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PANOT TANGSUCHARIT: THE PROTECTIVE EFFECT OF GARLIC OIL ON CHLOROFORM-INDUCED TOXICITY IN RATS. THESIS ADVISORS KRONGTONG YOOVATHAWORN, Ph.D., AMNUAY THITHAPANDHA, Ph.D., KITTIMA SRIWATANAKUL, Ph.D., SUDA RIENGROJPITAK, Ph.D. 155 P. ISBN 974-663-596-4

The aim of this investigation was to study the protective effect of garlic oil against chloroform-induced toxicity in rats. Administration of male adult Sprague-Dawley rats with chloroform intragastrically at the doses of 50, 100 and 200 mg/kg caused both hepatotoxic as well as nephrotoxic effects in a dose- and time-dependent manner. A significant increase in either alanine transferase (ALT) or aspartate transferase (AST) was observed at 12 h following chloroform administration. The activities of these two enzymes reached its peak within 24 h and then gradually declined at 48 and 72 h after the administration of chloroform. An increase in the dose of chloroform resulted in an elevation of ALT up to 10 folds and AST up to 3 folds. These results were supported by the findings from light microscopic studies of the liver cells which revealed centrilobular necrosis after chloroform treatment. The indicators of kidney function such as serum creatinine and blood urea nitrogen (BUN) showed the same pattern as that seen with ALT and AST but to a much lesser extent. To investigate its protective effect against chloroform-induced toxicity, garlic oil was given intragastrically to rats at the doses of 50 and 100 mg/kg at 1, 6 and 12 h before chloroform. It was found that the administration of garlic oil (100 mg/kg) at 12 h before chloroform treatment could offer only partial protection against the chlorinated hydrocarbon as seen by a decrease in AST, ALT as well as a decrease in serum creatinine. After chloroform treatment, the activity of hepatic aniline hydroxylase was significantly reduced to only 20% of the control. With the pretreatment with garlic oil, the activity of this enzyme was increased but not to the control level, because garlic oil itself could also inhibit the activity of these enzymes, presumably resulting in a decrease in the bioactivation of chloroform to a toxic metabolite. Histopathological study showed less severe hepatotoxic effect caused by chloroform after garlic oil pretreatment. It was concluded that garlic consumption might afford protection against chemicall-induced toxicity, especially if the toxic effect was mediated through the metabolite formed via cytochrome P450 2E1 (CYP2E1).