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May 19, 1971

The Honorable Alfred L. Frechette, M.D.
Chairman, Pesticide Board
Department of Public Health
600 Washington Street, Rm. 770
Boston, Massachusetts 02112

Dear Dr. Frechette:

I am writing to you in connection with your current consideration of the status of the herbicide 2,4,5-T. I have tried to keep abreast of studies of the toxicology of this compound and of the associated compound 2,3,7,8-tetrachlorodibenzo-p-dioxin. In doing so, I have become convinced that we are not in a position to say with scientifically acceptable confidence whether the continued use of 2,4,5-T is or is not a hazard to public health. Although there are several important unanswered questions, there are two which seem to be of particularly great importance and yet which have not been squarely addressed, let alone answered. These questions are the following:

1. Does the dose response curve for 2,4,5-T teratogenicity show a threshold concentration below which there are no effects?

Several writers have assumed that such a threshold exists and that it lies in the range of a few mg per kilogram body weight. However, to my knowledge there is no statistically valid evidence for such a conclusion. (As is well-known, a "no effect dose" does not simply mean a dose at which no effect is seen in a given experiment. Rather, it means a dose at which no effect is seen when linear extrapolation from a higher dose experiment would have predicted a statistically significant number of malformed animals. This elementary but crucial point seems not to have been understood by some of those who have presented statements to your Board.)

Large scale but still feasible
(~~Relatively simple~~) experiments could establish whether or not there is a threshold dose in the ppm range in laboratory animals. If there is such a threshold and if human exposures can be kept acceptably below that value, then and only then would I consider that 2,4,5-T itself does not constitute a teratogenic hazard to public health.

2. Are significant levels of dioxin present in human tissue and in the food chain?

The problem here is that there are simply no existing measurements showing that dioxin levels in human tissue and in the food chain are below the levels that might reasonably constitute a public health hazard. This is because existing analytical procedures are not sensitive enough to detect dioxin at potentially toxic levels. For example, it has been stated in testimony before your Board that according to recent tests " . . . dioxins have not entered the environment in sufficiently large quantities to cause any residual problems in eagles." The limit of detection in these tests was stated to be 50 ppb. However, the reported LD50 for dioxin in the guinea pig is 0.6 ppb, nearly a hundred times less than the limit of detection in this case. I am astonished that such testimony should be proffered as responsible scientific analysis.

Because of lack of essential data, we must defer judgment on whether or not significant amounts of dioxin are entering the human diet, from 2,4,5-T or any other source. Fortunately, analytical techniques sufficiently sensitive to resolve this question now appear to be within reach.

I have addressed only the technical aspects of the regulatory problem now before the Board. I realize that the question of whether or not to restrict the use of a chemical is a matter of public policy going beyond purely technical considerations, although such considerations are clearly of very great importance. What I do wish to emphasize is that we simply do not yet possess adequate technical information to decide some of the most essential relevant questions in the case of 2,4,5-T and that this information should be forthcoming if the proper experiments are undertaken.

Sincerely yours,

Matthew Meselson

Matthew Meselson
Professor of Biochemistry and
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