin, karrikins, etc.) encourage to enhance the