ABSTRACT

OCCURRENCE OF POLYCHLORINATED BIPHENYLS IN HUMANS

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The Human Monitoring Survey was established to determine on a national scale the levels and trends of certain more commonly used pesticide chemicals in the general population. Michigan Department of Public Health is one of several state health laboratories providing residue analyses of human adipose samples which are collected from hospitals scattered across the United States.

Since 1966 this laboratory has been analyzing samples of human adipose tissue routinely by dual-column gas chromatography. During the course of this work a recurring pattern of unidentified peaks was observed on chromatograms, some peaks eluting much later than p,p'DDT. The presence of these unknown compounds complicated the analysis of organochlorine pesticides due to having similar retention times, particularly to p,p'DDT, o,p'DDT, and p,p'DDD.

After Widmark (J. A. O. A. C. 1970) and others reported the presence of polychlorinated biphenyls in animal and environmental media, our attention was focused on this new type of environmental problem. Upon receipt of reference Aroclors from the Pesticides Repository, Perrine Primate Laboratory, E. P. A., this laboratory demonstrated a remarkable similarity between chromatograms of Aroclors, i. e., 1254 and 1260, and those of some human adipose samples.

In this paper, several examples of unusually high levels of polychlorinated biphenyls in human adipose will be presented. Using combined gas chromatography-mass spectrometry, the Perrine Primate Laboratory found that these particular samples contained substantial quantities of polychlorinated biphenyls ranging from pentachlorobiphenyl to decachlorobiphenyl.

Currently this laboratory is conducting semi-quantitative analysis of polychlorinated biphenyls in human adipose tissue by thin-layer chromatography on a total chlorine basis after extracted residues have undergone dehydrochlorination and oxidation steps. According to this analytical method, almost 50% of human adipose samples received by this laboratory contain 1, 0 ppm or more polychlorinated biphenyls, using Aroclor 1260 as the reference standard.