

# Effect of DDT on NADH-cytochrome b<sub>5</sub> Reductase Activity in the Freshwater Planarian, *Phagocata velata*

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The microsomal enzyme system has received considerable attention in recent years. Enzymes of this system have been located in mammalian liver (STRITTMATER and VELICK 1956), lungs (MATSUBARA and TOCHINO 1971), brain (AKERA and BRODY 1972), heart (WATSABAYSHI and GREEN 1972), and erythrocytes (PASSON and HULTQUIST 1972). Induction of microsomal enzyme activity in rat liver and various insects is known to occur with exposure to phenobarbital and DDT (REMMER et al. 1969). Induction by DDT is not as rapid as phenobarbital but the effects last more than twice as long.

Metabolism of DDT to DDD and DDE by the freshwater Planarian *Phagocata velata* suggests involvement of the microsomal enzyme system (PHILLIPS et al. 1974). The present study describes the effect of DDT on the activity of NADH-cytochrome b<sub>5</sub> reductase in the Planarian *Phagocata velata*.

## MATERIALS AND METHODS

*Phagocata velata* were collected and maintained under similar conditions as described by PHILLIPS et al. (1974). *P. velata* were isolated into six groups of 30 worms each in glass culture dishes. The worms were fed 0.2 g of beef liver perfused with 10 ppm DDT in corn oil. Six control groups were fed 0.2 g of beef liver perfused with corn oil only. After one hour of feeding, the worms were removed from the culture dish and placed in clean water. A group of 30 worms was homogenized in 0.1 M Tris-acetate, 0.001M EDTA, pH 8.1, at 6, 12, 24, 36, 48, and 120 hours after feeding. Assay for NADH-cytochrome b<sub>5</sub> reductase was by the method of STRITTMATER and VELICK (1957).

## RESULTS AND DISCUSSION

An initial increase in NADH-cytochrome reductase was noted at 6 hr. after feeding DDT followed by a decline in activity at 24 hr. (Fig 1). However, a significant

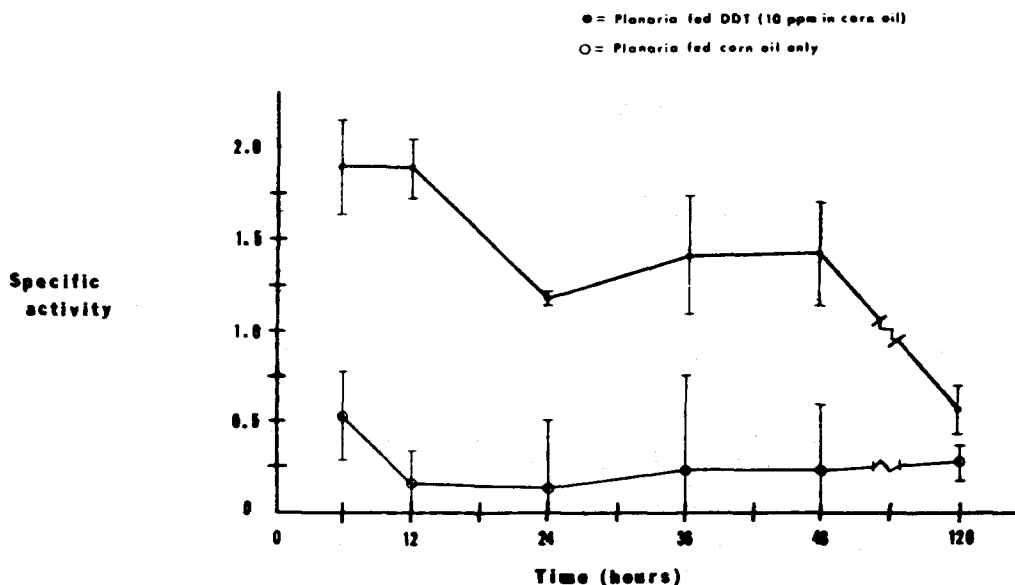


Figure 1 NADH-cytochrome  $b_5$  reductase activity in Phagocata velata following treatment with DDT. Bar lines represent  $\pm$  the standard error.

decline in activity was not noted until approximately 120 hours after feeding. This pattern of activity follows the reduction in DDT concentration with a corresponding increase in DDD concentration as reported by PHILLIPS et al. (1974).

P. velata is one of two species living in North America that will encyst during unfavorable environmental conditions. Its principal habitat is spring-fed brooks and marshes although also found in temporary pools. In streams, the worms generally reproduce asexually and are able to fragment and encyst under conditions of drought. When water returns, the worms excyst and regenerate. This ability to physically change during unfavorable conditions appears to be complemented with a system of microsomal enzymes capable of degrading chemicals known to be harmful in higher organisms.

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