CHAPTER VI

CONCLUSION

Methomyl is a highly toxic carbamate insecticide which widely used in Thailand. The mechanism of toxic action is inhibition of acetylcholinesterase enzyme that causes cholinergic signs such as lacrimation, bronchosecretion, muscular fasciculation, muscular weakness and respiratory disorders both in human and laboratory animals.

From this study, we have found that the determinations of total LDH activity, LDH isoenzymes, spleen weight, and relative spleen weight were affected in rats treated with a single dose and repeated doses of methomyl. However, no significant difference in weight gain and haematological values between the control groups and the treatment groups was observed.

The rats receiving an oral dose of all test groups showed significant increase in total LDH activity on the first day and the highest enzyme activity occured only in the rats receiving 7 mg/kg of methomyl on day 3 after dosing. Then, the level of LDH activity declined to normal level that showed the reversibility of this effect. These high LDH activities were concurrent with significantly increased LDH-3 and LDH-4. This altered isoenzymes profile may substantiate that the spleen may be a target organ of methomyl toxicity even in short term repeated exposure. This is also supported by the reductions of spleen weight and splenocyte viability in rats treated with 6 and 8 mg/kg of methomyl on day 1 and day 3 after dosing. The possible mechanisms were proposed in the previous chapter. Such proposals should be further investigated.

Interestingly, N-acetyl-L-cysteine (NAC), an antioxidant which acts like glutathione was found to be a protective agent of methomyl-induced splenotoxicity in the rats pretreated with 60 mg/kg of NAC. This may be due to the antioxidant properties of NAC which can act as a scavenger of free radicals released from inflammatory cells within the injured area. However, the pathologic findings which did not reveal the inflammaotry reaction suggest the second explanation that NAC relieved the over-vasodilatation and cytotoxic effect produced by NO via acetylcholine overstimulation.

In conclusion, the present study showed splenotoxicity of methomyl in rats and the possible correlation with increased LDH-4. However, there are limited studies indicating the distribution of LDH isoenzymes in various organs of rats. Further studies of the precise sources of LDH-4 should be established and the effects of methomyl to other organs should be observed. The exact mechanism of methomyl-induced splenotoxicity and the protective effect of spleen from methomyl by NAC should be further explored as well.