

BACTERIAL DEGRADATION OF HALOGENATED HYDROCARBONS

Ananda Nanayakkara and G. S. Widanapathirana

(Dept. of Botany, University of Kelaniya)

Ten different bacterial species which are capable of utilizing kerosene oil, were isolated from the soil by the enrichment culture technique. The soil samples were taken from the ground surrounding the base of the petrol and kerosene pumps. These micro-organisms were used to study the degradation of 10 different halogenated hydrocarbons.

The methods used for this were : (a) Growth; (b) Halide release; (c) Oxygen uptake.

These hydrocarbons are mono- and di-substituted aliphatics, mono- and di-substituted aromatics which contain Br, Cl or I atoms at either end in aliphatics or ortho, para or meta position in the benzene ring.

All the substrates tested except 1, 6-dichloro hexane and 1, 2-dibromopropane served as growth substrates for most of the organisms. Substrates such as 1-fluoro-hexadecane, 1-bromononane and 1-bromo-2, 6-dimethyl benzene were universal substrates for the majority of the organisms. These organisms also show an appreciable oxygen uptake but there are exceptions.

The values of halides released and growth in the substrates probably indicate that di-substituted hydrocarbons are more resistant to microbial degradation than the mono-substituted hydrocarbons. The values of halides released also indicate that di-substituted aliphatic hydrocarbons are resistant to microbial attack while the di-substituted aromatic hydrocarbons are not.

Pseudomonas aeruginosa, *Bacillus coagulans* and *Thermomonospora* species appear to be the most efficient organisms in the process of degradation of some of these chemicals.

Resting cell suspensions incubated with substrates that did not serve as growth substrate showed an appreciable oxygen uptake indicating that they are rapidly degraded and hence may be amenable to co-metabolic degradation in the natural soil.