



Isolation and Characterization of Organophosphate Pesticide-Degrading Bacteria

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Abstract: *The Soil acts as a reservoir of pesticide residues and serves as niche for microbial diversity. Soil microorganisms, including bacteria, fungi and actinomycetes, possess remarkable metabolic diversity, enabling them to degrade a wide range of organic pollutants, including pesticides. Organophosphate (OP) pesticides, while effective in pest control, mainly lepidopterous insects, pose a significant environmental and health risks due to their persistence and toxicity. These OPs are commonly used on variety of crops, including Rice, Wheat, Corn and vegetables, such as Eggplant, Bottle gourd, etc. This work is an effort at identifying potential organophosphate pesticide-degrading bacterial strains that*

could be relevant in bioremediation of pesticide contaminated soil from some selected agro ecosystems of Bihar Sharif, Bihar, which has a repeated history of organophosphate pesticide application. Isolated bacterial strains were examined for their degradation activity using a medium (Mineral Salt Peptone Yeast) treated with OPs which resulted in breakdown of complex organophosphates into energy sources for metabolic activities.

Keywords: *Organophosphate pesticide, Bioremediation, Organophosphate-degrading microbes, Mineral Salt Peptone Yeast.*

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Introduction:

With increasing population, there has been tremendous increase in agricultural activities to meet the demand of products such as biofuel, food, fibre, feed, and other bio-based commodities (Ortiz Hernández and Sanchez-Salinas, 2010). In modern agriculture, pesticides play a pivotal role in ensuring high profits to farmers, providing reliable supplies of agricultural produce at prices which are affordable to consumers, and also improving the quality of produce (Damalas, 2009).

A pesticide is defined as any compound or combination of compounds used to stop, kill, repel, or mitigate pests, including insects, mites, nematodes, weeds, and rodents. This includes different types of chemicals like insecticides, herbicides, and fungicides (Ortiz Hernández and Sanchez-Salinas, 2010). The pesticides are classed