Monsanto

JUN 29 1979

FROM (NAME - LOCATION - PHONE): W. M. Strauss F3EB Corporate Engineering 4-7189

DATE: June 27, 1979

SUBJECT: New York University Medical Center Proposal

REFERENCE:

cc: C. D. Malloch - F3EB
C. W. Roos - R1B
J. M. Schroy - F3EB
M. F. Weishaar - F3EB

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TO : J. Coleman Weber - B2SK

The following comments are based on my evaluation of the research proposal from the New York University Medical Center Institute of Environmental Medicine. Based on your request, these comments are offered to clarify the experimental design.

The experimental design uses the same general approach and philosophy employed in the abstracted studies. However, within the testwork, contingencies must be outlined to deal with various biological phenomenon which may cloud the interpretation of the experimental results.

During various phases of the testwork a co-metabolic response could be observed. Co-metabolism refers to the oxidation of a substrate without its utilization as a growth substrate. Since most isolation techniques rely on the proliferation of the microbial population, this could represent an impairment of the isolation attempt. A technique similiar to "analogue enrichment" might be helpful when PCBs are not utilized as the sole carbon source and under some circumstances when they are the only carbon source.

Bioabsorption refers to the disappearance of the test compound by mechanisms which bind the substrate to the organism. A false sense of degradation may result while the compound presists unaltered in the environment. One possible alternative to characterize this phenomenon is to lyse the bacterial cells, extract the PCBs, and run appropriate analyses on the cellular extract. Careful definition of the lysing technique is needed to insure the PCBs will remain unaltered. The cells must be lysed in a way that frees the enzyme-substrate molecule from interaction without altering the nature of the isomer.

Any isolated organisms should be classified as being facultative or strictly anaerobic. Additionally, any prior exposure of the sampling points to PCBs should be ascertained to estimate the extent of prior acclimation.

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Based on the literature's pattern of degradation, the selection of Aroclor 1016 and 1254 should provide an excellent test substrate with probable enhanced degradation of the isomers contained in Aroclor 1016. The in-situ studies should provide a critical understanding of the isolate(s) ability to function and interact in a stressed biological niche.

A variety of organisms and mixed cultures have been studied which are capable of degrading various PCBs. The studies have, in many instances, characterized the degradatory pathways and the major metabolic byproducts.

Most of the studies have been conducted on aerobic micro-organisms. The probable rational behind this approach lies in the authors' principal justification for their proposal -- that PCBs tend to accumulate in anaerobic and reducing environments. It could be argued that since the compounds accumulate in this type of environment that the indigenous microbial population is incapable of degrading the compounds, resulting in PCB accumulation.

A variety of factors could interfere with the organism(s) capability to assimilate the isomers. The characterization and explanation of this situation is viable and socially desirable.

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W. M. Strauss ← Type attach. the rest of this document to the letter

It is my intent to provide a basis for the evaluation of the current proposal and those anticipated from the California Institute of Technology and the Massachussetts Institute of Technology. Abstracts of recently published articles impacting this area of investigation are included to document recent work in this area.

I feel that the only major non-technical criticism of the proposed study resides in the lack of apparent experience of the authors in this type of isolation. Under equivalent proposals I would urge selection based on the past experience of the research team. To this end, I would feel it advisable to solicit publications which illustrate past success in this type of work.

I believe that the selection of the study should be made on a comparative basis. The study which is technically sound and aligned with Monsanto's overall objective for its sponsorship should be selected.

I would like to thank you and Dr. Roos for the opportunity to work on this assignment. If any clarification or additional information is desired it will be provided promptly.

W. M. Strauss

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