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MICROBIAL OXIDATION AND RELEASE OF CHLORIDE IONS FROM HALOGENATED HERBICIDES

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Six strains of bacteria capable of utilizing six commonly used chlorinated herbicides MCPA, 2, 4-D, 3, 4–DPA, TCA, Saturn 50 (Benthiocarb) and Lorox were isolated from paddy soil by enrichment cnlture technique. Three methods (a) growth test, (b) halide release, and (c) oxygeh uptake, were employed to study the degradation of the above chlorinated herbicides by these isolates. All organisms isolated were able to grow in 3, 4–DPA and dehalogenate the herbicide and also showed an appreciable oxygen uptake, probably, indicating that 3, 4–DPA is universally degraded by these bacterial species. 2, 4–D and MCPA were degraded by five bacterial species tested. Only three bacterial species showed any growth on TCA and this compound was neither dehalogenated nor oxidized by any bacterial species tested. T.C.A., probably is the most recalcitrant chlorinated herbicide and does not serve as a growth substrate for many of these bacteria.

Pseudomonas aeruginosa and *Micrococcus* species appear to be the most efficient organisms in the process of degradation of these herbicides, when the ability to grow in, and dehalogenate the herbicides were considered. Whereas *Pseudomonas* showed an appreciable oxygen uptake, utilizing all the six herbicides as a growth substrate, the *Micrococcus* species showed oxygen uptake only in 2, 4–D and 3, 4–DPA.

The evidence indicates that, generally, an organism capable of utilizing any of the above chlorinated herbicides, dehalogenates the same and also shows an appreciable oxygen uptake. But there are exceptions.

It is also apparent that dehalogenation of aromatic chlorinated herbicides is more efficiently carried out by bacteria than the aliphatic derivatives.