



Biodiversity and Medicinal Potential of Local Fruit Plants in Duwet Hamlet, East Java, Indonesia

Siti Azizah Ardiningtyas^{1*}, Nabilla Dwi Angkita², Dhiya Dhafa Apedina², Aalima Syahida², Azwina Fawziah¹

¹Agrotechnology Study Program,
Faculty of Science and Technology,
University Darussalam Gontor,
Ngawi 63261, Indonesia

²Department of Pharmacy,
Faculty of Health Science,
University Darussalam Gontor,
Ngawi 63261, Indonesia

***Corresponding author:**
sitiiazahardiningtyas@gontor.ac.id

SYNOPSIS

Plant inventory is a form of basic research that supports environmental conservation and the use of biological resources. Indonesian local fruit plants are high diversity, but their use as medicinal plants is still relatively limited. In Karanggupito Village, specifically in Duwet Hamlet, Ngawi, the community uses their yards to cultivate various plants. The purpose of this study was to identify local fruit plants with potential as medicinal plants and to analyze their potential that has not been optimally utilized. This study used a qualitative descriptive method consisting of three stages, namely identification, interviews, and literature review. Based on observations, 15 plant species were found growing in yards, including 12 fruit plants. The most commonly cultivated fruit plant was durian. The interviews revealed that only five species were regularly used as medicine. Among the local fruit plants, many had pharmacological potential, such as antioxidant, antibacterial, and anticancer activities. However, their use by the community was still limited, both in fresh and processed forms.

Keyword: ethnobotany; local fruits; medicinal plants; biodiversity; home gardens

INTRODUCTION

Karanggupito Village is located at the foot of Mount Lawu, Ngawi Regency, East Java, and is well known as one of the centers of durian fruit production. According to the Central Statistics Agency (BPS) in 2023, durian production in Ngawi Regency reached approximately 66,743.14 quintals, with 90% of village residents cultivating fruit plants in home gardens and yards (Harmowo, 2023). Beyond durian, BPS data also records a variety of fruit crops grown in the area, including bananas, mangoes, rambutans, guavas, and citrus (BPS, 2024). Four genera from indigenous Indonesian fruit plant families hold particularly high economic value: Anacardiaceae (genus *Mangifera*), Clusiaceae (genus *Garcinia*), Sapindaceae (genus *Nephelium*), and Bombacaceae (genus *Durio*), all of which have been designated as “national priority fruits” (Febrialdi, 2020).

Indonesia is recognized as one of the world’s mega biodiversity countries with rich fruit plant diversity. Plant inventory is defined as the process of identifying, recording, and mapping plant species utilized by local communities (Heke *et al.*, 2025). In recent years, inventory studies have been conducted across urban, border, and rural areas for conservation and sustainable utilization (Al Akromi *et al.*, 2024), including home garden food plant inventories in West Lombok Regency (Meidatuzzahra & Swandayani, 2020). Such inventories aim to conserve and uncover the potential of local fruits that remain largely unknown to the public, both in terms of cultivation and medicinal properties. Several fruit plant species are known to possess antioxidant and anti-inflammatory properties, and some demonstrate potential as remedies for various diseases (Melisnawati, 2019).

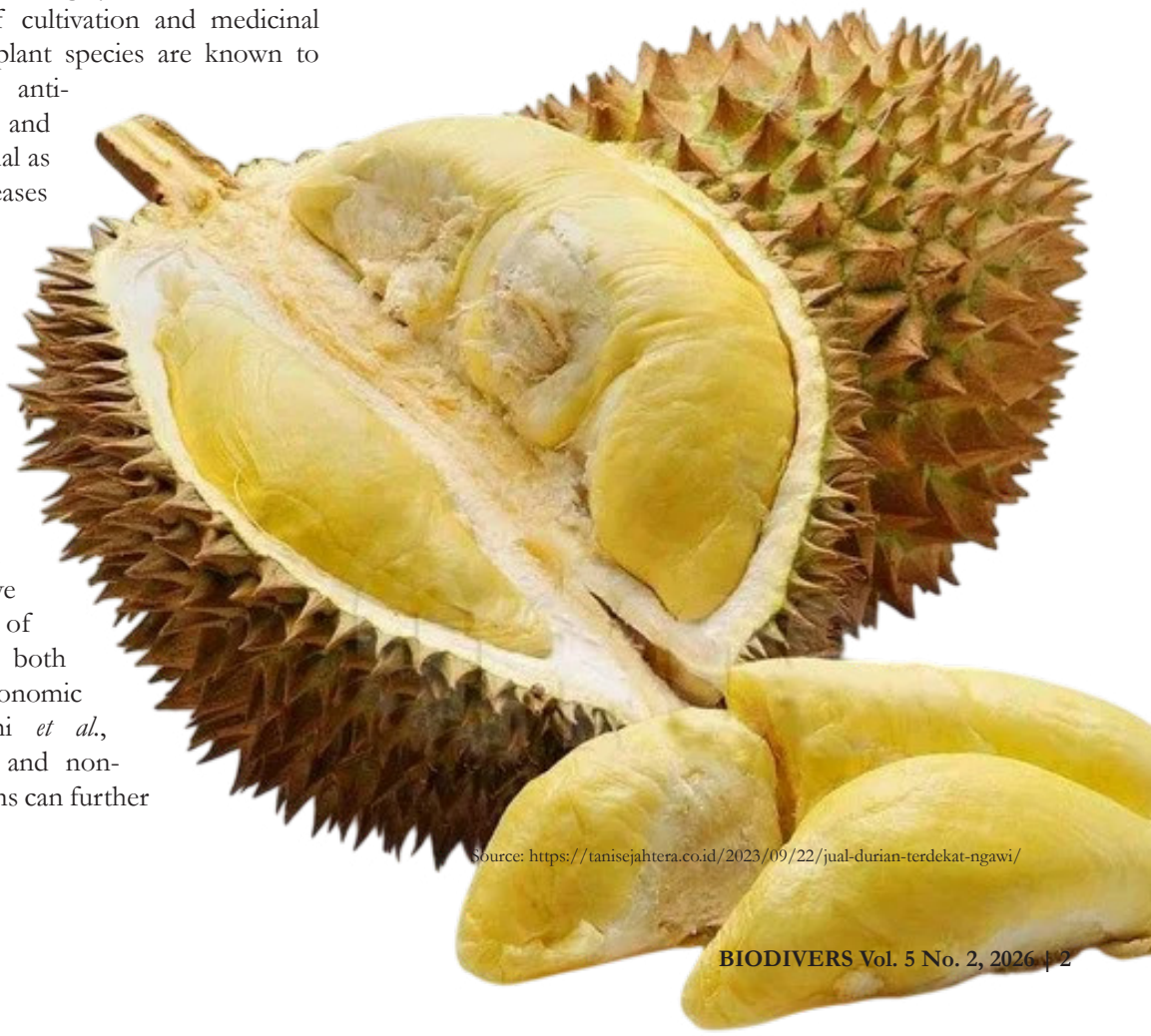
However, many communities still lack awareness of the medicinal and economic potential of fruit plants growing in their own home gardens. It is therefore important for rural communities to improve their understanding of local fruit plants from both nutritional and economic perspectives (Al Akromi *et al.*, 2024). The government and non-governmental organizations can further

support market development for local fruit products while increasing farmers’ income in Karanggupito Village.

This study aims to inventory and identify local fruit plants in Duwet Hamlet that can be utilized as medicinal plants, to analyze potentials not yet maximize. Through a comprehensive inventory, it is hoped that the agricultural potential of Duwet Hamlet can be optimized, contributing to farmers’ welfare while preserving the local environment.

Methods

This study was conducted in Duwet Hamlet, Karanggupito Village, Kendal District, Ngawi Regency, East Java, from 20 February to 18 March 2025. A qualitative descriptive method was employed, consisting of three stages of activities: 1) Inventory, carried out through field observation to identify local fruit plant species present in Duwet Hamlet. 2) In-depth interviews conducted with 10 local community members who voluntarily participated, along with 2 informants who serve as medical personnel at the community health center (puskesmas) in Duwet Hamlet. 3) Literature study, involving the collection and analysis of information from written sources to understand the bioactive compounds and medicinal properties of the identified local fruit plants.



Source: <https://tanisejahtera.co.id/2023/09/22/jual-durian-terdekat-ngawi/>

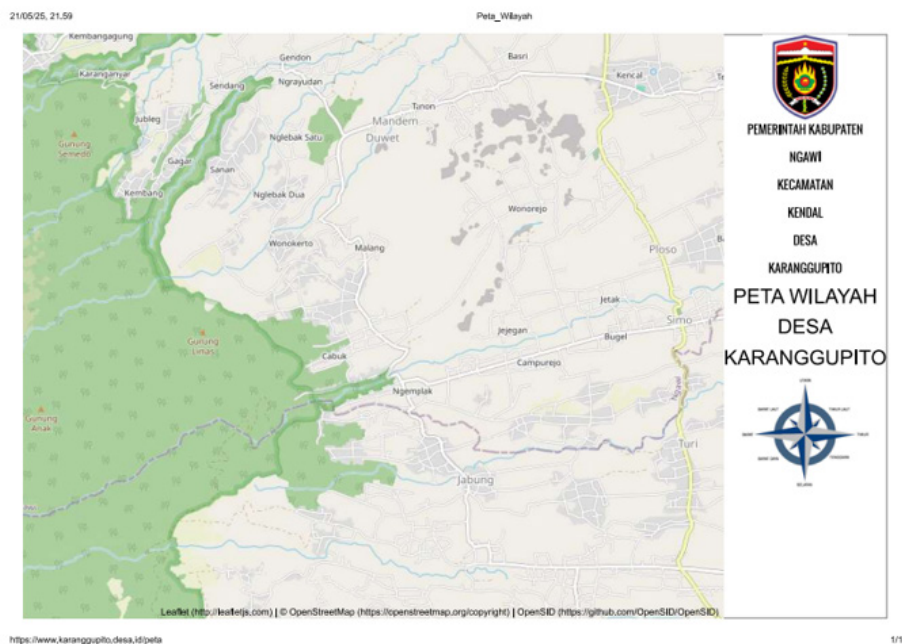


Figure 1 Fruit Plant Data Collection Location

Results and Discussion

This study was conducted in Karanggupito Village, which is geographically situated at coordinates 07°35'–7°46' South Latitude and 07°35'–7°46' S and 111°15'–111°88' E. East Longitude. The village has a highland topography with an elevation of 655 m above sea level. According to data from the Central Statistics Agency (BPS) of Ngawi Regency, the average annual rainfall was 2,740 mm in 2011. In terms of administrative boundaries, Karanggupito Village is located within Kendal District, Ngawi Regency, and is bordered by several surrounding villages: to the north by Ngrayudan Village, Jogorogo District; to the west by the Mount Lawu Natural Forest Area; to the south by Karangrejo Village, Kendal District; and to the east by Sidorejo Village, Kendal District. The distance from Karanggupito Village to the district administrative center is approximately 6 km, which can be reached in about 15 minutes, while the distance to the regency

government center is 46 km, with a travel time of approximately 1.5 hours (Harmowo, 2023).

In this study, plant inventory was categorized according to the utilization of plant parts used as traditional medicine. The results showed that plants utilized for their fruit include rambutan, durian, banana, papaya, dragon fruit, citrus, avocado, soursop, strawberry, pomelo, and water guava. Plants utilized for their leaves include banana, cassava, and jimsonweed (*Datura metel*). The seed part utilized was found in coffee plants, while the flower part utilized was found in jimsonweed (*Datura metel*). A total of 15 plant species were identified, consisting of 12 local fruit plants, 1 wild plant, 1 plantation crop, and 1 tuber food plant. Durian was the most abundantly cultivated plant in the home gardens of Duwet Hamlet residents, followed by banana and avocado. Meanwhile, the least cultivated fruit plants were pomelo, water guava, and jimsonweed (Fig 2).

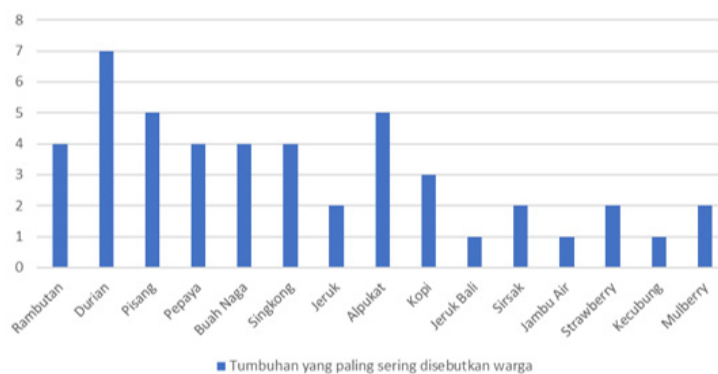


Figure 2 Diversity and abundance of local fruit plants cultivated in home gardens

Table 1 Local Fruit Plants Identified in Duwet Hamlet and Their Utilization as Traditional Medicine

No	Local Name	Latin Name	Uses	Method of Use	Respondents
1	Durian	<i>Durio zibethinus L.</i>	Digestive health	Consumed directly	7
2	Banana	<i>Musa paradisiaca</i>	Boosts immune system	Consumed directly	5
3	Rambutan	<i>Nephelium lappaceum L.</i>	Boosts immunity, aids digestion	Consumed directly	4
4	Cassava	<i>Manibot esculenta</i>	Boosts immunity, aids digestion	Boiled	4
5	Coffee	<i>Coffea arabica</i>	Reduces diabetes risk, prevents depression	Seeds selected, hulled, washed, sun-dried, roasted, ground, then brewed as a beverage	3

Home garden plants refer to vegetation grown in the land surrounding a residence, typically utilized to produce food or vegetable products (Bushron *et al.*, 2024). Home garden plants in Duwet Hamlet include both perennial fruit plants and seasonal plants. Perennial plants such as banana, papaya, water guava, dragon fruit, and occasionally avocado can typically bear fruit multiple times within a year. In contrast, seasonal plants such as durian, rambutan, and pomelo bear fruit only at specific times, usually during the dry season or at the end of the rainy season. Additionally, mulberry and strawberry are generally categorized as shrub plants; cassava is classified as a tuber crop; jimsonweed (*Datura metel*) is categorized as an ornamental plant; while coffee is classified as a plantation crop and is rarely found in home gardens.

Local Indonesian fruit plants hold significant importance for communities; however, many species with superior characteristics have not yet been managed optimally and remain potential for further

development (Kusumasari, 2018). The inventory of local fruit plants serves as a concrete effort to assess their potential of local fruit plants, particularly for use in traditional medicine. Based on interview results, it was found that community knowledge regarding fruit plants as medicinal plants remains notably limited, both in understanding and in management practices. Most residents utilize the fruit directly without any prior processing. According to two informants selected based on their background in the health sector, many plants contain high nutritional value as medicinal plants — for example, durian, papaya, and banana for digestive health, and guava leaves for treating diarrhea. Fruit plants offer numerous benefits, being rich in nutrients such as vitamins, minerals, proteins, and antioxidants that can enhance nutritional value, prevent malnutrition, and support overall health (Marappan *et al.*, 2025). Nevertheless, their utilization remains suboptimal due to the community's limited knowledge of the fruit plants available in their surroundings.

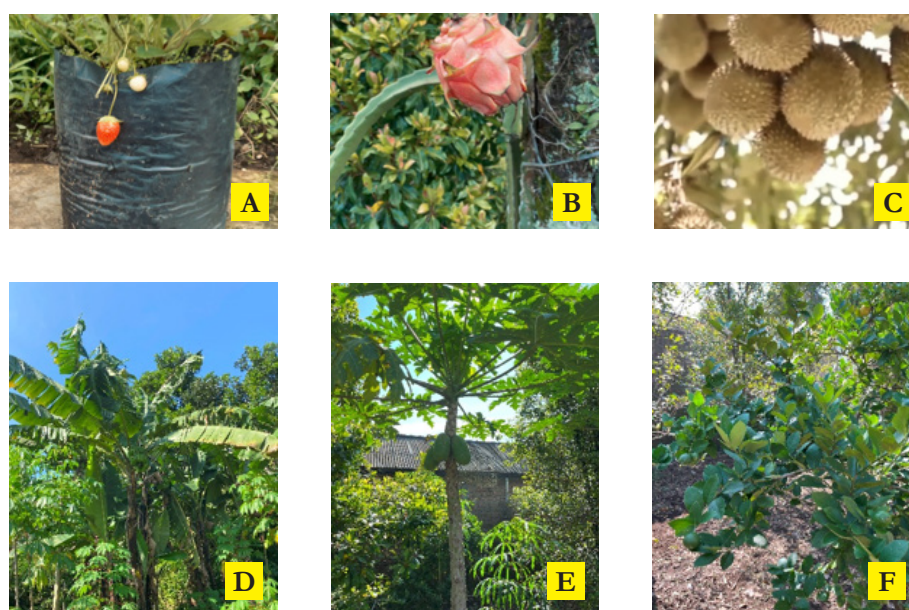
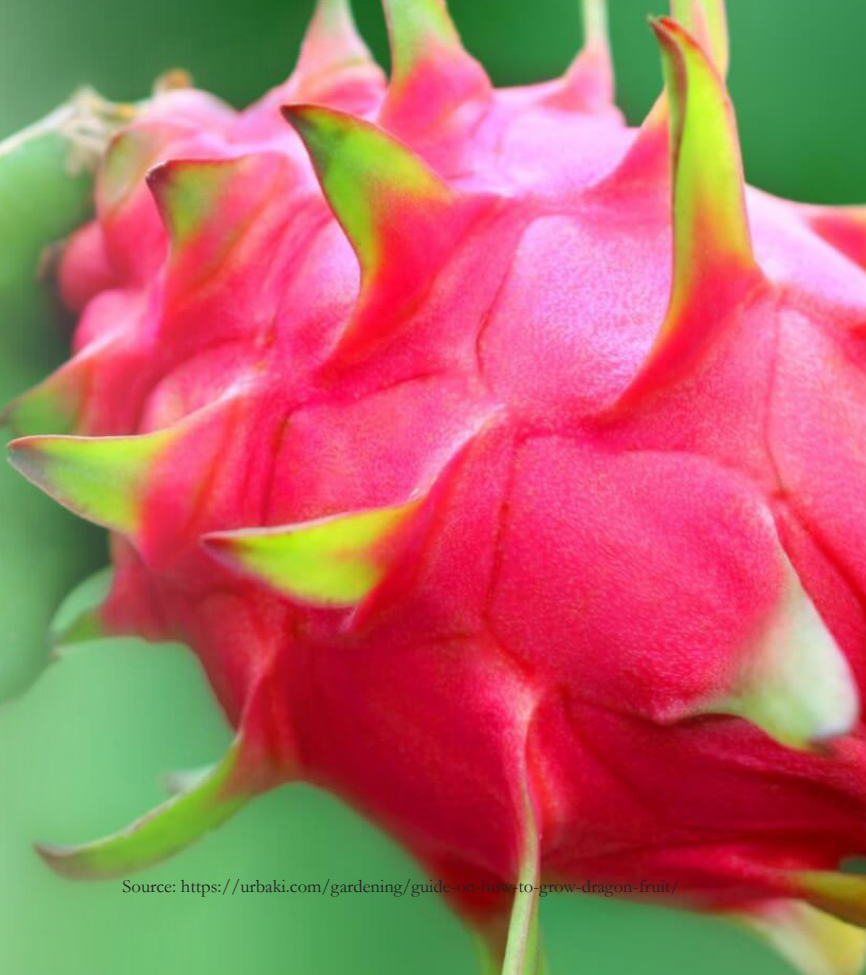


Figure 3 Several types of plants: a) Strawberries, b) Dragon Fruit, c) Durian, d) Bananas, e) Papaya, f) Oranges

Based on the literature study conducted, several benefits were identified with significant potential for further development. Local fruit plants not only serve as food sources, but also function as medicinal plants. Bioactive compounds commonly found in fruits consist of three main groups: phenolics, carotenoids, and terpenoids (Khoo *et al.*, 2016). The plant parts utilized may include leaves, stems, roots, flowers, fruits, endosperm, tubers, and rhizomes (Damaiyanti *et al.*, 2023). The utilization of fruit plants as medicine is particularly important given their ease of cultivation, their role in supporting family health independence, and their contribution to the conservation of local biodiversity. The use of home gardens as living laboratories for the residents of Duwet Hamlet serves as a concrete representation of utilization patterns and appropriate processing methods for the plant parts used. Therefore, information on the types of local fruit plants identified can provide an overview of their potential utilization as medicinal plants based on local wisdom (Table 2).



Source: <https://urbaki.com/gardening/guide-on-how-to-grow-dragon-fruit/>

Table 2 Medicinal Properties of Local Fruit Plants Identified in Duwet Hamlet Based on Literature Review

No	Latin Name	Plant Part	Processing Method	Medicinal Properties	Literature
1	Rambutan (<i>Nephelium lappaceum</i> L.)	Fruit, flesh and seed	Flesh and fruit are dried then ground; served by brewing with hot water	Antidiarrheal, anticancer, antibacterial, antidiabetic, antiviral, anti-inflammatory	(Afzaal <i>et al.</i> , 2023)
2	Durian (<i>Durio zibethinus</i> L.)	Leaves	Made into tea	Antioxidant	(Andry <i>et al.</i> , 2025)
3	Banana (<i>Musa paradisiaca</i>)	Stem	Stem extract made into gel	Antiacne	(Wibowo & Prasetyaningrum, 2015)
4	Papaya (<i>Carica papaya</i> L.)	Leaves	Leaf extract made into gel	Antiviral	(Hariono <i>et al.</i> , 2021)
5	Dragon Fruit (<i>Hylocereus</i> spp.)	Fruit	Consumed directly	Anti-inflammatory, antioxidant, anticancer (colon and prostate)	(Paško <i>et al.</i> , 2021)
6	Citrus (<i>Citrus</i> sp.)	Fruit	Made into essential oil	Antimicrobial, antioxidant	(Saini <i>et al.</i> , 2022)
7	Pomelo (<i>Citrus grandis</i>)	Fruit	Made into essential oil	Antimicrobial, antioxidant	(Saini <i>et al.</i> , 2022)
8	Avocado (<i>Persea americana</i>)	Leaves	Made into extract	Antioxidant	(Rahmah <i>et al.</i> , 2023)
9	Mulberry (<i>Morus alba</i> L.)	Fruit	Consumed directly	Anticholesterol, antiobesity, hepatoprotective	(Zhang <i>et al.</i> , 2018)
10	Soursop (<i>Annona muricata</i> L.)	Leaves	Dried and ground	Anticancer, antitumor	(Anwar <i>et al.</i> , 2024)
11	Water Guava (<i>Syzygium aqueum</i> (Burm. f.) Alston)	Bark	Ground	Anticervical cancer, anti-breast cancer	(Kristanti <i>et al.</i> , 2022)
12	Strawberry (<i>Fragaria × ananassa</i>)	Fruit	Consumed directly	Antioxidant, anti-inflammatory, anti-neurodegenerative, anticancer	(Katel <i>et al.</i> , 2022)



Source: <https://www.gardeningknowhow.com/edible/fruits/strawberry/sweet-strawberries.htm>

Research on the inventory of local fruit plants demonstrates that they have significant potential as natural remedies for various diseases. This potential can be further developed as a base material in the production of new medicines in the health sector. Therefore, the existence and cultivation of local fruits need to be preserved to ensure their continued availability and competitiveness against imported fruits in the market (Suryatini *et al.*, 2023). Consequently, the conservation and development of local fruit plants not only support food security and public health, but also strengthen the sustainable utilization of biological resources. In the agricultural aspect, optimizing the cultivation of local fruit plants in gardens can enhance crop diversification, strengthen household food security, and support a sustainable land-based agricultural system. Proper management through the selection of superior varieties, appropriate cultivation techniques, and integrated utilization of yields can increase both the functional and economic value of these plants.

CONCLUSION

Local fruit plants not only serve as food sources, but also have significant potential as natural for public health. Proper inventory and utilization can support the conservation of biodiversity while opening opportunities for the development of new medicines. The cultivation of local fruit plants in home gardens can strengthen household-based agricultural systems by diversifying commodity production and optimizing limited land. It is recommended that future research or community service programs conduct outreach and education to the community regarding the benefits and proper, safe use of local fruit plants.



<https://www.dailyhawker.com/what-fruit-has-the-most-seeds/>

READINGS

- Afzaal, M., Saeed, F., Bibi, M., Ejaz, A., Shah, Y. A., Faisal, Z., Ateeq, H., Akram, N., Asghar, A., & Shah, M. A. (2023). Nutritional, Pharmaceutical, and Functional Aspects of Rambutan in Industrial Perspective: An Updated Review. *Food Science & Nutrition*, 11(7), 3675. <https://doi.org/10.1002/fsn3.3379>
- Al Akromi, M. A. I., Salsabila, S., Hanifah, W., & Alghifari, Z. A. (2024). Analisis Data Inventarisasi Biodiversitas Buah pada Kawasan Perkotaan, Perbatasan, dan Pedesaan untuk Pelestarian dan Pemanfaatan Berkelanjutan. *JRPP*, 7(4), 1716–17178. <https://doi.org/https://doi.org/10.31004/jrpp.v7i4.38659>
- Andry, M., Ramadaini, T., Marseli, C., Azzahra, R., Syahputra, H., & Shiyan, S. (2025). Antioxidant Activity Test of Durian Seed Herbal Tea (*Durio zibethinus* Murr.) with Addition of Stevia Leaves (*Stevia rebaudiana* Bertoni) as a Natural Sweetener Using DPPH Method. *JPS*, 8(4), 2462–2471. <https://doi.org/https://doi.org/10.36490/journal-jps.com.v8i4.1070>
- Anwar, Y., Nurcahyani, A., Pebriani, R., Maulida, H. V., Firmansyah, M. Al, Kristina, E., & Janiva, G. (2024). Pengenalan Olahan Herbal Daun Sirsak (*Annona muricata* L.) untuk Membantu Pengobatan Penyakit Neoplasma. *Jurnal Kabar Masyarakat*, 2(3), 54–64. <https://doi.org/10.54066/jkb.v2i3.2193>
- Bushron, R., Mahardika, M. W., Arifanty, R. D., & Septiani, D. E. (2024). Pekarangan sebagai Sumber Pangan Keluarga di Wilayah Desa Kelapa Dua, Kabupaten Tangerang. *AGROINOTEK Jurnal Penelitian dan Pengabdian Masyarakat*, 5(2), 111–123. <https://doi.org/10.21776/ub.agroinotek.2024.005.02.05>
- Damaiyanti, D. R. R., Nurlaelih, E. E., Fajarwati, S. K., Sandy, Y. A., & Zahro, F. A. (2023). The Local Fruit Home Garden Ethnobotany of Pagung Village Kediri Regency. *Journal of Agricultural Science*, 8(2), 142–149. <https://doi.org/10.21776/ub.jpt.2023.008.2.05>
- Hariono, M., Julianus, J., Djunarko, I., Hidayat, I., Adelya, L., Indayani, F., Auw, Z., Namba, G., & Hariyono, P. (2021). The Future of Carica Papaya Leaf Extract as an Herbal Medicine Product. *Molecules*, 26(22). <https://doi.org/10.3390/molecules26226922>
- Harmowo. (2023, February 1). MANIS LEGIT DURIAN KARANGGUPITO - Desa Karanggupito. <https://karanggupito.desa.id/index.php/artikel/2023/2/1/manis-legit-durian-karanggupito>
- Heke, M. N. J., Ledo, M. E. S., & Ballo, A. (2025). Inventarisasi dan Identifikasi Tumbuhan Pangan di Kecamatan Sabu Barat Kabupaten Sabu Raijua. *BIOEDUKASI (Jurnal Pendidikan Biologi)*, 16(1), 140–148. <https://doi.org/http://dx.doi.org/10.24127/bioedukasi.v16i1.11413>
- Katel, S., Mandal, H. R., Kattel, S., Yadav, S. P. S., & Lamshal, B. S. (2022). Impacts of plant growth regulators in strawberry plant: A review. *Heliyon*, 8(12), e11959. <https://doi.org/10.1016/j.heliyon.2022.e11959>
- Khoo, H. E., Azlan, A., Kong, K. W., & Ismail, A. (2016). Phytochemicals and Medicinal Properties of Indigenous Tropical Fruits with Potential for Commercial Development. *Evidence-Based Complementary and Alternative Medicine : ECAM*, 2016, 7591951. <https://doi.org/10.1155/2016/7591951>
- Kristanti, A. N., Aung, E. E., Aminah, N. S., Takaya, Y., Aung, H. T., & Ramadhan, R. (2022). Bioactive Triterpenoids from Indonesian Medicinal Plant *Syzygium aqueum*. *Open Chemistry*, 20(1), 204–211. <https://doi.org/10.1515/chem-2022-0138>
- Marappan, K., Sadasivam, S., Natarajan, N., Arumugam, V. A., Lakshmaiah, K., Thangaraj, M., Giridhar Gopal, M., & Asokan, A. (2025). Underutilized Fruit Crops as a Sustainable Approach to Enhancing Nutritional Security and Promoting Economic Growth. *Frontiers in Sustainable Food Systems*, 9. <https://doi.org/10.3389/fsufs.2025.1618112>
- Meidatuzzahra, D., & Swandayani, R. E. (2020). Inventarisasi Tanaman Buah dan Sayur sebagai Pangan di Pekarangan Rumah Desa Suranadi, Kecamatan Narmada, Kabupaten Lombok Barat. *Bipendix*, 7(1), 10–15.
- Paško, P., Galanty, A., Zagrodzki, P., Luksirikul, P., Barasch, D., Nemirovski, A., & Gorinstein, S. (2021). Dragon Fruits as a Reservoir of Natural Polyphenolics with Chemopreventive Properties. *Molecules*, 26(8). <https://doi.org/10.3390/molecules26082158>
- Rahmah, R., Rahayu, Y. P., Ridwanto, R., & Daulay, A. S. (2023). Phytochemical Screening and Antioxidant Activity Testing of Avocado Leaf Ethanol Extract (*Persea americana* Mill.) Using the DPPH Method. *Journal of Pharmaceutical and Sciences*, 9–25. <https://doi.org/10.36490/journal-jps.com.v6i5-si.369>
- Saini, R. K., Ranjit, A., Sharma, K., Prasad, P., Shang, X., Gowda, K. G. M., & Keum, Y. S. (2022). Bioactive Compounds of Citrus Fruits: A Review of Composition and Health Benefits of Carotenoids, Flavonoids, Limonoids, and Terpenes. *Antioxidants*, 11(2), 239. <https://doi.org/10.3390/antiox11020239>
- Suryatini, K. Y., Agung, A., Putriningsih, A., Agung, G., Wiadnyana, G., & Milati, N. M. (2023). Pemanfaatan Buah Lokal sebagai Upakara dan Upaya Pelestariannya. *SEMBIO: Prosiding Seminar Nasional Biologi Dan Pendidikan Biologi*, 2, 1–7. <https://doi.org/10.59672/sembio.v2.3770>
- Wibowo, F. X. S., & Prasetyaningrum, E. (2015). Pemanfaatan Ekstrak Batang Tanaman Pisang (*Musa paradisiaca*) sebagai Obat Antiacne dalam Sediaan Gel. *Jurnal Ilmu Farmasi Dan Farmasi Klinik*, 12(1), 38–46. <https://doi.org/https://doi.org/10.31942/jiffk.v12i1.1401>
- Zhang, H., Ma, Z. F., Luo, X., & Li, X. (2018). Effects of Mulberry Fruit (*Morus alba* L.) Consumption on Health Outcomes: A Mini-Review. *Antioxidants*, 7(5), 69. <https://doi.org/10.3390/antiox7050069>