

INTERACTIONS OF LINDANE AND CARBARYL

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Formulations containing both lindane and carbaryl are used for the purpose of controlling insect populations. Lindane is used for the control of household insects, and also as a scabicide and pediculocide. Carbaryl is used for the control of pests of domestic animals. The aim of this study was to investigate the effects of lindane and carbaryl separately or in their combination on hepatic microsomal enzymes, and on cholinesterase activity. The influence of lindane on carbaryl metabolism and elimination in rats, was also investigated

Lindane induced the content of cytochrome P-450 and the activity of aniline 4-hydroxylase and 4-nitroanisole O-demethylase in liver in a dose-dependent manner. No significant effects on the activity of hepatic microsomal enzymes were found in animals treated with carbaryl alone. Mixtures of both lindane and carbaryl significantly elevated the activity of microsomal enzymes. However, the increase was lower than in the animals treated with lindane alone.

Carbaryl exerted an inhibitory effect on the activity of cholinesterase in blood and plasma. No significant effects on the investigated enzymes were found in the animals treated with lindane. Mixtures of lindane and carbaryl caused a significant decrease in the activity of the enzymes when compared to controls and the decrease was significantly lower than in the animals receiving only carbaryl.

The influence of lindane on carbaryl metabolism and elimination was investigated in rats given 1-naphthyl-1-C¹⁴ methylcarbamate intraperitoneally. The control animals received only C¹⁴-carbaryl. Within 24 hrs. after dosing in both groups of animals about 73% of the total radioactivity was eliminated with urine. However, in rats receiving both compounds the amount of hydroxylated metabolites was higher than in animals receiving carbaryl only.

The results of this study indicate that the induction of microsomal enzymes caused by lindane increased the biotransformation of carbaryl to less toxic hydroxylated metabolites. It is evident that formulations containing both lindane and carbaryl may be more effective in controlling many insects while also being less toxic to mammals than the individual insecticides used separately.