

PP-293

Bacteria and Actinomycetes as Biocontrol Agents for the Control of Fungal Pathogens of Chickpea and Sorghum

M Sreevidya and S Gopalakrishnan¹

Research Program-Grain Legumes, International Crops Research Institute for the Semi Arid Tropics (ICRISAT), Patancheru-502324, Andhra Pradesh, India.

¹Jawaharlal Nehru Technological University, Kukatpally, Hyderabad-500072, Andhra Pradesh, India.

Email: vidya.meesala@gmail.com

The use of botanical extracts, microorganism or its products for the control of a pathogen or pest is referred to as biocontrol. Use of biocontrol agents in agriculture reduces the problem of pollution as they decompose quickly and do not leave any residues. Several bacterial, fungal and actinomycetes are known for the control of plant pathogens and pests, for example actinomycetes *Saccharopolyspora spinosa* produces spinosad which is a broad-spectrum insecticide. A total of 88 actinomycetes isolates and 72 bacterial isolates were isolated from the soil and five different herbal vermicompost samples (neem, parthenium, jatropha, annona and gliricidia) and screened against the fungal pathogens *Sclerotium rolfsii* causing collar rot of chickpea, *Fusarium oxysporum* f. sp. *ciceris* causing wilt of chickpea, *Fusarium andyazii*, *Fusarium proliferatum* causing wilt in sorghum, *Macrophomina phaseolina* causing charcoal rot of chickpea, *Rhizoctonia bataticola* (Rb-6, -24 and -115) causing charcoal rot in sorghum. Among these, 19 actinomycetes isolates and 20 bacterial isolates were selected based on their zone of inhibition of the pathogen. These potent isolates are then studied for their plant growth promoting traits such as production of lytic enzymes (chitinase, protease, and lipase), indole acetic acid production, siderophore production, hydrocyanic acid and antibiotic production. The culture filtrates of 20 bacterial isolates grown in Luria broth were collected and extracted with ethyl acetate; the aqueous and organic phases were collected in methanol. Bioassay was conducted against all above mentioned pathogenic fungi.

Results showed that the organic phases of 10 bacterial isolates (Vermicompost Bacterial Isolate -4, -23, -10, -16, -19, Soil Bacterial Isolate -6, -7, -13, -23, and -27) showed maximum inhibition against *S. rolfsii*, *M. phaseolina*, *Rb-6*, *Rb-24* and *Rb-115*. Similarly, the culture filtrates of 19 actinomycetes isolates grown in starch casein broth will be studied for their antibiotic production. Most potential isolates will be selected for the isolation and purification of the compound(s) by using various chromatographic techniques such as thin layer chromatography, open column chromatography, flash chromatography and high pressure liquid chromatography. Efforts will be put to isolate the gene responsible for the production of the antibiotic so that it can be exploited in future for the mass production of the antibiotic by using genetic engineering and recombinant DNA techniques.

PP-294

Biocontrol and Plant Growth Promoting Traits of Bacteria Isolated from Rice Rhizosphere

Srinivas Vadlamudi and Subramaniam Gopalakrishnan

Biocontrol, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru-502 324, Andhra Pradesh, India.

Email: s.vadlamudi@cigar.org

Plant growth promoting rhizobacteria (PGPR) are the soil bacteria that colonize the roots of plants and enhance plant growth. PGPR can directly or indirectly affect plant growth through various mechanisms. Direct stimulation may include providing plants with fixed nitrogen, soluble phosphate, iron chelators and phytohormones, while indirect stimulation includes inhibiting phytopathogens thus promoting plant growth and development. Seven isolates of bacteria (SRI-156, SRI-158, SRI-178, SRI-211, SRI-229, SRI-305 and SRI-360) were earlier reported by us having potential for biocontrol of charcoal rot of sorghum and plant growth promotion (PGP) of the plant.