

Efficacy of Insecticide Formulation of Organo Phosphate 5 Ec Mixture of Maltahion on Mosquito *Aedes Aegypti*

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Abstract. Efficacy insecticide of organophosphate 5 EC formulation mixture of 20 % malathion and 10 % permentrin on mosquito *Aedes aegypti* was studied. The experiment use quatro of 25 individus of mosquitos during 24 hours observation to determinine their mortality after being sprayed with 1 gram of active ingredient in peet grady chamber. The result of the study revealed that 98 % mortality of mosquito *Aedes aegypti* during 3 minutes treatment and 100% mortality ini 4 minutesA concise and factual abstract is required.

Keywords: EC ; Organophosphate ; spray insecticide

1 Introduction

The application of insecticide as vector control has been widely conducted. Vector control to eradicate dengue hemorrhagic fever is an effort to broke the transmission of the disease. One way to do that is by fogging, such as thermal fogging and ultra low volume (cold fogging). Beside bendiocarb of carbamate group insectide [1], malathion belongs to organophosphate has beed applied in Indonesia since 1972 [2]. Malathion is commonly used as active agent of insecticide to which the mosquitos *A. aegypti* resistance. According to [3] this resistance was due to continuous application of one kind of insecticide so build the immunity up in the mosquitos. Even larvae of *A. aegypti* has also already resistance to Temephos (Abate) [4, 5, 6] which is consisted of Tetramethyl Thiodi. P-Phenylene, Phasphorothioate 1% and inert ingredient 99% [7]. Therefore it is important to get a new insecticide active agent.

In order to get alternative insecticide, the study of using single or mixture of active agent need to be carried out. Combination of insecticide from organophosphate and carbamate group has been conducted by [8] using malathion and propuxur respectively. The result showed that physical properties of those formulation is matched with Indonesian Pesticide Commission standard. Recently, synthetic insecticide belong to piretroid group, i.e. Permentrin has been recommended to mosquito *Aedes aegypti* as a vector of Dengue Hemorrhagic Fever/DHF [9]. Efficacy test of permethrin (100 g/l) as insecticide active agent has been conducted to several vector such as *A. aegypti* (dengue hemorrhagic fever), *Culex quinquefasciatus* (filariasis) and *Anopheles aconitus* (malaria) using thermal fogging method [10].

The aim of present work was to test the efficacy of insecticide of organophosphate 5 EC formulation mixture of 20 % malathion and 10 % permentrin on mosquito *Aedes aegypti* Semarang strain. The finding of new more effective pesticide is hope to contribute to building a low carbon development, achieving Indonesia's climate actions target, and sustainable food, industry and land use economy in Indonesia.

2 Materials and Method

The formulation of insecticide was done in PT. Bina Guna Kimia-Semarang and efficacy test was in Entomology Laboratory, Animal Medical Faculty of Bogor Agricultural University. Liquid insecticide formulation Organophosphate 5 EC consists of malathion 20 % and permentrin 10 % was tested to three days old mosquitos *A. aegypti* Semarang Strain in peet grady chamber size of 1900 mm x 1900 mm x 1900 mm. The efficacy test was done four times using twenty five mosquitos *A. aegypti*.

Mosquitos *A. aegypti* were put into peet grady chamber one hour prior to the test to certain that they are healthy live mosquitos. The test insecticide (Table 1) was sprayed into chamber using electric sprayer as much as 1,00 gram. The mosquitos which was fallen (knock down) in every minutes was counted during first 10 minute, then was counted in every ten minutes for 60 minutes. After 1 hour the treatment was taken out from the chamber and was examined for the recovery and after that was put back in the cahamber. To observe whether mosquitos recover from insecticide, in every

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hour was observed up to 6 hour. The observation was carried out for 24 hours.

Fallen (knock down) number of mosquito was determined using probitability analyses to calculated 50 and 90 % fallen time. The insecticide was effective when 90% fallen time not more than 15 minutes and mortality more than 90% in 24 hours.

Table 1. Formulation of tested insecticide organophosphate 5 EC [8]

Composition	Concentration
Malathion (gram)	20
Permentrin (gram)	10
Agrisol (gram)	5
Xyline (gram)	55
Iso propyl Alkohol	4
Propylene Glycol (gram)	4
Tolune (gram)	2
Endapan (gram)	0,005
Total (gram)	100

3 Results and Discussion

The tested insecticide formulation had 300 gr/lit active agent and 5 gr/lit emulsifier, and 550 gr/lit solvent. Although this concentration of active ingredient, emulsifier and solvent were lower than Indonesian Pesticides Commission Standard (404 gr/lit, 580 gr/lit, and 550 gr/lit respectively) their value are still high, that will affect the colour of insecticides [8].

Efficacy test them was performed in petty grady chamber using mosquitos of *A. aegypti*. The room temperaturuwe was 28°C and humidity was 50%. The result was shown in Table 2.

The result of present work (Table 2) revealed that 1,00 gram liquid insecticide wih active agent organophosphate 5 EC with 20 % malathion and 10 % permentrin sprayed in peet grady chamber was very effective to knock down and kill the *A. aegypti* mosquitos in which 98% mosquitos know downed in 3 minutes and all were killed in 4 minute. There were no mosquitos recover alive in 24 hours. This result was much better that previous studies. The experiment by [10] using organophosphate group with permentrin revealed the *A. aegypti* mosquitos mortality of 79,2 and 100 % during 50 minutes and 2 hours respectively. While the work of [11] gave result of 1 gram mixture of organophosphate dan carbamat group with 20% malathion and 10 % propoxure sprayed in peet grady chamber, knock down time *A. aegypti* mosquitos was 5% in 8 hours, and the mortality was only 85% in 24 hours.

Using only organophosphate group, i.e. malathion (in control grup) this experiment showed no mortality during 24 hours. It meant that the mosquitos has already resistance to malathion as found by [12].

Table 2. Efficacy test of tested formulation

Time	Knock down				Average (%)	Control
	1	2	3	4		
0'00"	0	0	0	0	0,00	0,00
1'00"	40	48	48	40	41,00	0,00
2'00"	84	88	80	72	81,00	0,00
3'00"	100	100	100	92	98,00	0,00
4'00"	100	100	100	100	100,00	0,00
5'00"	100	100	100	100	100,00	0,00
6'00"	100	100	100	100	100,00	0,00
7'00"	100	100	100	100	100,00	0,00
8'00"	100	100	100	100	100,00	0,00
9'00"	100	100	100	100	100,00	0,00
10'00"	100	100	100	100	100,00	0,00
20'00"	100	100	100	100	100,00	0,00
30'00"	100	100	100	100	100,00	0,00
40'00"	100	100	100	100	100,00	0,00
50'00"	100	100	100	100	100,00	0,00
1 Hour	100	100	100	100	100,00	0,00
Out from peet grady						
2 Hour	100	100	100	100	100,00	0,00
3 Hour	100	100	100	100	100,00	0,00
4 Hour	100	100	100	100	100,00	0,00
5 Hour	100	100	100	100	100,00	0,00
6 Hour	100	100	100	100	100,00	0,00
Mortality						
24 Hour	100	100	100	100	100,00	0,00

4 Conclusion

Liquid insecticide wih active agent organophosphate 5 EC with 20 % malathion and 10 % permentrin was very effective for *A. aegypti* mosquitos. This finding is sure give better contribution to build a low carbon development in pesticide industrial sector.

Acknowledgments

The author with to thank to PT. Bina Guna Kimia for the chemicals and to Entomology Laboratory, Animal Medical Faculty of Bogor Agricultural University for their facilities.

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