

## RESEACRH PLAN

### **Effectivity Combination of *Tagetes erecta* L Powder and Waste Goat Urine with Various Concentrations as Larvacide Against of *Plutella Xylostella* on Cabbage ( *Brassica oleracea* L)**

#### **Introduction :**

Cabbage ( *Brassica oleracea* L.) one of the important horticulture commodities in the world. Cabbage production continues to be improved in meeting community needs, but efforts to increase cabbage production still face problems, namely *Plutella xylostella*. This pest threatens the stability of agricultural production due to the yield loss and the decreasing crop productivity. The loss could reach 20-95% or even total loss when it is massively attacked. The existence of pests and diseases in plant cultivation has to be addressed wisely. The use of chemical pesticides is the last option with consideration of the economic threshold condition in the field. Now, the control of pests in agriculture fields by using natural ingredients is being developed intensively.

Plants contain many chemicals which are secondary metabolites and are used by plants as a means of defense from invading organisms. The content of secondary metabolites produced by plants is known to be able to kill disturbing organisms such as insects. To control pests that are environmentally friendly and accessible to all people, it is hoped that the plants around the settlement can be utilized, namely by utilizing secondary metabolite content produced by these plants.

*Tagetes erecta* is often found in yards and around the house as an ornamental plant because it has attractive and long-lasting flowers, has a distinctively pungent smell so it is widely used as an insect repellent plant, *Tagetes erecta* also contains alkaloid compounds, flavonoids, tannins, and saponins. These phytochemical compounds have an effect as a botanical insecticide. My previous research using *Tagetes erecta* as refugia shows that *Tagetes erecta* has repellent activity against several insects and is a microhabitat for predators and parasitoids and can suppress stem borer attacks on rice.

Goat urine is liquid manure that contains nutrients N, P, K and organic matter (Sutanto, 2002). Goat urine also contains the hormone auxin Indole Butyric Acid (IBA) which can stimulate plant roots affect the process of cell addition, cell wall plasticity, and cell division (Suparman et al, 1990). Goat urine has a distinctive odor to repel pests or diseases in plants (Raharja, 2005).

Based on these results, I plan to see another potential of *Tagetes erecta* which combination with waste goat urine in the laboratory.

## Method Plan :

The materials used in this Research is *Tagetes erecta*, waste goat urine, *Plutella xylostella* instar 3, cabbage, alcohol 70%, and Aquades. The tools used were Freeze dryer, beaker glass, measuring cylinder, gauze, weighing paper, Stirring rod, Magnetic stirrer, blender, funnel, Analytical Balance, hand sprayer, tweezers, paper labels, container box, and others that support research.

The research was conducted using methods experiments designed in Completely Randomized Design (CRD) of single factors using Larvacide *Tagetes erecta* combination with waste goat urine, consisting of various concentrations (100 ml / L, 200 ml / L, and 300 ml / l), plus two treatments, sprayed with water and a synthetic pesticide solution as a control. Each treatment was repeated 3 times. Observations are made to find out the effect of *Tagetes erecta* extract with goat urine on toxicity pests of cabbage, especially *Plutella xylostella*.

## Object Research :

### 1. Mortality

The calculation of the percentage of mortality uses the following formula :

$$M = \frac{b}{a + b} \times 100 \%$$

(Fagoone dan Lauge, 1981 dalam Sinaga, 2009)

Exp : M = Percentage of pest mortality ; a = total of dead *Plutella xylostella* ; b = Total of living *Plutella xylostella*

### 2. Speed of death

$$V = \frac{T_1 N_1 + T_2 N_2 + T_3 N_3 + \dots + T_n N_n}{n}$$

Exp : V = Speed of death ; T = Observation time ; N = Total of Insects death ; n = Total of Insect tested

### 3. Decreased eating activity

Observation begins with weighing the consumed weight of feed (cabbage leaves) the test insects at a period of 1-7 days after application larvacide. This variable was used to see the level of palatability of *Plutella xylostella* observed based on levels of the decreased proportion of eating activity. The percentage decrease in eating activity is calculated with the following formula :

$$P = 1 - \left( \frac{T}{C} \right) \times 100 \%$$

(Pujiono, 1988 dalam Tohir 2010)

Exp : P = percentage decrease in activity eat ; T = weight of feed eaten treatment ; C = weight of feed eaten control

## Analysis Data :

The data from the observations were then analyzed using analysis of variance at the 5% level, if there is a real effect, a further test is performed using Duncan's multiple distance test on the 5% level.

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