Short Communication

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Microbiology & Virology 2018: Isolation and characterization of rhizobacteria from banana plant as growth promoting and biocontrol agent against soil borne pathogen- Ibrar Khan- Abbottabad University of Science & Technology

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The growth promoting bacteria (PGPR) are group of bacteria mainly found in the rhizosphere of plant, having capability to stimulate their health and growth and also defend them from different soil borne pathogens by different mechanisms. In current study, total thirty-four strains of PGPR were isolated from the rhizosphere of healthy banana plants and differentiated on the basis of morphological characteristics and biochemical tests. Phosphate solubilizing ability, capability of auxin production as well as sideroshore competency of PGRP were also investigated for the stimulation of plant growth. Out of 34 isolated strains, six isolates were found positive with high siderophore producing activity, six strains were confirmed having the ability of production of indole acetic acid (IAA), and 17 isolates were found with excellent ability to solubilize the insoluble phosphate. As enzymatic production seemed to have a significant role in inhibition of different pathogens of plants, most of the isolates in current study were found positive for the production of amylases, oxidase, pectinases, proteases, lipases, catalases. Furthermore, seven PGPR isolates also showed the antifungal activity with maximum 51.59% and 50.48% growth inhibition of Fusarium oxysporum f.sp. cubense in vitro. Thus, these rhizosphere isolates might be used to endorse plant growth and a good biocontrol for pathogenic fungi in banana growing areas of Pakistan

Rhizobacteria are bacteria associated with roots that form symbiotic relationships in many plants. They are an important group of microorganisms used in biofertilizers. Biofertilization represents about 65% of the overall yield nitrogen gracefully Rhizobacteria are regularly alluded to as plant development advancing rhizobacteria, or PGPRs. The term PGPR was first used by Joseph W. Kloepper in the late 1970s and has become increasingly used in scientific literature. PGPRs are host plants of different species with different relationships. The two main classes of relationships are rhizospheric and endophytic.

Plant growth promoting rhizobacteria (PGPR) were first defined by Kloepper and Schroth to describe soil bacteria that colonize plant roots after seed inoculation and enhance plant growth. The following elements are involved in the process of colonization: the ability to survive inoculation of seeds, to multiply in the spermosphere (response to the seed), and the attachment to the surface of the colonizing system. The ineffectiveness of PGPRs in the field has often been attributed to their inability to colonize plant roots. An

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assortment of bacterial characteristics and explicit qualities add to this procedure, however just a couple have been distinguished. These include motility, chemotaxis to seed and root exudates, production of pili or fimbriae, specific cell surface composites of production, Protein root exudates and detection of specific composites for use. of the quorum. The generation of mutants in the expression of these traits helps us understand the precise role that each plays in the colonization process. Advances in identifying new, previously uncharacterized genes are made using unbiased screening strategies that rely on gene fusion technologies. These strategies use reporter transposons and in vitro expression technology (IVET) to detect genes during colonization. Using molecular markers such as green fluorescent protein or fluorescent antibodies, it is possible to confocal laser scanning microscopy using the root on the individual rhizobacteria of the monitor. This approach was also combined with a probe targeting rRNA to monitor of the quorum.

Studies on sugar beet crops have found that some root colonizing bacteria are deleterious rhizobacteria (DRB). DRB had reduced germination rates, root lesions, reduced root elongation, root distortions, increased fungal infection, and reduced plant growth. In one trial, the yield of sugar was reduced by 48%. Six strains of rhizobacteria have been identified as being DRBs. The strains belong to the genera Enterobacter, Klebsiella, Citrobacter, Flavobacterium, Achromobacter and Arthrobacter. Due to the large number of taxonomic species yet described, a complete characterization was not possible because the drb is very variable. The presence of PGPR has been shown to reduce and inhibit the colonization of DRB on sugar beet roots.

Rhizobacteria are also able to control plant diseases that are caused by other bacteria and fungi. Disease is suppressed through induced systematic resistance and through the production of antifungal metabolites. Pseudomonas biocontrol strains have been hereditarily adjusted to improve plant development and improve the sickness obstruction of horticultural yields. In horticulture, inoculant microscopic organisms are regularly applied to the seed layer of seeds before being planted. Vaccinated seeds are bound to set up enormous enough rhizobacterial populaces inside the rhizosphere to create outstanding gainful consequences for the harvest

Many have been used for the selection of microbial biological control agents, with no system being more efficient than another. One approach has been to isolate potential microbial antagonists from the environment, such as soil, seeds or roots. This is based on the premise that any antagonist will be ecologically adapted to this environment and will be able to survive and express activity as a biological control agent. Another approach has been to isolate antagonists from suppressive soils for a particular pathogen. This approach was used for the isolation of Streptomyces griseoviridis, a biological control agent for the control of Fusarium and Pythium spp. It is also used for the isolation of non-pathogenic Fusarium oxysporum, an

effective biological control agent for Fusarium wilt in sweet potato and tomato. Alternatively, pathogens of propagules or mycelia have been isolated from soils as antagonists have been isolated. In this case, the antagonists have the potential to attack the pathogen and be adapted to the environment in which the pathogen is active. The rating procedure has been used to obtain several pathogens of sclerotic antagonists, including.

Biological control can be simply defined as the application of one living organism to another. This process is also called biological control. Biological application is mainly introduced to reduce a pest population and to produce pest free yields. It is a self-sustaining, long-term treatment method for the management of invasive plants. The living organism applied in this system is used to suppress a weed infestation and to control pests, including insects, pathogens and grazing animals. Phytophthora, Rhizoctonia, Fusarium, Verticillium, and Armillaria are some of the most common soil pathogens in the Pacific Northwest. Excess moisture and soil pH are the catalysts for these pathogens to thrive. Phytophthora causes downy mildew. Armillaria and Rhizoctonia cause root rot (a tree of the base at honey fungi is a visual symptom of Armillaria); Verticillium and fusarium are known to cause wilt. Their life cycle varies, so it is important to take note of the weather conditions, soil conditions, location and other obvious factors that directly impact the sick plant, or heavy foot traffic.

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