CONFIDENTIAL

PCB - U.K. Monsanto Plants

Monsanto Chemicals Ltd

FROM (LOCATION): H.A. Vodden

DATE: Ruabon

SUBJECT: January 18th 1971

REFERENCE: HAV/MV

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Annual Report 1970 - Organic Chemicals - P.C.Bs - Europe

Biodegradation Studies

To investigate and define the extent to which biodegradation of polychlorinated biphenyls is likely.

A biphenyl-degrading culture (C_2) has been found to degrade many isomers of PCB. A theoretical hypothesis has been formulated, from the known degradation pathway for biphenyl, to predict which chlorinated isomers might be expected to degrade. Experimental work has largely confirmed this hypothesis although a few loose ends still remain.

The extent of degradation of a number of Monsanto products has been studied experimentally. Analytical procedures have been developed to analyse the degradation residues and technique for quantifying these residues is at an advanced stage of development. It has been demonstrated that the order of degradability for Monsanto products is as follows:

MCS 1016 > MCS 717 > MCS 762 > Aroclor 1242, MCS 1016 being the most degradable.

Experimental work has also demonstrated that HB40 can be degraded by C_2, but as with the PCB products, quantification of the extent of degradation has still to be determined.

We are supporting a project at University College, Bangor, in which it is hoped to select and study cultures specifically for degrading chlorinated biphonyls. Claims to have isolated cultures capable of growing on Aroclor 1242 and 1254 have not so far been substantiated, but a new culture, C_3, which appears to degrade biphenyl through a different pathway from C_2 has been isolated. This culture is being grown at Ruabon for experimental studies.

Aroclor - Environmental Contamination

1. Prevention of indiscriminate pollution by PCB

Technical service to customers has included advice on how to avoid pollution and instruction on disposal of waste material. Analytical service has been provided in many cases to assist customers in defining their pollution problems.

We have established that the incinerator operated by Parle Waste Disposal Ltd., at Rainham is satisfactory for the disposal of liquor PCB wastes. We have had discussion with incinerator manufacturers and operators to find a suitable unit for the incineration of solid wastes, but have not yet completed this.

Advice and assistance has been given to the Newport Plant on monitoring and control of pollution. Improvements in the interception of Aroclor contaminated drain-water and in pollution-control generally, coupled with routine monitoring of the Plant effluent, have resulted in a steady decrease in the average level of PCBs., but occasional high levels indicate the need for constant vigilance.

2. Technical co-operation with national authorities

During the year we have maintained close relationships with a number of national authorities in the U.K. those have included the Nature Conservancy, the Ministry of Agriculture Fisheries and Food and the Government Chemist. In the Netherlands, the University of Utrecht and the TNO organisation have been visited, in Sweden we have liaised with the National Environment Protection Board. Through meetings, discussions and correspondence with numerous societies and organisations interested in various aspects of the environment we have presented Monsanto's technical contribution to the PCB problem and have, in general, received complimentary comment regarding Monsanto's attitude.

The discovery, by analysts at the Ministry of Agriculture's Infestation Control Laboratory of relatively high levels of PCBs (40% chlorine) in small cardboard drums was one of the first reported findings of the lower chlorinated PCBs in the environment. This report was a major factor in influencing NCR/Wiggins Teape to change from Aroclor 1242 to HB10.

Although spasmodic press reports have appeared relating PCBs to the sea-bird incident of late 1969, the NERC report on the incident has not yet been published. The final draft , of which we have been promised a copy, has not yet been agreed amongst all the contribution.

We made technical presentations to the other European manufacturers of PCB products as part of a plan for unified action in Europe.

The paper on 'Askarels - Environmental Pollution' was presented at the August CIGRE meeting in Paris and a modified version made available to the Conference on PCBs at Stockholm in September. This paper was well received.

H.A. VODDEN