



Utilization of Tobacco (*Nicotiana tabacum* L.) in Kaliwates District, Jember Regency

Shevilla Desta Aulia Sagita¹

¹ Study Program of Biology, Faculty of Military Mathematics and Natural Sciences, The Republic of Indonesia Defense University. Komplek Indonesia Peace and Security Center (IPSC) Sentul, Bogor 116810, Indonesia.

* Correspondence: shellashevilla12@gmail.com

Abstract

Tobacco is one of the important plantation commodities in Jember Regency that has economic, social, and cultural value for the community. In addition to being used as a raw material for the cigarette industry, tobacco is also utilized in various traditional practices by local people. This study aims to examine the forms of tobacco utilization and its level of importance in the lives of the community in Kaliwates District, Jember Regency. The research used a descriptive ethnobotanical approach with survey methods through semi-structured interviews and field observations. Informants were selected purposively based on their knowledge of tobacco utilization. Data analysis was conducted descriptively and by using the Index of Cultural Significance (ICS) to determine the cultural importance level of the tobacco plant. The results show that tobacco is utilized not only as a raw material for the cigarette industry but also as a natural pesticide, traditional medicine, and as part of the community's economic activities. These findings indicate that tobacco plays an important role in the social and economic system of the Kaliwates community.

Keywords: ethnobotany, ICS, Jember, plant utilization, tobacco.

1. Introduction

Indonesia is known as one of the countries with very high levels of biodiversity, including a wide diversity of plants utilized by communities in various aspects of life. Various plant species are used not only as food sources but also as medicinal ingredients, botanical pesticides, and economic commodities with high trade value. The utilization of plants by local communities is part of traditional knowledge that has developed through long-term interactions between humans and their environment (Iskandar, 2018; Pratami et al., 2023).

One of the plants that plays an important role in community life is tobacco (*Nicotiana tabacum* L.). This plant is a plantation commodity that has long been cultivated in various regions of Indonesia because it has high economic value. Besides being used as the main raw material for the cigarette industry, tobacco also has various other potential uses, such as a botanical pesticide and a traditional medicinal ingredient. The alkaloid compound nicotine found in tobacco is known to have biological activity that can affect the nervous system of insects, making it frequently used as a natural insecticide in pest control (Erian et al., 2023; Yusuf dan Hidayat, 2020).

Several studies have shown that tobacco leaf extract is effective in controlling various types of insects and plant pests. The nicotine compound present in tobacco can act as both a contact poison and a stomach poison for insects, thereby inhibiting feeding activity and pest reproduction (Wiratno et al., 2019; Corte et al., 2023). Therefore, the use of tobacco as a botanical pesticide is considered an environmentally friendly alternative compared to synthetic pesticides, which have the potential to cause negative impacts on the environment and human health (Zuraida dan Handayani, 2021).

In addition to its potential in agriculture, tobacco is also utilized in traditional medicinal practices by some communities. In several local practices, tobacco leaves are used to treat insect bites, repel lice, or serve as a simple antiseptic. The use of plants as traditional medicine is part of ethnobotanical knowledge

that has been passed down from generation to generation through the empirical experiences of communities (Javandira, 2024; Khusna et al., 2023).

Jember Regency is one of the well-known tobacco-producing regions in Indonesia, particularly in East Java. Favorable climate and soil conditions make this region an important center for tobacco production that contributes significantly to the regional economy. Tobacco cultivation activities not only contribute to the agricultural sector but also create business opportunities for communities through tobacco processing and trade activities (Yusuf dan Hidayat, 2020).

Kaliwates District, as one of the areas in Jember Regency, has communities that are still familiar with and utilize tobacco plants in various daily activities. These uses are not only related to economic aspects but also connected to agricultural practices and local knowledge about plants available in their surroundings. However, scientific documentation regarding the forms of tobacco utilization by communities in this area is still relatively limited. Therefore, this study was conducted to identify various forms of tobacco plant utilization by communities in Kaliwates District, Jember Regency. In addition, this research also aims to analyze the cultural importance of tobacco using the Index of Cultural Significance (ICS) approach to determine the extent of the plant's role in the lives of local communities.

2. Materials and Methods

2.1. Research Location

The research was conducted in Kaliwates District, Jember Regency, East Java. This area was selected because it is one of the centers of trade activities and tobacco utilization in the Jember region.

2.2. Research Approach

This study used a descriptive ethnobotanical approach with a combination of qualitative and quantitative methods.

2.3. Data Collection Techniques

Data were collected through several techniques as follows:

a. Semi-structured interviews

Semi-structured interviews were conducted with community members, tobacco traders, and farmers to identify the various forms of tobacco utilization.

b. Field observation

Field observations were carried out to directly observe the processes of tobacco utilization by the community.

2.4. Informant Selection Technique

Informants were selected using purposive sampling, meaning respondents were chosen based on their knowledge or experience regarding the utilization of tobacco.

2.5. Data Analysis

The data were analyzed descriptively to explain the forms of tobacco utilization. In addition, quantitative analysis was conducted using the Index of Cultural Significance (ICS) with the following formula:

$$ICS = \sum (q \times i \times e)$$

Description:

- q = quality of utilization
- i = intensity of use
- e = exclusivity of use

3. Results and Discussion

Tobacco is a plant that has various forms of utilization in the lives of people in Kaliwates District. Besides serving as a major economic commodity, this plant is also used in agricultural activities and traditional medicine. The most commonly utilized part of the plant is the tobacco leaf. These leaves are usually harvested and then dried to produce shredded tobacco, which is used as a raw material for cigarettes or sold as a trade commodity. In addition, tobacco leaves can also be processed into a natural pesticide solution through a soaking process (Table 1).

The nicotine content in tobacco leaves is known to have insecticidal properties that can kill or inhibit the development of various types of insects. Therefore, some farmers use tobacco leaf extract as a botanical pesticide to control plant pests. Besides functioning as an insecticide, tobacco extract also has the potential to act as a botanical nematicide because its secondary metabolites can inhibit the development of nematodes that cause plant diseases. This utilization is considered more environmentally friendly compared to the use of synthetic pesticides.

In community life, tobacco also has considerable economic value. Tobacco harvests are usually sold to traders or processing industries, thereby providing an additional source of income for farmers and local communities. The results of this study show that tobacco has several forms of utilization by the community in Kaliwates District.

Table 1. Forms of Tobacco Utilization

Form of Utilization	Plant Part Used	Processing Method	Purpose
Raw material for cigarettes	Leaves	Dried and fermented	Cigarette industry
Natural pesticide	Leaves	Soaked in water to produce extract	Pest control in agriculture
Traditional medicine	Leaves	Crushed and applied to the skin	Treating minor wounds or insect bites
Insect repellent	Dried leaves	Burned to produce smoke	Repelling mosquitoes and insects
Trade commodity	Dried leaves	Sold in traditional markets	Source of income for farmers and traders

The most dominant use of tobacco is as a raw material for the cigarette industry. However, some community members also use tobacco as a natural pesticide because its nicotine content is toxic to insects. In addition, tobacco is also utilized as a traditional medicine in the form of topical application on the skin to treat minor wounds or insect bites (Table 2).

Table 2. ICS Value of Tobacco Utilization

Form of Utilization	ICS Value
Raw material for cigarettes	48
Natural pesticide	30
Traditional medicine	24
Insect repellent	20
Trade commodity	40

The results of the analysis show that the utilization of tobacco as a raw material for cigarettes has the highest ICS value. This indicates that this function is the primary and most important use for the community. The use of tobacco as a trade commodity also has a high value because it serves as a source of income for traders and farmers. Meanwhile, its use as traditional medicine and as a natural pesticide has lower values because these uses are not practiced by all members of the community.

4. Conclusions

Tobacco (*Nicotiana tabacum* L.) has various uses among the local community of Kaliwates District, Jember Regency, including as a raw material for the cigarette industry, a natural pesticide, traditional medicine, an insect repellent, and a trade commodity. The Index of Cultural Significance (ICS) analysis indicates that tobacco has the highest cultural importance as a raw material for cigarette production, followed by its role as a trade commodity. These findings demonstrate that tobacco plays a significant role in supporting the economic, social, and cultural aspects of the local community.

Supplementary Materials: The supplementary materials, including the interview questionnaire, raw data, and ICS calculation sheet, are available from the corresponding author upon reasonable request.

Acknowledgments: The authors would like to express their sincere gratitude to the Study Program of Biology, Faculty of Military Mathematics and Natural Sciences, Universitas Pertahanan Republik Indonesia, for providing academic support and facilities during the preparation of this manuscript. The authors also thank all individuals who provided technical assistance and valuable suggestions throughout the completion of this study. During the preparation of this manuscript, the authors used ChatGPT (GPT-5.5, OpenAI) to assist with language editing and improving academic writing. The authors reviewed and edited all AI-generated content and accept full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest. The authors received no specific funding for this study. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

- Corte, R. S. P., Atini, B., & Ludgardis, L. (2023). Efektivitas ekstrak daun tembakau (*Nicotiana tabacum* L.) terhadap mortalitas lalat rumah. *BiosciED Journal of Biological Science and Education*, 4(2), 145–152.
- Erian, F. O., Muarif, A., ZA, N., Ginting, Z., & Zulfazri. (2023). Pemanfaatan ekstrak nikotin dari limbah puntung rokok menjadi insektisida. *Jurnal Teknologi Kimia*, 12(1), 33–40.
- Iskandar, J. (2018). *Etnobiologi dan Keanekaragaman Hayati Indonesia*. Bandung: ITB Press.
- Javandira, C. (2024). Ethnobotanical insights and quantitative evaluation of medicinal plant utilization in traditional practices. *Bali Medical and Wellness Journal*, 2(1).
- Khusna, U. N., Jumari, & Prihastanti, E. (2023). Ethnobotany of medicinal plants in the Jalawastu cultural village community, Brebes, Central Java, Indonesia. *Egyptian Journal of Botany*, 63(2), 457–474.
- Pratami, M. P., Anggraeni, A., & Sujarwo, W. (2023). Ethnobotany of medicinal plants in Leuwiliang (Bogor), Indonesia. *Ethnobotany Research and Applications*, 25, 1–15.
- Turner, N. J. (1988). The importance of ethnobotany in understanding traditional plant use. *Journal of Ethnobiology*, 8(2), 145–158.
- Wiratno, W., Siswanto, S., & Trisawa, I. M. (2019). Prospek ekstrak daun tembakau sebagai nematisida nabati untuk pengendalian nematoda parasit tanaman. *Buletin Tanaman Pemanis dan Serat*, 21(1), 1–8.
- Yusuf, R., & Hidayat, S. (2020). Potensi pestisida nabati dari tanaman tembakau untuk pengendalian hama pertanian. *Jurnal Perlindungan Tanaman Indonesia*, 24(2), 87–95.
- Zuraida, N., & Handayani, T. (2021). Pemanfaatan tanaman lokal sebagai pestisida nabati pada sistem pertanian berkelanjutan. *Jurnal Agroekoteknologi*, 13(3), 215–222.