

Screening of Actinobacterial Isolates for Degradation of Monocrotophos Pesticides (Mcp) – Chemical Residues Available in Soil †

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Abstract: The several uses of chemical pesticides in preventing and controlling the diseases and pests of a crop is in use, but at the same time, pesticide residues have brought serious harm to human health and the environment. The microbial degradation of pesticide residues is the solution to the above problem. It is an important subject to study microbial degradation of pesticides in soil environment in the field of internationally environmental restoration science and technology. In the present investigation, a total of 120 soil samples were collected from different field areas of the Uttarakhand region (Tehri-Garhwal, Chamoli, Srinagar, Uttarkashi, and Haridwar), which are meant for prevalent usage of Monocrotophos pesticides. A total of 256 microbes was isolated; out of which 15 isolates of Actinobacteria (5.8%) were isolated, assumed to be positive for degrading MCP pesticides. The actinobacterial isolates were screened on specific agar media and characterized by morphological colonies appearance and staining procedures. The actinobacteria isolates were categorized based on a) type of pigment production and colony and color. The isolates appeared as mucoid, irregular, rhizoid, and some of the colonies initially appeared as mucoid, and after 10 days of incubation, showed rhizoid. The color colonies observed were red-, gray- and yellow-colored spores were observed. The Gram's staining smear showed gram-positive rods. The dominant isolates of Actinobacteria were found to be of genera viz. *Micromonospora*, *Actinomyces*, *Nocardia*, and *Streptomyces*. Determination of pesticide concentration on the bacterial growth OD value UV spectroscopy was carried out to confirm degradation and degraded by-product produced was determined via HPLC analysis. The comparative degradation of MCP pesticides by the isolates was found to be in the range of 37 % to 55%. The degradation rate was found to be significant and efficient by genera viz. *Micromonospora* (55%), *Actinomyces* (37%) and *Streptomyces* (42%) respectively. The studies are in continuation to determine the further degradation performance of actinobacterial isolates.

Keywords: Actinobacterial isolates; morphological appearance; degradation rate; monocrotophos pesticides.

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Conflicts of Interest

The authors declare no conflict of interest.