Bumitama Gunajaya Agro

Development of Aromatic Plant Extract Selasih "*Ocimum basilicum*" and Kemangi "*Ocimum americanum*" as an Enhancer of *Elaeidobius kamerunicus* Pollination Effectiveness and Oil Palm Fruit Set

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TUJUAN RISET

1. To identify aromatic plants *“Ocimum basilicum”* with high volatile compound content (such as eugenol and anethole) that have the potential to attract *Elaeidobius kamerunicus*.
2. To measure the effectiveness of the developed attractant by evaluating the increased visitation of *Elaeidobius kamerunicus* to oil palm flowers.
3. To evaluate the impact of volatile compound application on fruit set and oil palm productivity compared to a control (without attractant treatment).
4. To analyze the economic and environmental benefits of using natural attractants in sustainably improving oil palm productivity.

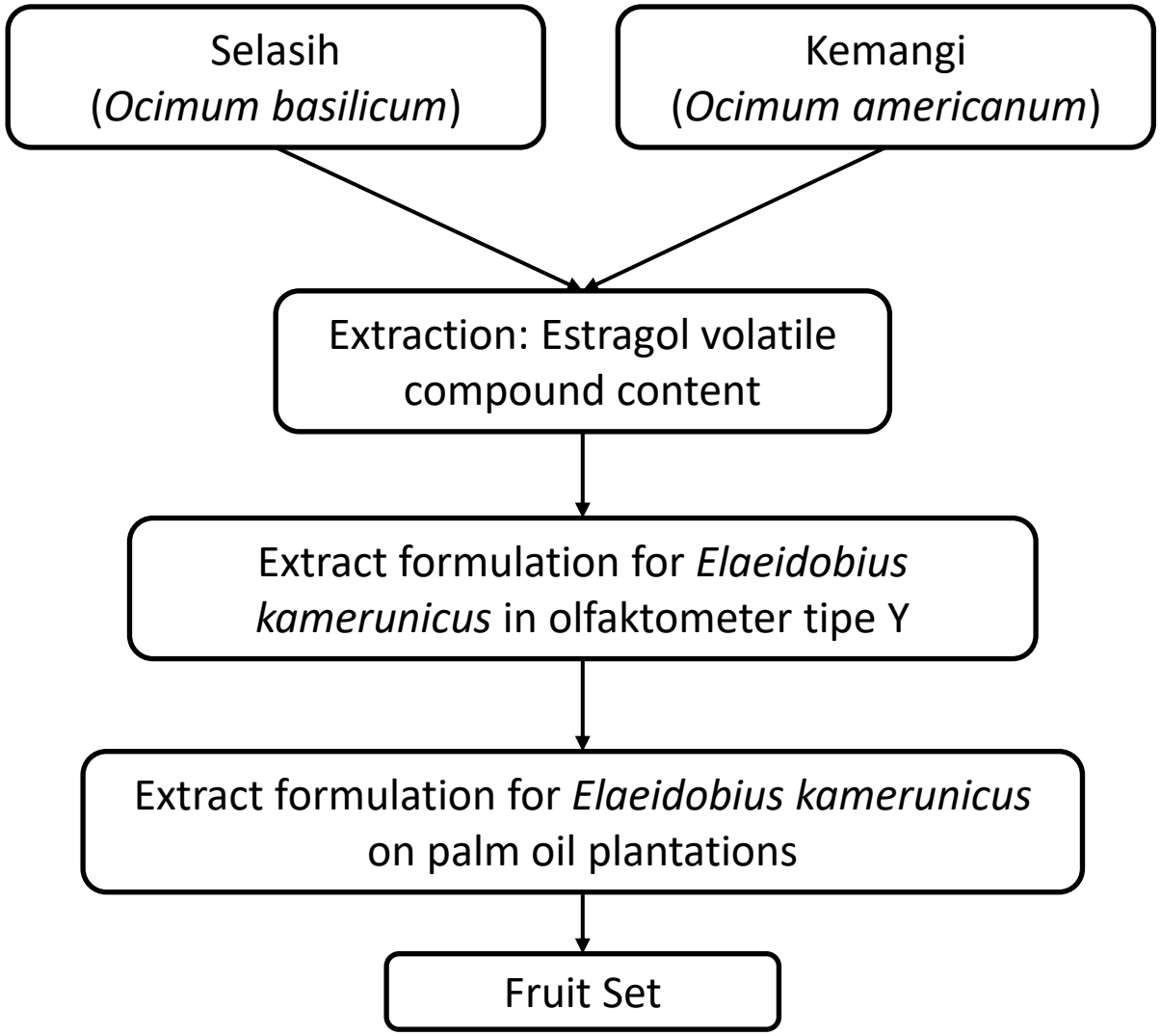
JUSTIFIKASI RISET

Oil palm pollination heavily relies on the weevil *Elaeidobius kamerunicus*. However, the population and activity of these pollinators can fluctuate due to environmental factors, pesticide use, or the absence of natural attractants. Suboptimal pollination results in low fruit set, ultimately reducing yield and productivity.

A low fruit set decreases the number of fruit bunches formed, leading to lower productivity per hectare. Enhancing pollination through natural means can maximize yield without requiring land expansion. Volatile compounds from aromatic plants are known to act as natural attractants for insects, including pollinators.

The use of aromatic plant extracts can improve natural pollination efficiency, reducing dependence on costly artificial pollination techniques. This approach is more environmentally friendly than synthetic chemicals and aligns with sustainability principles in the palm oil industry. It also lowers production costs by optimizing natural pollination, making it more efficient than manual methods or chemical applications. Furthermore, this research contributes to understanding volatile compounds' role in plant-insect interactions and fosters agronomic innovations with potential applications in sustainable palm oil cultivation.

BIG PICTURE RISET



METODOLOGI RISET

1. Preparation Stage and Identification of Volatile Compounds

a. Collection and preparation of basil plant samples

b. Extraction of essential oils and volatile compounds

c. Characterization of volatile compounds

2. **Formulation of Attractants and Laboratory Testing on *Elaeidobius kamerunicus***

a. Development of attractant formulations

b. Laboratory testing of insect response

3. **Field Trials in Oil Palm Plantations**

a. Experimental setup in the field

b. Observation and data collection

4. **Data Analysis and Evaluation of Effectiveness**

5. **Conclusion and Recommendations**

GANTT CHART RISET

No.	Activity	Month							
		1	2	3	4	5	6	7	8
1.	Research Preparation								
	Collection of plant material								
2.	Extraction & Identification of Volatile Compounds								
	GC-MS analysis								
3.	Attractant Formulation & Laboratory Tests								
	Y-tube olfactometer test (E. kamerunicus)								
4.	Field Tests in Palm Oil Plantations								
	Observation of E. kamerunicus activity								
	Observation of fruit set								
5.	Data Analysis & Evaluation								
	Statistical analysis (ANOVA, Tukey HSD)								
	Evaluation of research results								
6.	Preparation of Reports & Publications								

LUARAN RISET

Scientific Publication
•Article in an accredited journal (SINTA 2 or higher)

Economic & Industrial Impact
•Increased palm oil productivity
•Improved natural pollination efficiency, reducing reliance on artificial pollination

Sustainability in Plantations
•Reduced use of chemicals in palm oil production
•Supporting biodiversity by enhancing the role of natural pollinators

Benefits for Farmers & Companies
•Higher yields without expanding land area
•Easy-to-implement technology for farmers and plantation companies]

RENCANA ANGGARAN RISET

Tools and materials

No	Cost components	Amount	Unit price	Total
1.	Kemangi Plant Leaves	10 Kg	Rp 70.000	Rp 700.000
2.	Selasih Plant Leaves	10 Kg	Rp 70.000	Rp 700.000
3.	Mineral water bottle	50 bottle	Rp 1000	Rp 50.000
4.	Cotton	10 pack	Rp 8000	Rp 80.000
5.	Wire	10 meters	Rp 20.000	Rp 200.000
6.	Duct tape	3 pcs	Rp 10.000	Rp 30.000
7.	Kassa	10 pack	Rp 10.000	Rp 100.000
8.	Olfactometer with Y type	10 pcs	Rp 250.000	Rp 2.500.000
	Total			Rp 4.360.000

Uji Sampel

No	Cost components	Amount	Unit price	Total
1	Plant extraction	20 Kg	Rp 120.000	Rp 2.400.000
2	GC-MC test	2	Rp 550.000	Rp 1.100.000
	Total			Rp 3.500.000

Lain-lain

No	Cost components	Amount	Unit price	Total
1	Operational, etc	2	Rp 1.000.000	Rp 2.000.000
	Total			Rp 2.000.000

DAMPAK RISET (FINANCIAL & NON FINANCIAL)

✅ **Enhanced Pollination Efficiency & Palm Oil Productivity**
If the plant extrac attractant proves effective, the population & activity of *Elaeidobius kamerunicus* will increase.
This leads to a higher fruit set rate and optimal palm oil yield.

✅ **Innovation in Natural Volatile Compound Utilization**
This research explores the use of volatile compounds as natural attractants, reducing dependence on artificial pollination. It also opens commercial opportunities for essential oil-based attractants in the plantation industry.

✅ **Reduced Environmental Impact of Palm Plantation Practices**
Natural attractants minimize the use of synthetic chemicals in palm oil production.
This supports sustainable agriculture and enhances insect biodiversity in plantations.

✅ **Opportunities for Publication & Industry Collaboration**
Strong research data can be published in international scientific journals.
Potential partnerships with palm oil companies for large-scale implementation and product commercialization.

DAMPAK RISET (FINANCIAL & NON FINANCIAL)

- **Difficulties in Field Testing**
  Fluctuations in *E. kamerunicus* populations may lead to inconsistent research results. Strict controls are required to ensure valid and representative data.

- **Varying Attractant Effectiveness in the Field**
  Volatile compounds may not always attract *E. kamerunicus* under different environmental conditions. Factors like temperature, humidity, and wind can influence effectiveness.

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Thank you

Open Innovation BGA Tahun 2025