Determination of the level of metabolic products present in urine has been utilized as an indicator of type and degree of exposure to chemicals. Two of the most widely studied urinary metabolites, namely DDA, the carboxylic acid metabolite of DDT and the para-nitrophenol metabolite of parathion have been used to gain insight into the degree of exposure to these parent compounds (LAWS, et al. 1967; ELLIOTT, et al. 1960).

Polychlorinated biphenyls (PCB's) were first reported as environmental contaminants in 1966 (JENSEN). The scientific literature now abounds with reports concerning the analysis and toxicology of these highly stable and persistent materials.

For many years it was generally believed that PCB's were not metabolized to any appreciable extent by mammalian systems (REYNOLDS, 1969). However, as early as 1959, BLOCK and CORNISH (1959) reported on the conversion of biphenyl and 4-chlorobiphenyl to monohydroxylated compounds in the rabbit. WEST, et al. (1956) isolated pure compounds resulting from the metabolism of biphenyl in the rat. Recently JENSEN, et al. (1974) described the separation and identification of individual isomers of PCB's in the technical material and in human adipose tissue. Based on the percentages of various isomers stored in adipose tissue, he indicated that two adjacent unsubstituted carbon atoms were required for rapid metabolism. This supported the contention of previous investigators who were working with chlorobenzenes (JONDORF, et al. 1955). KAISER and WONG (1974) reported that microbial degradation of Aroclor 1242 resulted in non-chlorinated aromatic and aliphatic products. GRANT and his group (1974) demonstrated that Aroclor 1254 was metabolized in rats. He noted significant differences in GLC peak patterns for the PCB standard and the PCB which was extracted from the tissues. Similar findings were reported for Aroclor 1254 by CURLEY, et al. (1971) using Electron Capture-Gas Chromatography in their examinations of rat tissues and urine. No metabolites were isolated or identified.
This paper reports on metabolic products observed in rat urine, through Coulson Conductivity-Gas Chromatography (CC-GC) and combined Gas Chromatography-Mass Spectrometry (GC-MS) analyses, following a prolonged diet of Aroclor 1016 or Aroclor 1242.

EXPERIMENTAL

Aroclor 1016 and 1242 were of electrical grade, lot No. KB-06-756 and KB-05-415, respectively. They were supplied by Monsanto Chemical Company, St Louis, Missouri. The Aroclors were fed in parallel experiments to male Sherman strain rats, 61 to 73 days old at a dietary level of 100 ppm each. Twenty-four hour urine was collected from four experimental rats fed Aroclor 1242 or Aroclor 1016 and one control under the following schedule: 2 weeks after onset of the experiment; one and 2 months after onset of experiment; 4, 6, 8 and 10 months after onset of experiment. After 6 months on the diet, some rats were allowed to recover by removal of PCB diet, for time periods of 2, 4 and 6 months. Urine was collected at these intervals. A more detailed accounting of the experimental protocol can be found in another publication (BURSE, et al. 1974). The amount of Aroclor 1242 consumed ranged from 6.6 mg/kg bodyweight/day to 3.89 mg/kg bodyweight/day while Aroclor 1016 ranged from 6.9 - 3.5 mg/kg bodyweight/day.

The twenty-four hour urine samples were combined from four rats in each experimental group. Total urine volume ranged from 40 to 80 ml. The urine was refluxed in an equal volume of concentrated HCl for three hours and extracted 3 times with 50 ml of benzene. The benzene extract was washed with 20 ml of 5% NaOH w/v followed by 20 ml water. The aqueous phases were combined and acidified with 20 ml of 1.2 N HCl. The acidic aqueous phase was extracted 3 times with 10 ml of benzene and dried over sodium sulfate. To each sample was added diazomethane (STANLEY, 1966). Each sample in a volume of 0.5 ml was eluted from a micro column containing 3% w/w deactivated silica gel using 10 ml of a 1:1 benzene: hexane mixture.

A Microtek-2000 gas chromatograph, equipped with a Coulson Conductivity Detector was used for preliminary screening for halogen in the sample extracts. Pyrex glass columns (1.83m X 4mm i.d.), packed with 5% OV-210 on 80/100 mesh Supelcoport, and 3% OV-1 on 70/80 mesh Chromosorb G were operated at 165° and 170° respectively.

Composited urine sample extracts were adjusted to 0.5 ml with pesticide grade hexane. Eight microliters