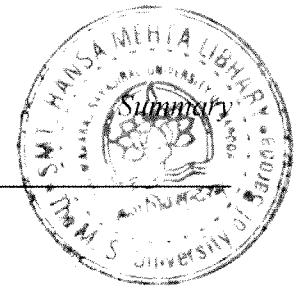

Summary

- ✓ Soil samples were collected from two locations, agricultural soil (sugarcane field) from Junagadh district and industrial site soil (engaged in γ-HCH manufacturing for more than 20 years) Vadodara district of Gujarat state, India.
- ✓ Total 82 bacteria were isolated from the above mentioned soil samples.
- ✓ 22 bacteria were isolated from agricultural soil; however, none of these bacterial isolates showed γ-HCH biodegradation activity.
- ✓ 49 bacteria were isolated from industrial site soil by direct method without enrichment. One of the isolate showed zone of clearance on γ-HCH clearance assay. This isolate was identified by 16S rDNA sequence identity as *Shewanella* sp. CGR-L1.
- ✓ *Shewanella* sp. CGR-L1 was able to degrade about 68 % of 10 mg l^{-1} γ-HCH within four days of incubation in MSM-L2 in presence of glucose.
- ✓ *Shewanella* sp. CGR-L1 was able to tolerate γ-HCH concentration of 50 mg l^{-1} in the MSM-L2 medium.
- ✓ *lin*A gene involved in the biodegradation of γ-HCH was amplified and sequenced.
- ✓ Four copies of *lin*A were detected in southern blot analysis.

- ✓ One plasmid of size ~2.5 kb was observed in *Shewanella* sp. CGR-L1. Plasmid curing and PCR confirmed that it is not involved in the biodegradation of γ-HCH.
- ✓ Metabolite produced during the biodegradation of γ-HCH were identified as γ-PCCH and 1, 2, 4-TCB.
- ✓ Eleven bacteria were isolated from industrial site soil after enrichment. One of the isolate showed zone of clearance in γ-HCH clearance assay. This isolate was identified by 16S rDNA sequence identity as *Sphingobium* sp. Strain CGR-L2.
- ✓ *Sphingobium* sp. CGR-L2 showed around 97% biodegradation of γ-HCH after 3 days of incubation in MSM-L2 in absence of glucose.
- ✓ Increase in inoculum concentration augmented the degradation of γ-HCH residue in the medium.
- ✓ Maximum metabolic activity of *Sphingobium* sp. CGR-L2 was observed in the presence of glucose.
- ✓ Optimum pH and temperature for γ-HCH biodegradation by *Sphingobium* sp. CGR-L2 were 8 and 30^0C, respectively.
- ✓ *Sphingobium* sp. CGR-L2 degrades around ~87 % of the γ-HCH (10mg l^{-1}) within the 9 hours of time.
- ✓ Metabolite produced during the biodegradation of γ-HCH was identified as γ-PCCH.

- ✓ Reduction of other isomers, γ-HCH, β-HCH as well as α-HCH was observed during the biodegradation analysis with technical HCH.
- ✓ Genes involved in the biodegradation of γ-HCH *lin*A, *lin*B, *lin*C, *lin*D, *lin*E and *lin*R were present in the isolate *Sphingobium* sp. CGR-L2.
- ✓ Southern blot analysis indicated that isolate CGR-L2 carries a single copy of *lin*A, *lin*B and *lin* C gene.
- ✓ *Sphingobium* sp. CGR-L2 was able to degrade γ-HCH and β-HCH in microcosm study.
- ✓ Other bacterial isolates from enrichment culture showed random occurence of *lin*A, *lin*B and *lin*C.
- ✓ To conclude, two γ-HCH degrading bacteria were obtained with different isolation approaches. Our results show that *Sphingobium* sp. CGR-L2 has the potential for use in bioremediation of soils contaminated with HCH.