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Empowerment of Oil Palm Plantation Farmer Groups through PENA (Pestisida Nabati) Socialization

Pemberdayaan Kelompok Tani Perkebunan Kelapa Sawit Melalui Sosialisasi PENA (Pestisida Nabati)

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Abstract

To increase crop yields, farmers use various pesticides to prevent pest attacks. Currently, the use of chemical pesticides by farmers in agriculture and horticulture is increasing, and is a concern for environmental sustainability. The purpose of this service activity is to increase farmers' knowledge about the production and use of vegetable pesticides or pesticides made from natural ingredients. This activity was carried out in Riau Province, Buatan Baru Village, Kerinci Kanan District, Siak Regency. The output of this service is the increased understanding and knowledge of the community about the benefits of the production and use of Pestisida Nabati (PENA) and their impact on the environment.

Keywords*: community service, Pestisida Nabati (PENA), agriculture*

Abstract

Untuk meningkatkan hasil panen, petani menggunakan berbagai pestisida untuk mencegah serangan hama. Saat ini penggunaan pestisida kimia oleh petani di bidang pertanian dan hortikultura semakin meningkat, dan menjadi kekhawatiran tersendiri untuk keberlanjutan lingkungan. Tujuan dari kegiatan pengabdian ini adalah untuk meningkatkan pengetahuan petani tentang produksi dan penggunaan pestisida nabati atau pestisida yang berbahan alami. Kegiatan ini dilaksanakan di Provinsi Riau, Kampung Buatan Baru, Kecamatan Kerinci Kanan, Kabupaten Siak. Luaran dari pengabdian ini adalah meningkatnya pemahaman dan pengetahuan masyarakat akan manfaat dari kegiatan produksi dan penggunaan pestisida nabati (PENA) dan dampaknya terhadap lingkungan.

Keywords*: pengabdian, pestisida nabati (PENA), pertanian*

1. INTRODUCTION

The development of agricultural commodities on various available lands continues to grow in line with the development of the population that needs food (Zamaya et al., 2021). In order to increase agricultural yields, farmers use various pesticides to prevent pest attacks. Currently, the use of chemical pesticides by farmers on agricultural land, food crops and horticulture tends to increase. Excessive use of chemical pesticides will leave residues in soil, water, and transported into agricultural products that will endanger the health of humans and other living things (Sutriadi et al., 2020). The government is currently promoting sustainable agriculture that focuses on the development of environmentally friendly agriculture (Rahmawati, 2020).

Siak Regency is reserving the "SIAK HIJAU and RIAU HIJAU" program, where it is necessary to educate and assist farmers so that they can run sustainable oil palm plantations, by reducing the excessive use of chemicals. One example is using palm oil waste to make Pestisida Nabati

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(PENA). Partners in this community service activity are The Business Partner Marketing Cooperative. This cooperative has 600 oil palm farmers, in accordance with Decree 1732/BH/XIII of the Ministry of Cooperatives and MSMEs with a plantation area of about 600 hectares. This cooperative is located in Buatan Baru Village, Kerinci Kanan District, Siak Regency, Riau Province. This oil palm plantation has been managed independently and has not cooperated with the previous company.

In oil palm plantations, it is necessary to control the attack of horn beetle pests (Oryctes rhinoceros L.). Horn beetle pest infestation (Oryctes rhinoceros L.) causes a decrease in the production of Fresh Fruit Bunches (FFB) in the first year up to 69 percent, even causing 25 percent of young plants to die. The control that is usually carried out by farmers still relies on the use of synthetic chemical insecticides. However, the use of chemical insecticides can cause many disadvantages, including health disruption and environmental damage (Hirma Windriyati et al., 2020). In addition, the continuous use of synthetic insecticides can have negative impacts, including causing pest resistance, pest recaution, and secondary pest blasting. For this reason, it is necessary to develop another alternative that can reduce the use of synthetic insecticides, namely the use of PENA (Pestisida Nabati).

The use of PENA is one of the ways to control pests that are environmentally friendly. PENA has several advantages such as being easily decomposed in nature, relatively safe for non-target organisms, extract components can be synergistic, pest resistance does not occur quickly, can be combined with other integrated pest control components. The basic ingredients for making plant-based pesticides that can be prepared at the farmer level include forest betel leaf extract. Forest betel (Piper aduncum L.) contains active ingredients such as piperin, piperisde, pipelongumin and guininsin (Setty Siamtuti et al., 2016). The compound enters the body of the insect as a contact poison and works as a nerve toxin so that it interferes with the flow of nerve impulses in nerve axons like how pyrethroid insecticides work. The use of ethanol chemicals in the manufacture of PENA can make it easier for farmers because PENA can be stored for a long period of time.

This community service activity is to introduce how to produce PENA by utilizing raw materials from palm frond waste produced from groups and communities around farmer groups and the use of forest betel leaves that are easy to get around the location. The current production facility owned by partners is a 4 x 6 meter fertilizer processing site equipped with a fermentation tank, manure crushing unit and evaporator for the PENA extraction process. Technically, production equipment is able to run a continuous production business.

2. METHOD

The method used in this activity is lectures and providing examples of direct practice to the target community. The implementation of this activity is divided into several stages:

1. The preparatory stage, namely the preparation for the implementation of socialization on Pestisida Nabati (PENA)
2. The socialization stage, which is to give lectures on the benefits of Pestisida Nabati (PENA) to the target community
3. Stage of providing samples for making Pestisida Nabati (PENA) to target communities

3. RESULTS AND DISCUSSION

Socialization about the use of plant-based pesticides must be intensively carried out so that the public understands the benefits and advantages obtained (Barokah et al., 2021). This community service is an effort to disseminate knowledge about plant-based pesticides that provide benefits to the community, such as:

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1. Environmentally friendly, because it reduces the impact of soil and water pollution because natural materials are easily decomposed in nature
2. Health factors, which are generally safer for humans and pets than chemical pesticides, reduce the risk of pesticide-related diseases
3. Improve the local economy where it can be produced from local ingredients, reduce costs and increase farmers' economic independence.
4. Sustainable, as it provides a more sustainable alternative to agriculture that reduces reliance on synthetic chemicals.

With these benefits, plant-based pesticides play an important role in supporting healthier and more sustainable agriculture. Plant-based pesticides support plantation sustainability by:

1. The use of natural materials reduces dependence on chemicals, as it reduces the use of synthetic pesticides that can pollute soil and water.
2. Plant materials are generally friendly to soil ecosystems and maintain soil health by supporting microbial balance that is important for soil fertility.
3. Increase biodiversity to reduce negative impacts on non-target organisms and support a more diverse ecosystem. Surrounding areas will become farms.
4. Sustainable pest control, as plant materials often have targeted effects on specific pests. This minimizes pest resistance to pesticides.

With these economic benefits, the use of plant-based pesticides not only supports agricultural sustainability but also provides significant economic benefits to farmers and society as a whole.

Table 1. The Difference between Plant-Based Pesticides and Chemical Pesticides

Description	Plant-Based Pesticides / Pestisida Nabati	Chemical Pesticides
Base Ingredients	Made from natural ingredients derived from plants, such as leaf extracts, flowers, or seeds	Made of synthetic chemicals specifically designed to kill or control pests. Examples include organophosphates, pyrethroids, and glyphosate based herbicides
How it works	It generally works in a more specific way on a particular pest or by interfering with the biological processes of the pest, such as the digestive system or nervous system.	They are usually designed to interfere with specific biological processes in pests, such as the nervous system or metabolism. Have a wider range of targets and in some cases may affect organisms other than the target.
Environmental Impact	They tend to be more environmentally friendly because the ingredients come from natural sources and usually leave no harmful residues. Usually more easily decomposable in the environment	Can be a source of hazardous residues that are a source of contamination to soil and water. Some chemical pesticides have a long-term impact on ecosystems and biodiversity
Security	It is relatively safer for humans and pets if used as directed. However, their effectiveness can vary and some extracts may still cause	Use should be done with caution as it may pose a risk to the health of humans, pets, and non-target organisms if

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Description	Plant-Based Pesticides / Pestisida Nabati	Chemical Pesticides
	irritation or allergic reactions	not used correctly. Excessive or improper exposure can lead to serious health problems
Use	It can be produced locally and is often cheaper if the raw materials are available in the surrounding environment	It is usually more effective in controlling different types of pests and diseases in a shorter period of time, but it often requires special protection and handling when applied

Plant-based pesticides are often considered more environmentally friendly and safer for human health, but they may require more frequent application and can be less effective than chemical pesticides in some cases. Chemical pesticides, on the other hand, offer stronger and more consistent control over pests, but with greater potential risks to human health and the environment (Irawan, 2018).

Figure 1. Socialization on the Making of Plant-Based Pesticides

Figure 2. The Service Team with the Head of the Village (Village Head) of New Invention and Chairman of KUD Mitra Usaha

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4. CONCLUSION

The conclusions in the implementation of this service are:

1. People who are members of farmer groups understand more about the benefits of Pestisida Nabati (PENA)
2. The public understands how to make Pestisida Nabati (PENA)
3. The community is enthusiastic about developing and making Pestisida Nabati (PENA)

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