400 ppm 2000 ppm.

TOXICOLOGY AND APPLIED PHARMACOLOGY 17, 656–668 (1970)

# Comparative Toxicologic Study with Polychlorinated Biphenyls in Chickens with Special Reference to Porphyria, Edema Formation, Liver Necrosis, and Tissue Residues

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*Received November 3, 1969*

Comparative Toxicologic Study with Polychlorinated Biphenyls in Chickens with Special Reference to Porphyria, Edema Formation, Liver Necrosis, and Tissue Residues. Vos, J. G. and Koeman, J. H. (1970). *Toxicol. Appl. Pharmacol.* 17, 656–668. In a comparative 60-day oral toxicity test (400 ppm) in chickens, three 60%-chlorinated commercial polychlorinated biphenyl (PCB) preparations were used: compound I (Phenoclor DP 6), compound II (Clophen A60), and compound III (Aroclor 1260). Using mortality, mean survival time, mean weight, and pathological observations (hydropericardium, abdominal, and subcutaneous edema and centrolobular liver necrosis) as parameters, a significant difference in toxicity was found between the compounds: compounds I and II showed the highest, compound III the lowest, toxicity. Microscopically centrolobular liver necrosis was found in chicks fed compounds I and II. Atrophy of the spleen was found in all test groups. Chemical porphyria was found as a general PCB effect: increased fecal excretion of coproporphyrin and protoporphyrin and fluorescence of tissues occurred in all test groups. Additional experiments with compound I (2000 ppm) in Japanese quail and rats confirmed the porphyrogenic action. Gas chromatographic analyses of liver and brain of dead chicks gave PCB levels that varied between 120 and 2900 ppm. The relationship of hydropericardium (chick edema) and liver necrosis to the differences in toxicity observed between the technical PCB mixtures is discussed.

In recent years the presence of polychlorinated biphenyls (PCB) has been exhibited in fish and wildlife in many countries, including the United States, Great Britain, Sweden, and The Netherlands (Jensen, 1966; Holmes *et al.*, 1967; Holden and Marsden, 1967; Koeman *et al.*, 1967; Risebrough *et al.*, 1968; Koeman *et al.*, 1969).

Commercial PCB preparations are oily fluids consisting of a mixture of different chlorinated biphenyls. These chemicals are extremely stable with very low aqueous solubility. They are used as lubricants, as fluids for heat transfer and dielectric media, in protective coatings for wood, metal, and concrete, and for many other applications. Which of these applications has contributed to the present widespread environmental contamination has not been elucidated. The occupational hazards in the use of PCB have been known for years; normal handling of these compounds has not given rise to great difficulties (Irish, 1963).

Animal experiments with rats and guinea pigs have shown that the ingestion of PCB



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