



RHIZOBACTERIA AND THE BENEFICIAL EFFECTS IMPOSED BY THEM

Shakeela sofi¹, Kousar Javaid², Naveena Nazim³

¹Division of Plant Pathology, Sher-e- Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar, INDIA-190025

²Division of fruit science, SKUAST-K Srinagar, INDIA-190025

³Temperate Sericulture Research Institute Mirgund, SKUAST-K Srinagar, INDIA

ABSTRACT

The rhizosphere of a plant is a microecological zone in direct proximity with plant roots. It is functionally defined as the particulate matter and microorganisms that cling to the roots after being gently shaken in water (Walker et al. 2003). The rhizosphere is a metabolically busier fast changing competitive environment than the surrounding soil. Several biochemical signal exchanges take place between microbial communities and their host plants. A wide diversity of bacteria and plant-associated microbes can interact with host plants in a beneficial way either by enhancing their growth or mitigating diseases (Beattie, 2006; Nihorimbere et al., 2011). Rhizobacteria that exert beneficial effects on plant growth and development are referred to as plant growth promoting rhizobacteria (PGPR) (Ashrafuzzaman et al., 2009). PGPR promote plant growth through ability to produce either growth regulators or solubilize mineral phosphates and other nutrients or fix N₂ or antagonism against phytopathogenic microbes by the production of siderophores, antibiotics and cyanide (Sarvanakumaret al. 2007). PGPR may use more than one of above mechanisms to enhance plant growth. PGPR belong to diverse genera, especially of Azospirillum, Alcaligenes, Arthrobacter, Enterobacter, Erwinia, Acinetobacter, Bacillus, Burkholderia, Flavobacterium, Pseudomonas, Rhizobium and Serratia. All of them are able to exert beneficial effects on plant growth (Tilak et al., 2005). The beneficial microbial interactions with plants have been grouped into three categories. The first category corresponds to microbes that interact direct or indirectly with the plant and are responsible for improving plant nutrients in rhizosphere. The second category are responsible for stimulating plant growth indirectly by preventing pathogenic growth. The third category involves the microbes that directly influence plant growth by phytohormone production, phosphate solubilization and siderophore/volatile compound production (Podile and Kishore, 2006; Nihorimbere, 2011). Other important facts of microbial inoculants when compared with chemical pesticides and fertilizers are their ecofriendly nature, better safety, more target-oriented activity, effectiveness in smaller doses, ability to multiply and sustain for longer periods, quick decomposition least chances of induced resistance by pathogens/pests and finally and effective in organic/conventional agriculture (Berg, 2009).

Keywords- ECOFRIENDLY, RHIZOBACTERIA, RHIZOSPHERE.