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Biodegradation of malathion by PGPR

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For the degradation of an organophosphorus insecticide, malathion, five plant growth promoting rhizobacteria viz. *Rhizobium meliloti, Azotobacter chroococcum, Azospirillum lipoferum, Pseudomonas fluorescens* and *Bacillus polymyxa* were used. These were isolated from the root nodule of *Trigonella foenum graecum (Rhizobium), sugarcane rhizoplane (Azospirillum)* and garden soil *(Azotobacter chroococcum, Azospirillum lipoferum* and *Bacillus polymyxa).* The tolerance to the malathion was observed by measuring the colony diameter of these PGPR on their respective cultivation media. The *Rhizobium meliloti* showed growth up to 200 µg/ml concentrations. The remaining PGPR i.e. *Azotobacter chroococcum*, *Azospirillum lipoferum, Pseudomonas fluorescens* and *Bacillus polymyxa* showed growth up to 1000 µg/ml. By taking the sub lethal concentration of malathion in the respective broth cultivation media these PGPR were inoculated and incubated for 10 days at room temperature.

The amount of residual malathion after the treatment of PGPR was measured by GCMS method. The estimation of residual malathion after 10 days was calculated on the basis of area occupied in the gas chromatogram under GCMS analysis. The maximum degradation was found in case of *Bacillus polymyxa* and *Pseudomonas fluorescens* while least degradation was found in case of *Azotobacter chroococcum*. Other two PGPR were moderate. To identify the degradation whether extracellular or intracellular the TLC analysis was performed by taking the cell free extract of the malathion degradation assay which showed that there were no degradation of malathion but after sonication of the bacterial cells, the malathion degradation products were reported which were analyzed by GCMS.

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