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CHARACTERIZATION OF *RHIZOBIUM* ISOLATES FROM *SESBANIA* RHIZOSPHERE AND THEIR ROLE IN BIOREMEDIATION OF GLYPHOSATE AND MONOCROTOPHOS

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ABSTRACT

Monocrotophos and glyphosate are widely used as plant protection agents worldwide. The present study deals with the characterization and efficiency of three *Rhizobium* isolates (SR G, SR I, SR 01) obtained from the root nodules of *Sesbania rostrata* for biological remediation of these pesticides. Identity of these Gram's negative rod shaped isolates was established using biochemical as well as 16S rRNA sequencing. These isolates showed good ability of growth when the tested pesticides were used as a sole source of carbon and or phosphorous. The sensitivity of these three rhizobial isolates in response to different types of antibiotics with various concentrations indicated SR 01 to be resistant against most number of antibiotics. 16S-rRNA genes sequence analysis revealed maximum similarity of SR G with *Rhizobium* sp. SCAUS14 (KF836037.1), SR I with *Sinorhizobium saheli* OP3-1 (JX855185.1), and SR 01 with *Ensifer* sp. AC01b (JF450128.1). These isolates showed sigmoid growth pattern in MS1 medium supplemented with glucose (20mM). However, when grown in glyphosate (30mM), and monocrotophos (20mM) supplemented MS1 medium, they showed a typical and uncommon growth curve. The rhizobial isolates grown in pesticide-supplemented medium showed comparatively longer lag phase; and a clear-cut demarcation between other growth phases of the batch cultures was missing. HPLC analysis of the filter sterilized supernatant revealed SR G to be most efficient in removal of glyphosate (43.99%), followed respectively by SR I (40.82%) and SR 01 (38.70%). However, removal of monocrotophos was maximum by the isolate SR G (34.79%) which was closely followed by SR 01 (33.25%) and SR I (26.99%). The results revealed the potentiality of these bacterial isolates for bioremediation of environmentally unsafe xenobiotic compounds.

KEYWORDS: Glyphosate, Growth Curve, Harmful, Monocrotophos, Pesticides