Plant Physiology, Development and Adoptions

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7. Role of PGPR in Mitigation of Heavy Metal Stress in Plants

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Abstract

The increased level of heavy metals in soil has deteriorated the quality of agriculture and poses a serious threat to the environment. This current hitch has evolved over years as a result of rapid industrialization and modern agricultural practices. Elevated levels of heavy metals in the environment are found to be toxic for all life forms including plants. Presence of heavy metal in soil exhibit stress in plants that impair their overall health and productivity. Plant growth-promoting rhizospheric bacteria are found to play an important role in the management of heavy metal impacted soils. Resistance to multiple toxic heavy metals along with the production of plant growth-promoting substances such as indole acetic acid, siderophores and ACC deaminase are important attributes of plant growth-promoting rhizobacteria. These mechanisms provide PGPR an opportunity in enhancing plant growth in metal stressed environments with important implications for remediation of metal contaminated areas as well. Hence, plant growth-promoting rhizobacteria with metal tolerance ability can be explored for their potential applications in bioremediation and reducing the stress developed in plants due to excess heavy metals.

Key words: Heavy metals, metal stress, rhizobacteria, PGPR, tolerance

1. INTRODUCTION

Anthropogenic activities, such as mining of natural resources, manufacturing industries, modern agricultural practices and energy production, have led to harmful impacts in natural environments. One of the major environmental problems caused by modern-day industries is an increase in the concentration of heavy metals in the air, land and water. Heavy metals are a group of metallic chemical elements that have