Polychlorinated Biphenyl Residues in the Milk of Environmentally and Experimentally Contaminated Cows

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One of the PCB's, Aroclor 1254, has been used in coatings for silos. Milk samples obtained from the six farms with these silos contained PCB residues in the range of 5 to 11 µg/g milk fat when silage was fed. When silage was not fed, detectable levels in the range of 1 to 2 µg/g milk fat were present.

On one farm the cows had been simultaneously exposed to PCB and high levels of DDE. The cows were removed from the sources of both contaminates at about the same time. Milk samples were obtained from the individual cows at 3 week intervals for 6 months. Concentration of the PCB in milk declined about 50% within 3 weeks after removal from silage. Subsequently, the rate of decline was 1.3% per day. The rate of decline of DDE concentration in milk fat was also 1.3%. The correlation between rates of the two compounds for individual cows was 0.82.

In a laboratory experiment, 9 cows with varying stages of lactation and levels of production were fed 200 mg per day Aroclor 1254 for 60 days. Milk samples were obtained during the 60 day feeding period and the following 60 days. Level of residue in milk approached but did not reach equilibrium at 60 days. The concentration at 60 days was 50 µg/g in the milk fat. The total quantity excreted in milk was 35 µg per day. When the PCB feeding stopped there was an initial decline to 24 µg/g within 10 days. Thereafter the concentration decline was approximately 1.0%/day. Concentration of PCB in the milk fat was not related to stage of lactation or level of milk production.

In both the environmental and laboratory work only the more highly chlorinated fractions of the Aroclor 1254 were excreted into milk. For these fractions the residues appeared to behave identically to DDE in all parameters that were studied.

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