

Research Title: The Application of Star Anise, Dill and Lemon Grass
Essential oil Formulas Incorporated with Petroleum Oil to
Control Brown Planthopper in Field Condition

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ABSTRACT

The examination of 10 plant essential oil (EO) formulas, the mixtures between *Illicium verum* (I) and *Anethum graveolens* (A) EOs at different ratios (4:0, 3:1, 2:2, 1:3 and 0:4 referred as I4A0, I3A1, I2A2, I1A3 and I0A4, respectively) and mixtures between *Illicium verum* (I) and *Cymbopogon citratus* (C) EOs at different ratios (4:0, 3:1, 2:2, 1:3 and 0:4 referred as I4C0, I3C1, I2C2, I1C3 and I0C4, respectively) at 1.0% incorporated with petroleum oil to control brown planthopper (*Nilaparvata lugens*: BP) was performed in laboratory condition by contact and direct spray methods. The result found that the mixtures between I and C EO formulas were highly toxic against BP (>80% at 12 hrs) better than that of the mixtures between I and A EO formulas

The direct spray method of using I4C0, I3C1, I2C2, I1C3 and I0C4 EO formulas at 1% against BP were conducted. The results showed that the I2C2 and I1C3 EO formulas killed more than 75% BP when compared to the initial experiment. In addition, the control (water) group resulted with no significant difference when compared to the petroleum oil treated alone. In the repellent test, the results showed that the I1C3 EO formula gave high repellence more than that of I2C2 EO formula and insecticide groups, respectively.

The I2C2 and I1C3 EO formulas at 1.0% were tested to control BP in field experiments. The counts of BP, other rice insect pests and natural enemies were observed before and after treatments in the field of Suwanvajokkasikit Animal R&D Institute, Kasetsart University, Kamphaeng Saen Campus, Nakhon Pathom province. In general, I2C2 and I1C3 EO formulas and insecticide showed the highest effectiveness against BP with no significant difference. The BP greatly reduced lower 5% in 2 days after treated with EO formulas, whereas, the BP populations still remained more than 30 after treated with water (control group).

The study of other rice insect pests and natural enemies in field experiments based on simple random sampling method using sweeping net at 20 times/sampling

spot. All insect pests and natural enemies were identified. The insect pests were *Micraspis discolor*, *Nephotettix virescens* and *Recilia dorsalis*. Those insect pests greatly reduced after treated with I2C2 EO formula and insecticides. The natural enemies found that *Argyrophylox nigrotibialis*, *Tytthus chinensis*, *Cyrtorhinus lividipennis*, *Paederus fuscipes*, *Ophionea ishii* and spiders (*Lycosa pseudoannulata*, *Oxyopes lineipes* and *Argiope* sp.) were found. The *P. fuscipes*, *O. ishii* and spiders tended to increase after treatment in all experiments with no significant difference when compared to the control. Besides, *A. nigrotibialis*, *T. chinensis* and *C. lividipennis* tended to reduce after treatment in all experiments with no significant difference when compared to the control.

KEY WORDS: *Nilaparvata lugens* (Stål), essential oil, rice, insecticide, petroleum oil