

## Biodegradation of pesticide, Endosulfan from synthetic and wastewater by isolated bacterial strains

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**SUMMARY:** Pesticides cause pollution by running off from agricultural fields, horticultural land and domestic gardens. Pesticides decrease biodiversity in the soil because they do not just kill the intended pest, they often kill many of the other small organisms. In order to prevent the ecosystem from the ill effects of pesticides, they are necessary to be removed. Endosulfan is an organochlorine pesticide under the cyclodiene group, a derivative of hexachlorocyclopentadiene and chemically similar to aldrin, chlordane and heptachlor. Present research was carried out for the development of treatment technology for the isolation of soil micro-organisms having affinity for the biodegradation of endosulfan contaminated wastewater.

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### Key Words :

Biodegradation,  
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Pesticides are toxic and are potentially hazardous to human, animals, other organisms and the environment. Pesticide pollution was reported to have killed fishes and resulted in reproductive failure in birds. Chronic effects from exposure to certain pesticides include birth defects, toxicology to a fetus, production benign or malignant tumors, nerve disorders, blood disorders, genetic changes, endocrine disruption and reproductive effect. The symptoms of pesticides poisoning can range from a wild skin irritation, permanent blindness, to coma or even death. Micro-organisms can metabolize pesticides if they are bioavailable and if they have chemical structure compatible with the organisms' enzymes that catalyze the biodegradation. Mechanisms of degradation include mineralization, partial degradation to secondary compounds, adsorption, humification and volatilization. In this study, pesticide tolerant bacterial strains were isolated for bioremoval of endosulfan.

Nullah sewage of Ludhiana where waste water from agricultural fields using pesticides and effluent from industries is disposed off into the water bodies. pH of waste water sample was 5.4, total solids 11800mg/l, total dissolved solids 5600mg/l, total suspended solids 6200 mg/l, alkalinity 480mg/l, hardness 650mg/l, turbidity 42 NTU, biological oxygen demand 220mg/l, chemical oxygen demand 450mg/l and nickel 2ppm and chromium 4ppm (APHA, 1995).

### Isolation and characterization of pesticide tolerant strains :

In the present study, bacteria which can remove endosulfan from aqueous solution by using endosulfan as carbon source were isolated by enrichment method. The isolated strains were characterized for various biochemical, growth and morphological characteristics (Harley and Prescott, 1993).

### Procurement of synthetic endosulfan :

Synthetic pesticide was procured from Bharat Insecticides Limited. The net content of the bottle of synthetic endosulfan was 100 ml.

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## EXPERIMENTAL METHODOLOGY

### Initial characterization of wastewater :

Wastewater was procured from *Buddah*