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## Socialization of the Use of Botanical Pesticides Based on Noni and Garlic in the Braja Asri Village Area, Way Jepara District, East Lampung Regency

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### ABSTRACT

Socialization is a process of interaction and learning carried out by the community with the aim of providing education related to matters that are not directly correlated with the learning process in schools. Many farmers in Braja Asri village use chemical pesticides to kill plant pests (OPT) which is the background for the socialization regarding the use of this botanical pesticide. The choice of noni as the basic ingredient for making pesticides is because many residents have noni fruit plants that are not used in their yards. In addition, additional ingredients in the form of garlic are also used in the process of making this botanical pesticide because it is easy to find. The implementation method for the KKN work program period II in 2024 at the University of Lampung is Participatory Rural Appraisal (PRA) in the form of an approach in the process of empowerment and increasing community participation that emphasizes community involvement in all activities carried out. The result is, as many as 30 people participated in this socialization activity until its completion.

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## 1. Introduction

Braja Asri Village is located in Way Jepara District, East Lampung Regency. The majority of Braja Asri residents are farmers. The village's extensive agricultural land is used by the community to grow food crops, including staple foods, vegetables, fruits, and plantation crops such as rubber. Most farmers experience various obstacles and disruptions, including the presence of plant pests (OPT), one of which is pests. Pests are a significant concern, particularly those that attack food crops. These pests disrupt the stability of crop yields, particularly food crops. Pest attacks can cause significant losses for farmers, reaching 20-50% of maximum production and even lead to crop failure (Sutriadi *et al.*, 2019, Efriyanti *et al.*, 2022, Elfina *et al.*, 2025).

The use of chemical pesticides to control pests can be replaced by the use of botanical pesticides, which are made from natural ingredients and cause less environmental damage and impact on human health. Botanical pesticides can be made from various plants containing terpenoids, alkaloids, phenolics, and other bioactive compounds, such as spices, papaya leaves, bandotan leaves, tobacco, shallots, garlic, noni, and others. The compounds found in these plants can help inhibit and even kill pests and pathogens in plants. In addition to being environmentally friendly, these pesticides from natural ingredients are also easy to make and the basic ingredients are readily available (Hadiyanti *et al.*, 2021).

Natural plants with potential as botanical pesticides generally have a slightly pungent odor with a slightly spicy and bitter taste. Plants with these characteristics are generally rarely attacked by pests, especially pests that cause plant diseases. Plant parts that can be used in the production of botanical pesticides include roots, stems, leaves, fruits, and seeds. One common method in the process of producing botanical pesticides is to first extract the plant. This plant extract contains secondary metabolites needed in the process of making botanical pesticides (Tando, 2018; Sutiharni, *et al.*, 2022).

One plant that can be used as a botanical pesticide is the noni fruit. Noni fruit is commonly used by the public as an herbal remedy. Noni extract has anti-inflammatory properties that can help reduce inflammation in the body for people with inflammatory diseases such as arthritis and can also help lower high blood pressure (Wahyudi, 2022). Furthermore, noni fruit is also known to be rich in bioactive compounds such as xeronine, scopoletin, and terpenoids, which function as pest control agents. Noni extract can inhibit the growth of several types of pests, so it can be used as an alternative to reduce dependence on chemical pesticides (Suparto *et al.*, 2022). In addition to noni, garlic is also used in the process of making botanical pesticides. Garlic is rich in chemical compounds commonly used to treat various human diseases. Not only for humans, garlic is also rich in antibacterial compounds to inhibit

bacterial growth. Garlic can also be used as a botanical pesticide because it contains allicin, a compound that has insecticidal and antimicrobial properties believed to control pests (Sabaruddin, 2020).

## **2. Methods**

### **2.1 Time and Place**

This community service activity was carried out at the House of the Village Head of Hamlet III, Braja Asri Village, Way Jepara District, East Lampung Regency on July 24, 2024. This activity was carried out by a service team of 7 people. The participants in this activity were the residents of Braja Asri Village, especially farmers.

### **2.2 Tools and Materials**

The tools used to make the botanical pesticide include a bucket, a used 1.5L mineral water bottle, and plastic gloves. Meanwhile, the ingredients used are water, noni, and garlic.

### **2.3 Implementation method**

The method used in implementing the community movement work program within the community service series is participatory community empowerment or Participatory Rural Appraisal (PRA). PRA is an approach to the process of empowerment and increasing community participation that emphasizes community involvement in all activities carried out (Susilawati *et al.*, 2021). The Botanical Pesticide socialization work program uses noni fruit and garlic as raw materials. The data used in this article is primary data sourced from the experiences and direct observations of group members, as well as secondary data obtained through a review of several literature and previous research related to the manufacture of Botanical Pesticides from organic materials. The socialization regarding the use of this pesticide was delivered in a community meeting forum. The matters discussed in this socialization included the required raw materials, the manufacturing method, the benefits of botanical pesticides, and the advantages of botanical pesticides.

## **3. Results and Discussion**

The implementation of outreach and training on the production of botanical pesticides from noni fruit and garlic is part of a community service program conducted by a group of University of Lampung students in Braja Asri Village, East Lampung Regency. The resulting botanical pesticide is characterized by a greenish-brown color (which can vary depending on the concentration of the ingredients) with the

distinctive aromatic odor of noni and garlic. It is a liquid (solution) and has a pH ranging from 5-6 (weak acid).

Based on outreach in Braja Asri Village, most farmers are unaware of the use of noni fruit and garlic as raw materials for botanical pesticides. This was discovered during the outreach process. Furthermore, farmers in Braja Asri Village still use chemical pesticides as an option for pest and disease control. Prepared pesticides from noni fruit and garlic were distributed to farmers to control pests on cultivated crops. Most farmers grow horticultural crops such as kale and chili peppers.

According to [Kiswondo \(2022\)](#), the use of botanical pesticides has advantages because the plants used as botanical pesticides contain compounds toxic to pests, such as secondary metabolites that act as repellents or suppress appetite and inhibit reproduction. Despite their toxic properties, using plant parts as botanical pesticides is safer and more environmentally friendly.

These botanical pesticides have been shown to significantly reduce pest infestations. However, their effectiveness can vary depending on the type of pest, the extent of infestation, and the concentration of the pesticide used. The effectiveness of these botanical pesticides is seen within a few days of application. Optimal control is usually achieved after 2-3 applications at regular intervals.

Noni fruit contains active compounds such as alkaloids, flavonoids, and saponins, which have insecticidal, antifeedant (reducing pest appetite), and insect growth inhibitor properties ([Hasna and Nasril, 2014](#)).



**Figure 1.** Noni fruit

Meanwhile, garlic contains allicin, a compound with insecticidal, antifungal, and antibacterial properties. Allicin works by disrupting the pest's nervous system and inhibiting the growth of pathogenic fungi and bacteria (Rusdy, 2012). Research by Malau, (2018) indicates that the use of garlic as a botanical pesticide has an effect on *Plutella xylostella*, resulting in increased mortality in the larval phase, decreased appetite, and prevented the process of pupae from developing into adults.



**Figure 2.** Garlic

Botanical pesticides have several advantages, including the following:

1. Environmentally Friendly: Easily biodegradable, so they do not pollute the environment and are relatively safe for humans and non-target animals.
2. Easy to Make and Apply: The ingredients are readily available, and the manufacturing process is relatively simple.
3. Low Production Cost: Can be an economical alternative for smallholder farmers.



**Figure 3.** Results of Botanical Pesticides from Noni Fruit and Garlic.

The application of botanical pesticides made from noni fruit and garlic has good potential for controlling various types of pests. The combination of these two natural ingredients is effective in killing various types of pests, such as caterpillars and aphids. These botanical pesticides not only kill but also inhibit the growth and development of pests. However, the use of botanical pesticides also has limitations in their application process, including the following:

1. **Slower Effectiveness:** Compared to synthetic pesticides, the effectiveness of botanical pesticides is relatively slower.
2. **Limited Durability:** Botanical pesticides are easily degraded by sunlight and rainwater, so they require regular application.
3. **Limited Control Spectrum:** Usually effective against only certain types of pests.



**Figure 4.** Making botanical pesticides from noni fruit and garlic



**Figure 5.** Socialization of the Use of Botanical Pesticides by the Community

#### 4. Conclusion

The socialization program on the use of botanical pesticides provided knowledge and information on plant species that can be utilized as raw materials for producing botanical pesticides. In addition, it educated farmers in Braja Asri Village on the proper use of botanical pesticides. As a result, local farmers began to understand the plants that function as basic ingredients for botanical pesticide production.

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#### 6. References

- Efriyanti, L., Arifmiboy, & Khomarudin, A. N. (2022). Pemanfaatan Aplikasi Mobile Expert System Bagi Petani, Kelompok Tani dan Toko Saprotan untuk Meningkatkan Pengendalian Hama dan Penyakit Tanaman Cabe. *Open Community Service Journal*, 1(2), 88–94. <https://doi.org/10.33292/ocsj.v1i2.13>
- Elfina, Y., Idwar, Asiah, N., & Ibrahim, R. (2025). Pendampingan Petani Tanaman Hias de Garden Arifin Ahmad dalam Diagnosa dan Pengendalian Penyakit Tanaman Anggrek. *Open Community*

- Hadiyanti, N., Probojati, R. T., dan Saputra, R. E. 2021. Aplikasi Pestisida Nabati untuk Pengendalian Hama Pada Tanaman Bawang Merah dalam Sistem Pertanian Organik. *Jatimas: Jurnal Pertanian dan Pengabdian Masyarakat*. 1(2): 89-97.
- Hasnah dan Nasril. 2014. Efektivitas Buah Mengkudu (*Morinda citrifolia* L.) Terhadap Mortalitas *Plutella xylostella* L.pada Tanaman Sawi.Fakultas Pertanian Unsyiah. Darussalam Banda Aceh.
- Kiswondo, S., & Hamdani, M. 2022. Upaya Peningkatan Produksi Kacang Hijau (*Phaseolus radiatus* L.) Melalui Pemberian Pupuk Hayati dan NPK. *JURNAL AGROPLANT*. 7(1):55-66.
- Malau, E. M. 2018. Uji Bioaktivitas Ekstrak Bawang Putih (*Allium sativum* L.) Terhadap Hama *Plutella xylostella*. L. (Lepidoptera: *Plutellidae*). Universitas Brawijaya.
- Mubushar, M., Aldosari, F.O., Baig, M. B., Alotaibi, B. M., Khan, A. Q. 2019. Assessment of Farmers on Their Knowledge Regarding Pesticide Usage and Biosafety. *Saudi Journal of Biological Sciences*. 26(7): 1903-1910.
- Rusdy. A. 2012. Pengaruh Pemberian Ekstrak Bawang Putih Terhadap Mortalitas Keong Mas. Fakultas Pertanian Unsyah Banda Aceh.
- Sabaruddin, S. 2020. Aplikasi Pestisida Nabati Bawang Putih (*Allium sativum* L.) Untuk Pengendalian HamaUlat Grayak (*Spodoptera* L.) pada Tanaman Cabai (*Capsicum annum* L). *Jurnal Agroekoteknologi Tropika Lembab*. 3(2): 121-126.
- Suparto, H., Gazali, A., Sofyan, A., Hikmah, R. N., & Kulu, I. P. 2023. Uji Efektivitas Pestisida Nabati Daun Mengkudu Terhadap Pengendalian Penyakit Antraknosa Pada Tanaman Cabai. *Jurnal Penelitian UPR*. 3(1): 24-30.
- Sutiharni, Martanto, E. A., Bodang, Y., & Tanati, A. E. (2022). Environmentally Friendly Technological Innovations in The Form of Botanical Pesticides and Biological Pesticides for Cocoa Plants in Ransiki Tourism Areas. *Indonesian Journal of Community Services Cel*, 1(2), 93–101. <https://doi.org/10.70110/ijcsc.v1i2.13>
- Sutriadi, M. T., Harsanti, E. S., Wahyuni, S., dan Wihardjaka, A. 2019. Pestisida Nabati: Prospek Pengendalian Hama Ramah Lingkungan. *Jurnal Sumberdaya Lahan*. 13 (2): 89-101.
- Tando, E. 2018. Potensi Senyawa Metabolit Sekunder dalam Sirsak (*Annona muricata*) dan Srikaya (*Annona squamosa*) sebagai Pestisida Nabati untuk Penedalihan Hama dan Penyakit pada Tanaman. *Jurnal Biotropika*. 6(1): 21-27.

Wahyudi, W. 2022. Buah Mengkudu (*Morinda citrifolia*), Kandungan dan Efektivitasnya sebagai Antihipertensi: Tinjauan Pustaka. *Jurnal Penelitian Farmasi & Herbal*. 4(2): 102-108.