PCB – Publications

Report
of the
Secretary's Commission
on
Pesticides
and
Their Relationship
to
Environmental Health

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
December 1969

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price $2.00

MONS 064610

sures occur, opportunities to make meaningful observations of health consequences should not be overlooked.

Extrapolations from occupationally exposed populations to the general population always require qualification. The most significant difference between the two groups is that the general population includes large numbers of very young, very old, ill and disabled, while such persons are found rarely or not at all among the occupationally exposed. These individuals are often least resistant to the effects of toxic agents; it is therefore apparent that dose-response relationships based on studies of formulators or other occupational groups may be extrapolated to the general population only with great caution.

Analytical complexities

An appreciation of some of the more important analytic and interpretive problems peculiar to the organochlorines is essential for perspective in this area.

A recently-discovered source of error in analysis of DDT and related materials by gas chromatography is the presence of polychlorinated biphenyls (PCB). Since 1929, polychlorinated biphenyl liquids, resins, or solids have been spread widely in our environment in oils, hydraulic fluids, adhesives, plastics, building materials, fuels, fire retardants, heat transfer agents, electrical equipment, paper, and many other industries. The presence of PCB has caused serious analytical errors in the nonspecific gas chromatographic analysis of the chlorinated hydrocarbons (Jensen, 1966; Richardson, 1969; Reynolds, 1969). It is clearly necessary to confirm qualitatively the determination of DDT residues and not to be confused by gas chromatographic peaks that overlap DDT but represent totally different materials (Schechter, 1968). Such false peaks have been reported in gas chromatograms from some wildlife samples, along with organochlorine pesticides (Roburn, 1965). Cod liver oil from Norway gave rise to gas chromatographic peaks in the region expected for DDT, DDE, and TDE, but paper chromatography indicated the presence of halogenated compounds which were not known pesticides at all (Eidelman, 1963). In samples for the Nature Conservancy in Britain, compounds were detected interfering with detection of p,p′DDT and p,p′TDE (Harrison, 1966). Since 1966, the presence of PCB has also been noted in the British (Holmes, *et al.* 1967; Holden and Marsden, 1967; Robinson, undated reference cited in Richardson, 1969), Dutch (Koeman, *et al.* 1969), and North American (Risebrough, *et al.* 1968) environments.

Polychlorobiphenyls have been identified in fish, wildlife, and the environment as cited above, but no attempt appears to have been made to look for them in human tissues or excreta. Pooled samples of

MONS 064611

[illegible] from Colorado Springs and eight individual samples [illegible], Calif., were positive for PCB (Risebrough, 1969; [illegible] communication). Past reports of levels of chlorinated hydrocarbon pesticides might thus have been too high as a result of the [illegible] PCB. A further source of error might be introduced by [illegible] of [illegible] in plastic containers (Quinby, 1966). G.E.?

Analyses of environmental samples must be supported by qualitative and quantitative confirmation of the results. Too many papers have been published that incorporate no such quality controls; nor have potential sources of error been considered. Especially when the results are reported as positive near the lower limits of detection of the gas chromatographic method (which is often the case), the results may be absolutely misleading. The mass of material in question is then also insufficient for qualitative and quantitative corroboration of the results by other techniques of analysis.

CITED REFERENCES

Eidelman, M.: Determination of micro quantities of some chlorinated organic pesticide residues in edible fats and oils. J of the Assoc Offic Agricul Chem. 46: 182–6, 1963.

Harrison, R. B.: J. Sci. Fd. Agric. 17: 10, 1966.

Holden, A. V., Marsden, K.: Organochlorine pesticides in seals and porpoises. Nature. 216: 1274–6, 30 December 1967.

Holmes, D. C., Simmons, J. H., Tatton, J. O'G.: Chlorinated hydrocarbons in British wildlife. Nature. 216: 227–29, 21 October 1967.

Jensen, S.: New Scientist. 32: 612, 1966.

Korman, J. H., Ten Noever De Brauw, M. C., De Vos, R. H.: Chlorinated biphenyls in fish, mussels and birds from the River Rhine and the Netherlands Coastal Area. Nature. 221: 1126–28, 22 March 1969.

Reynolds, I. M.: Polychlorobiphenyls (PCB's) and their interference with pesticide residue analysis. Bull Environ Contamin Toxicol. 4: 128–43, 1969.

Richardson, A.: Organochlorine compounds other than insecticides in the environment. "Shell" Research Limited. Tunstall Laboratory, Sittingbourne, Kent, England. February 1969.

Risebrough, R. W., Huggett, R. J., Griffin, J. J., Goldberg, E. D.: Pesticides: Transatlantic movements in the northeast trades. Science. 159: 1233–36, 15 March 1968.

Robinson, J.: Undated reference. "Shell" Research Limited. Tunstall Laboratory, Sittingbourne, Kent, England.

Roburn, J: A simple concentration-cell technique for determining small amounts of halide ions and its use in the determination of residues of organochlorine pesticides. Analyst. 90: 467–75, 1965.

Schechter, M. S.: The need for confirmation (Editorial). Pesticide Monitoring Journal. June 1968.

Complexities of Terminology

A large body of information has been published regarding the health consequences of human exposure to pesticides. Review of these publications reveals that the scientific terminology is often imprecise and

MONS 064612