ABSTRACT

Aedes aegypti is a mosquito that acts as vectors of dengue hemorrhagic fever (DHF). One of the efforts to control the population of *A. aegypti* to reduce mortality due to DHF through the utilization bioinsecticide MORIZENA herbal mosquito coils is a mixture of permot leaf extract, *Chrysanthemum* flower seed extract, essential oils lemongrass leaf-stem with chemical ingredients that are toxic to *A. aegypti*. *Chrysanthemum* flower seed extract (*Chrysanthemum cinerariaefolium*) and essential oil lemongrass leaf-stem (*Cymbopogon nardus*) has been widely studied for use as an insect repellent and its products have been commercialized, whereas permot leaf extract (*Passiflora foetida*) have not been studied and used as an insect repellent active ingredients, especially the *A. aegypti*. MORIZENA composition in this study is permot leaf extract 40%, chrysanthemum seed extract 40% and essential oil leaf-stem lemongrass 20%.

This study is an experimental research study design with posttest only control group. *A. aegypti* adult females and non-target animal is an adult male mice aged ± 2 months with initial weight 18-23 g, which is divided into 7 treatment groups were 0% (negative control group), synthetic mosquito coils transfluthrin 2500 ppm (positive control group), herbal mosquito coils MORIZENA graded dose 500 ppm, 1000 ppm, 2000 ppm, 3000 ppm and 4000 ppm. Each group in the contents of 25 *A. aegypti* with 4 times the replication. The data were obtained by analyzing the knockdown 50 (KdT_{50}) and probit analysis to obtain the LC_{50} and LC_{90} values and acetylcholinesterase activity. Data for mice that were analyzed were weight and lung, trachea histopathologic changes that include changes in the epithelium and cilia, the number of goblet cells, the epithelial layer height and diameter of the trachea, whereas the histopathologic changes of lung alveolar membrane covering the damage that cause dilation diameter and thickening of interalveolaris septum.

The results showed that the concentration of carbon monoxide (CO) emitted by the smoke of MORIZENA dose of 500 ppm is 140 ppm, dose of 1000 ppm is 165 ppm, dose of 2000 is 212 ppm, dose of 3000 ppm is 228 ppm, dose of 4000 ppm is 320 ppm, whereas dose of tranfluthrin 2500 ppm is 545 ppm. Beside that, there were differences between the MORIZENA group with graded dose and Transfluthrin 2500 ppm group causing death by mosquitoes KdT_{50} more than > 90% and the LC_{50} values at doses of 999 ppm and LC_{90} values at a dose of 2977 ppm, it can be said to be the effective dose of MORIZENA is 2977 ppm. The activity of the enzyme acethylcholinesterase *A. aegypti* increase in exposure to MORIZENA grup dose of 3000 ppm is 0.275 µmol/min/mg protein, dose of 4000 ppm is 0.278 µmol/min/mg protein and Transfluthrin 2500 ppm group is 0.279 µmol/min/mg protein. Exposure of MORIZENA with graded doses of up to 4000 ppm did not cause changes in body weight and lung weight of male. Mice of MORIZENA group do not cause damage to the trachea up to a dose of 3000 ppm, compared with a group of MORIZENA dose of 4000 ppm and Transfluthrin 2500 ppm group. Exposure of MORIZENA up to 3000 ppm dose does not cause depletion of the tracheal diameter, compared with a dose of 4000 ppm and Transfluthrin 2500 ppm group. Exposure of MORIZENA up to 3000 ppm do not cause structural changes in organs tracheal epithelial compared with a dose of 4000 ppm and Transfluthrin 2500 ppm group. Exposure of MORIZENA do not cause damage to the lung alveoli until a dose of 3000 ppm compared with a group of MORIZENA dose of 4000 ppm and Transfluthrin 2500 ppm group. Exposure of MORIZENA do not cause the widening of the lung alveoli diameter of up to 3000 ppm dose compared with a group of MORIZENA dose of 4000 ppm and Transfluthrin 2500 ppm group. Exposure of MORIZENA do not cause thickening of the interalveolaris septum up to a dose of 3000 ppm compared with a group of MORIZENA dose of 4000 ppm and Transflutrin 2500 ppm group.

The conclusion that can be drawn is MORIZENA up to a dose of 3000 ppm had higher levels of CO safe for use, the effective dose of MORIZENA (*A. aegypti* can kill more than 90%) is 2977 ppm, and does not cause weight loss, severe damage to the lungs and airways are the trachea and lungs of mice.