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FOREST HERBAL TEA SHOULD BE PROMOTED IN INDONESIA

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Abstract

Forest herbal tea is made from plants in the forest area. Various types of plants, including trees, shrubs, and herbs, can be sources of forest herbal tea. Most of the forest herbal tea sources are wild plants found in natural forest areas in Indonesia. This means that Indonesia has abundant forest herbal tea resources, which should be promoted. However, the use of raw materials in forest herbal tea products is still limited. This review shows why forest herbal tea products should be promoted in Indonesia in terms of cultivation, standardisation, processing method, economic value, and diversity of products.

Keywords: *Forest, Herbal Tea, Indonesia*

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INTRODUCTION

It is accepted that tea is the most popular beverage in the world after water. Tea beverages can be classified into conventional tea and herbal tea. Conventional tea is made by brewing tea plant leaves (*Camellia sinensis*). Meanwhile, herbal tea is defined as a beverage made by plants other than tea plants (Ravikumar, 2014). There needs to be more than this definition to describe herbal tea production in the beverage industry.

Herbal tea is a beverage made from a mixture of the leaves, branches, flowers, seeds, and the roots of various plants. Thus, the raw material source for herbal tea is more than just leaves, like in conventional tea. If the plants used for herbal tea production are made from forest plants, this beverage is called forest herbal tea (Triandini and Wangiyana, 2022).

Forest herbal tea consumption has recently increased in the global market. The data shows that forest herbal tea has a 4.5% market share with a 1.2 billion US dollar value in 2022 (Sukhava, 2022). This information can be the basis data for Indonesia, a country which is well positioned to obtain an advantage in the worldwide forest herbal tea marketplace (Xuetao, 2015). The exploration of these products can give several advantages to this country.

As a country with Asia's largest tropical forest area, Indonesia has abundant forest herbal tea sources. According to The Ministry of Environment and Forestry, Indonesia has 94.1 million hectares of forest area, which covers 50.1% of land area. This data means Indonesia likely has a large forest herbal tea material source that needs further exploration (Wangiyana and Triandini, 2021). However, the use of forest herbal tea commodities is much lower than other commodities in the forestry sector. Regarding the potency of this commodity to increase Indonesia's gross domestic product in forestry, forest herbal tea commodities should be promoted in Indonesia.

This mini-review will first demonstrate the potential source of forest herbal tea in Indonesia. Then, the extent to which forest herbal tea can give some advantages as a promising beverage product will be discussed.

FOREST HERBAL TEA SOURCE MATERIAL

Indonesia has various raw materials for forest herbal tea with a wide range of products. These products can be produced from various organs of plants, including leaves, flowers, rhizomes, seeds, and bark (Ravikumar, 2014). This means that different organ sources can produce different characteristics of forest herbal tea. There are some examples of these products: soursop herbal tea is made from its leaves, coffee herbal tea is made from its flowers, ginger herbal tea is made from its rhizome, Avocado herbal tea is made from its seeds, and Cinnamon herbal tea is made from its bark (table 1).

Table 1. Example of Forest Herbal Tea Product

No	Forest Herbal Tea Product	Plants species	Organ	Reference
1	Grapes Herbal Tea	*Vitis vinifera*	Fruit Peels	(Saragih, Suter and Yusasrini, 2021)
2	Coffee Herbal Tea	*Coffea* Sp.	Flower	(Supeno et al., 2020)
			Leaves	(Daryanto, 2019)
			Fruit Peels	(Garis, Romalasari and Purwasih, 2019)
3	Soursop Herbal Tea	*Annona muricata*	Leaves	(Maharani, Setyobroto and Susilo, 2017)
4	Pandan Herbal Tea	*Pandanus amaryllifolius*	Leaves	(Phuoc et al., 2018)
5	Snake Fruit Herbal Tea	*Salacca edulis*	Furit Peels	(Ariansyah, 2016)
6	Curcuma Herbal Tea	*Curcuma xanthorrhiza*	Rhizome	(Moehady, 2015)
7	Muntingia Herbal Tea	*Muntingia calabura*	Leaves	(Sudarmanto, 2015; Tiyani, Suharti and Andriani, 2020)
8	Cinnamon Herbal Tea	*Cinnamomum verum*	Bark	(Bernardo et al., 2015; Mangala Gowri et al., 2017)
9	Aquilaria Herbal Tea	*Aquilaria malaccensis*	Leaves	(Adrianar, Batubara and Julianti, 2015; Karsiningsih, 2016)
10	Gyrinops Herbal Tea	*Gyrinops versteegii*	Leaves	(Samsuri and Fitriani, 2013; Wangiyana et al., 2018, 2021)
11	Cacao Herbal Tea	*Theobroma cacao*	Fruit Peels	(Kusuma, Putra and Darmayanti, 2019)
			Leaves	(Supriyanto, Darmadji and Susanti, 2014)
12	Lemongrass Herbal Tea	*Cymbopogon citratus*	Stem	(Nambiar and Matela, 2012)
			Leaves	(Royhanaty, Mayangsari and Novita, 2018; Wangiyana et al., 2019)
13	Galangal Herbal Tea	*Alpinia galanga*	Rhizome	(Ding et al., 2019)
14	Turmeric Herbal Tea	*Curcuma longa*	Rhizome	(Bhowmik et al., 2009)
15	Clove Herbal Tea	*Syzygium aromaticum*	Flowers	(Mani et al., 2012)
16	Ginger Herbal Tea	*Zingiber officinale*	Rhizome	(Chao et al., 2011)
17	Betel Herbal Tea	*Piper betle*	Leaves	(Adzam, 2018)
18	Strobilanthes Herbal Tea	*Strobilanthes crispus*	Leaves	(Bakar, Asmah and Othman, 2006)
19	Chrysanthemum Herbal Tea	*Chrysanthemum indicum*	Flowers	(Setiawati et al., 2019; Shahrajabian et al., 2019)
20	Mulberry Herbal Tea	*Morus* Sp	Leaves	(Killedar and Pawar, 2017; Larasati and Issutarti, 2017)
21	Mango Herbal Tea	Mangifera indica	Furit Peel	(Nanthachai, 2020)
22	Betel Nut Tea	*Areca catechu*	Seed	(Singkhum, 2022)
23	Mahogany Herbal Tea	*Swietenia mahagoni*	Seed	(Sukardiman et al., 2013)
24	Pirdot Herbal Tea	*Saurauia bracteosa*	Leaves	(Situmorang and Sunandar, 2019)
25	Papaya Herbal Tea	*Carica papaya*	Flowers	(Bergonio and Perez, 2016)
26	Hibiscus Herbal Tea	*Hibiscus sabdariffa*	Flowers	(Mckay et al., 2010)
27	Starfruit Herbal Tea	*Averrhoa bilimbi*	Leaves	(Rozi, Silvy and Syukri, 2022)
28	Rambusa Herbal Tea	*Passiflora foetida*	Leaves	(Nathaniel, Putra and Sri Wiadnyani, 2020)

These forest herbal teas have different characteristics in terms of colour, aroma, taste and bitterness, attracting a wide range of consumers with different preferences (Willis et al., 2017). Consumer preference assay based on sensory evaluation revealed that the hedonic panellist, a consumer representative in the research scale, accepts forest herbal tea as a beverage with unique characteristics (Oduro et al., 2013). This data means that forest herbal tea products have an excellent prospect to be developed in Indonesia (Wangiyana, Triandini and Anita Nugraheni, 2021).

ADVANTAGES OF FOREST HERBAL TEA UTILIZATION

First of all, it could be argued that the information about the Forest Herbal Tea Plant source cultivation method still needs to be improved since most of these plants are classified as wild plants (Bester, Joubert and Joubert, 2014). However, as Bester and his team state, the raw material of forest herbal tea is mostly from wild plants that can grow naturally in a natural environment. This means that forest herbal tea plants do not need a particular cultivation method. (Güzel and Güzelşemme, 2018) state that wild plants as source material of forest herbs should not be difficult to cultivate because they are less demanding than crop plants (Wangiyana, Putri and Triandini, 2019). This indicates that the forest herbal tea cultivation method is promising to be developed with this advantage in mind (Wangiyana *et al.*, 2022). Forest herbal tea source material is mostly from tree plants, which do not need special cultivation treatment like fertilizer (Triandini and Wangiyana, 2022). Furthermore, forest herbal tea source materials tend to resist pests and disease .

It has been argued that Forest Herbal Tea products require continued raw material standardisation. However, raw material standardisation of forest herbal tea will provide new pharmacological insights, leading to innovation (Poswal *et al.*, 2019). One pharmacological insight is the various secondary metabolites with health benefits contained in forest herbal tea. Pharmacology in vitro study has revealed that forest herbal tea raw material has antioxidant, antimicrobial, anti-inflammatory, and anti-metastasis properties (Etheridge and Derbyshire, 2019). This indicates the prospect of consuming forest herbal tea products as alternative medicine. In addition, forest herbal tea products can also be consumed regularly to experience their health-beneficial effects. Thus, the standardisation of raw materials not only can make forest herbal tea a standardised beverage product but also a standard medical product (Kunle, Egharevba and Ahmadu, 2012).

It could also be argued that forest herbal tea needs continued research into processing methods. The conventional tea processing method, which involves enzymatic oxidation as a critical issue, has been well-studied for comparison. Enzymatic oxidation in the tea processing method determines the type of tea product, whether it is black tea, oolong tea, or green tea (Deb and Jolvis Pou, 2016). However, Forest herbal tea production does not require enzymatic oxidation. This is because enzymatic oxidation of forest tea raw material does not significantly affect the type of products developed from it. Thus, the production is simpler and more efficient than conventional tea. Moreover, forest herbal tea production can be conducted without specialised equipment (Wangiyana and Triandini, 2022). This is because the primary raw material processing in forest herbal tea products involves drying and chopping, which can be conducted in a home industry. Therefore, forest herbal tea has promising potential to be developed on the home industry scale (Triandini *et al.*, 2022).

It has been argued that forest herbal tea requires no promotion in terms of its economic potential. Conventional tea products have high economic value as one of the most popular beverages in the world. However, the economic feasibility data of forest tree products is expected to reveal a new income source for forest commodities (Wangiyana, Gunawan and Triandini, 2023). This is because forest herbal tea can give additional income to the farmer. Firstly, the raw material of forest tea is mostly not the primary harvesting target of the commodity. For example, agarwood's main commodity is resin, while agarwood leaves processed into forest herbal tea are the secondary commodity (Wangiyana and Sami'un, 2019). Secondly, some raw materials for forest herbal tea are by-products of harvesting. For example, forest herbal tea can be produced from grape peel, snake fruit peel, mangosteen peel, and cacao peel. Consequently, forest herbal tea can add value to waste, which has become a problem in the forestry sector (Karki and Bhattarai, 2012).

Although there are various advantages to developing forest herbal tea, these products still face challenges in Indonesia. Various raw materials for forest herbal tea need further exploration to enrich

forest herbal tea production. This raw material mainly involves plants that become the subject of ethnobotany, a study of interrelations between humans and plants that provides valid information about the utility of plant species by indigenous people (Suthari *et al.*, 2021). This indicates that forest herbal tea exploration will concern language issues. Most local tribes, especially those living in isolated forest areas, have valuable information about local plants as forest herbal tea raw material is consumed regularly by them (Pandey and Tripathi, 2017). However, most of these people cannot speak Indonesian. Therefore, the information about plants is mostly in the form of the local language, which sometimes cannot be translated into Indonesian. The challenge can be increased if the plants are endemic and have not been introduced into the international taxonomic system (Jadid *et al.*, 2020).

CONCLUSION

Forest herbal tea in Indonesia should be promoted because this country has considerably significant prospects for developing this beverage. The utilisation of herbal tea products in Indonesia has several advantages. The first advantage is that Indonesia has various forest herbal tea source materials that can be produced into beverages with unique characteristics. The second advantage is that forest herbal tea plants do not need a particular cultivation method, which makes it easier to develop them. The third advantage is that standardising forest herbal tea raw materials can provide pharmacological insights, leading to innovation in the field of medicine. The fourth advantage is that forest herbal tea requires a simple processing method that can be conducted at the level of home industry, without the need for heavy investment. The fifth advantage is that forest tree products may be expected to reveal a new income source for forest commodities.

There is every hope that the Indonesian government will establish more priority programs for forest herbal tea development in the future. An advanced consumer preference test should be applied to several forest herbal tea products, especially on a pilot plant scale, not limited to a research scale. Raw material exploration involving local indigenous communities in several places in Indonesia can also be a good recommendation for developing forest herbal tea products. This exploration will need to involve language and botanical experts to anticipate the utilisation of endemic plants that have not been introduced into the international taxonomical system.

REFERENCES

Adrianar, N., Batubara, R. and Julianti, E. (2015) 'Value of Consumers Preference Towards To Agarwood Tea Leaves (Aquilaria malaccensis Lamk) Based on The Location Of Leaves In The Trunk', *Peronema Forestry Science Journal*, 4(4), pp. 12–16.

Adzam, M. (2018) *Kajian Pembuatan Teh Herbal Daun Sirih (Piper betle L) dengan Metode Pengolahan dan Suhu Pengeringan Yang Berbeda*. Universitas Pasundan.

Ariansyah, F. (2016) *Uji organoleptik teh herbal dari kulit buah salak pondoh hitam (Salacca edulis reinw) sebagai alternatif minuman penderita diabetes*. Sekolah Tinggi Ilmu Kesehatan.

Bakar, M. F. A., Asmah, R. and Othman, F. (2006) 'Effects of Strobilanthes crispus Tea Aqueous Extracts on Glucose and Lipid Profile in Normal and Streptozotocin-Induced Hyperglycemic', *Plant Foods for Human Nutrition*, 61(1), pp. 7–12. doi: 10.1007/s11130-006-0002-z.

Bergonio, K. B. and Perez, M. A. (2016) 'The potential of male papaya (Carica papaya , L .) flower as a functional ingredient for herbal tea production', *Indian Journal of Traditional Knowledge*, 15(1), pp. 41–49.

Bernardo, M. A. *et al.* (2015) 'Effect of Cinnamon Tea on Postprandial Glucose Concentration Effect of Cinnamon Tea on Postprandial Glucose Concentration', *Journal of Diabetes Research*, 2015(913651), pp. 1–6. doi: 10.1155/2015/913651.

Bester, C., Joubert, M. E. and Joubert, E. (2014) 'A breeding strategy for South African indigenous herbal teas', in *XXIX International Horticultural Congress on Horticulture: Sustaining Lives, Livelihoods and Landscapes*, pp. 15–22.

Bhowmik, D. *et al.* (2009) 'Turmeric: A Herbal and Traditional Medicine', *Archives of Applied Science Research*, 1(2), pp. 86–108.

Chao, D. *et al.* (2011) 'Effect of Hot-Attribute Aged Ginger Tea on Chinese Medical Pulse Condition of Healthy Young Humans', *Journal of Traditional and Complementary Medicine*, 1(1), pp. 69–75. doi: 10.1016/S2225-4110(16)30059-1.

Daryanto, K. A. (2019) *Optimasi karakteristik sensoris teh daun kopi Robusta dan Liberika dampit terhadap suhu penyeduhan*. Universitas Brawijaya.

Deb, S. and Jolvis Pou, K. R. (2016) 'A Review of Withering in the Processing of Black Tea', *Journal of Biosystems Engineering*, 41(4), pp. 365–372. doi: 10.5307/JBE.2016.41.4.365.

Ding, P. *et al.* (2019) 'Research and application of Alpinia officinarum in medicinal field', *Chinese Herbal Medicines*, 11(2019), pp. 132–140. doi: 10.1016/j.chmed.2019.04.003.

Etheridge, C. J. and Derbyshire, E. (2019) 'Herbal Infusion and Health a Review of Findings from Human Studies Mechanisms and Future Research Direction', *Nutrition & Food Science*. doi: 10.1108/NFS-08-2019-0263.

Garis, P., Romalasari, A. and Purwasih, R. (2019) 'Pemanfaatan Limbah Kulit Kopi Cascara Menjadi Teh Celup', in *Prosiding Industrial Research Workshop and National Seminar*, pp. 8–11.

Güzel, Y. and Güzelşemme, M. (2018) 'Wild plants used as herbal tea in Antakya and Defne provinces of Hatay', *Anadolu Ege Tarımsal Araştırma Enstitüsü Dergisi*, 28(1), pp. 1–5.

Jadid, N. *et al.* (2020) 'An ethnobotanical study of medicinal plants used by the Tengger tribe in Ngadisari village, Indonesia', *PLoS ONE*, 15(7), pp. 1–16.

Karki, M. B. and Bhattarai, N. (2012) 'Enhancing the contribution of nontimber forest products in supporting green economy and sustainable development in mountain countries', in *2012 IUFRO Conference Division 5 Forest Products*. Lisbon, pp. 35–40.

Karsiningsih, E. (2016) 'Analisis Kelayakan Finansial dan Strategi Pengembangan Teh Gaharu di Kabupaten Bangka Tengah (Studi Kasus: Teh Gaharu "Aqilla" Gapoktan Alam Jaya Lestari)', *AGRARIS: Journal of Agribusiness and Rural Development Research*, 2(2), pp. 143–151. doi: 10.18196/agr.2235.

Killedar, S. G. and Pawar, A. V (2017) 'Preparation of herbal tea from mulberry leaves', *Journal of Medicinal Plants Studies*, 5(2), pp. 325–328.

Kunle, O. F., Egharevba, H. O. and Ahmadu, P. O. (2012) 'Standardization of herbal medicines - A review', *International Journal of Biodiversity and Conservation*, 4(3), pp. 101–112. doi: 10.5897/ijbc11.163.

Kusuma, I. G. N. S., Putra, I. N. K. and Darmayanti, L. P. T. (2019) 'Pengaruh Suhu Pengeringan Terhadap Aktivitas Antioksidan Teh Herbal Kulit Kakao (Theobroma cacao L.)', *Jurnal Ilmu dan Teknologi Pangan*, 8(1), pp. 85–93.

Larasati, A. and Issutarti (2017) 'The Analysis of Consumer Preferences on Mulberry Leaves Tea as An Antioxidant-Enriched Product', *Advances in Economics, Business and management Research*, 40(Icam), pp. 41–51.

Maharani, S., Setyobroto, I. and Susilo, J. (2017) 'Kajian variasi pengolahan teh daun sirsak, sifat fisik, organoleptik dan kadar vitamin E', *Jurnal Teknologi Kesehatan*, 13(2), pp. 77–81.

Mangala Gowri, P. *et al.* (2017) 'Effectiveness of cinnamon tea in reducing weight among late obese adolescence', *Asian Journal of Pharmaceutical and Clinical Research*, 10(4), pp. 156–159. doi: 10.22159/ajpcr.2017.v10i4.16420.

Mani, F. *et al.* (2012) 'Influence of Clove Tea (Syzygium Aromaticum) on Body Weight and Biochemical Parameters of Rats Subjected to Ethanol Consumption and Abstinence', *Medicinal chemistry*, 2(4), pp. 81–85. doi: 10.4172/2161-0444.1000119.

Mckay, D. L. *et al.* (2010) 'Hibiscus Sabdariffa L . Tea (Tisane) Lowers Blood Pressure in Prehypertensive and Mildly Hypertensive Adults', *The Journal of Nutrition*, 140, pp. 298–303. doi: 10.3945/jn.109.115097.lowers.

Moehady, B. I. (2015) 'Serbuk Temulawak Sebagai Bahan Baku Minuman', in *Prosiding Industrial Research Workshop and National Seminar*, pp. 55–60.

Nambiar, V. and Matela, H. (2012) 'Potential functions of Lemon grass (Cymbopogon citratus) in health and disease', *International Journal of Pharmaceutical and Biological Archives*, 3(5), pp. 1035–1043.

Nanthachai, N. (2020) 'Effect of kneading and fermentation time on chemical quality of herbal tea from mango peel', *International Journal of GEOMATE*, 18(68), pp. 60–65.

Nathaniel, A. N., Putra, I. N. K. and Sri Wiadnyani, A. A. I. (2020) 'Pengaruh suhu dan waktu pengeringan terhadap aktivitas antioksidan dan sifat sensoris teh herbal celup daun rambusa (Passiflora foetida L)', *Jurnal Itepa*, 9(3), pp. 308–320.

Pandey, A. K. and Tripathi, Y. C. (2017) 'Ethnobotany and its relevance in contemporary research', *Journal of Medicinal Plants Studies*, 5(3), pp. 123–129.

Phuoc, M. N. *et al.* (2018) 'Herbal tea production from pandan (Pandanus amaryllifolius) leaf', *Research on Crops*, 19(4), pp. 741–745.

Poswal, F. S. *et al.* (2019) 'Herbal Teas and their Health Benefits : A Scoping Review', *Plant Food for Human Nutrition*, 74(2019), pp. 266–276.

Ravikumar, C. (2014) 'Review on herbal teas', *Journal of Pharmaceutical Sciences and Research*, 6(5), pp. 236–238.

Royhanaty, I., Mayangsari, D. and Novita, M. (2018) 'Manfaat Minuman Serai (Cymbopogon citrus) Dalam Menurunkan Intensitas Dismenore', *Jurnal SMART Kebidanan Sekolah Tinggi Ilmu Kesehatan (STIKes) Karya Husada Semarang*, 5(1), pp. 37–46.

Rozi, F., Silvy, D. and Syukri, D. (2022) 'Characterization of herbal tea bags made from starfruit leaves (Averrhoa bilimbi), Gotu Kola leaves (Centella asiatica) and Cinnamon powder (cinnamomun burmanii) as functional drinks', *And. Int. J. Agaric. Nat. Sci*, 3(1), pp. 47–54.

Samsuri, T. and Fitriani, H. (2013) 'Agarwood tea Production from Gyrinops versteegii', *Jurnal Ilmiah Biologi Bioscientist*, 1(2), pp. 137–144.

Saragih, F. J., Suter, I. K. and Yusasrini, N. L. A. (2021) 'Aktivitas Antioksidan Dan Sifat Sensoris Teh Herbal Celup Kulit Anggur (Vitis vinifera L .) Pada Suhu Dan Waktu Pengeringan', *Itepa: Jurnal Ilmu dan Teknologi Pangan*, 10(3), pp. 424–435.

Setiawati, T. *et al.* (2019) 'Pengenalan khasiat obat tanaman krisan dan pembuatan teh krisan sebagai minuman kesehatan', *Ethos: Jurnal Penelitian dan Pengabdian kepada Masyarakat*, 7(1), pp. 64–69.

Shahrajabian, M. H. *et al.* (2019) 'A Review of Chrysanthemum The Eastern Queen in Traditional CHinese Medicine with Healing Power in Modern Pharmaceutical Science', *Applied Ecology and Environmental Research*, 17(6), pp. 13355–13369.

Singkhum, U. (2022) 'Effects of Different Processing Conditions on Physicochemical Properties , Bioactive Compounds and Sensory Acceptance of Betel Nut Tea', *J. Agri. Prod*, 4(1), pp. 28–39.

Situmorang, R. O. and Sunandar, A. D. (2019) 'Pirdot (Saurauia bracteosa DC) Leaf Processing Technique for Making Herbal Tea', in *IOP Conf. Series: Earth and Environmental Science*, pp. 1–9. doi: 10.1088/1755-1315/359/1/012004.

Sudarmanto, A. (2015) 'Program Pendampingan Teh Seduh dan Celup dari Daun Kersen Guna Menumbuhkan Kreatifitas Wirausaha di Kelurahan Lamper Tengah Kecamatan Semarang Selatan Kota Semarang', *Dimas*, 15(1), pp. 71–84.

Sukardiman *et al.* (2013) 'Hypoglycemic Activity Herbal Tea Combination of Andrographis paniculata Herbs and Swietenia mahagoni Seeds', *E-Journal Planta Husada*, 1, pp. 4–6.

Sukhava, A. (2022) *The trends and specific of the world tea market*.

Supeno, B. *et al.* (2020) 'Inovasi Pengolahan Limbah Bunga Kopi untuk Minuman Teh sebagai Produk Sampingan Petani Kopi di Wilayah Hutan Kemasyarakatan Sesaot', *Jurnal PEPADU*, 1(2), pp. 144–150.

Supriyanto, Darmadji, P. and Susanti, I. (2014) 'Studi Pembuatan Teh Daun Tanaman Kakao (Theobroma cacao L) Sebagai Minuman Penyegar', *Agritech*, 34(4), pp. 422–429. doi: 10.22146/agritech.9437.

Suthari, S. *et al.* (2021) 'Ethnobotanical perspectives in the treatment of communicable and noncommunicable diseases', in *Phytomedicine*. Academic Press, pp. 251–289.

Tiyani, U., Suharti and Andriani, S. (2020) 'Formulasi dan uji organoleptik teh celup daun Kersen (Muntingia calabura L.) untuk memelihara kadar gula darah dan penambahan rimpang Jahe (Zingiber officinale) sebagai penghangat tubuh', *Journal of Holistic and Health Science*, 4(1), pp. 43–49.

Triandini, I. G. A. A. H., Wangiyana, I. G. A. S., Ratnaningsih, Y., & Rita, R. R. N. D. (2022) 'Pelatihan pembuatan teh herbal penunjang primary health care selama masa pandemi Covid-

19 bagi ibu PKK Tanjung Karang Kota Mataram', *SELAPARANG Jurnal Pengabdian Masyarakat Berkemajuan*, 6(2), pp. 630–636.

Triandini, I. G. A. A. H. and Wangiyana, I. G. A. S. (2022) 'Mini-review uji hedonik pada produk teh herbal hutan', *Jurnal Silva Samalas*, 5(2), pp. 12–19.

Triandini, I.G.A.A.H., Gumangsari, N.M.G. and Wangiyana, I.G.A.S. (2023). 'Knowledge and Behavior regarding Consumption of Herbal Galactagogues among Breastfeeding Women in Mataram City'. Embrio: Jurnal Kebidanan, 15(1), pp.1-10.

Wangiyana, I.G.A.S., Ratnaningsih, Y., Usman, K., Atmaja, I.G.D. and Triandini, I.G.A.A.H. (2023). Pelatihan Pembuatan Teh Herbal Hutan untuk Petani Hutan Buwun Sejati. SELAPARANG: Jurnal Pengabdian Masyarakat Berkemajuan, 6(3), pp.1631-1638.

Wangiyana, I. G. A. S., Triandini, I. G. A. A. H., Putradi, D., & Wangiyana, W. (2018) 'Tannin Concentration of Gyrinops Tea from Leaves of Juvenile and Mature Agarwood Trees (Gyrinops versteegii Gilg (Domke)) with Different Processing Methods', *Journal of Chemical and Pharmaceutical Research*, 10(10), pp. 113–119.

Wangiyana, I. G. A. S., Sawaludin, S., Nizar, W. Y., & Wangiyana, W. (2019) 'Tannin concentrations of Gyrinops tea with different leaf processing methods and addition of herbal medicine ingredients Tannin Concentrations of Gyrinops Tea with Different Leaf Processing Methods and Addition of Herbal Medicine Ingredients', in *AIP Conference Proceedings*. AIP Publishing, pp. 1–7.

Wangiyana, I. G. A. S., Supriadi, Nikmatullah, A. & Mulyaningsih, L. *et al.* (2021) 'Tannin Concentration of Gyrinops Tea Taken Form Different Agarwood Plantation and Different Processing Method Tannin Concentration of Gyrinops Tea Taken Form Different Agarwood Plantation and Different Processing Method', *IOP Conf. Series: Earth and Environmental Science*, 913(012068), pp. 1–7. doi: 10.1088/1755-1315/913/1/012068.

Wangiyana, I. G. A. S., Supriadi, S., Nikmatullah, A., Sunarpi, S., & Triandini, A. A. H. (2022) 'Diversity of Gyrinops versteegii from several agarwood plantation on Lombok Island (Indonesia) as raw material of Gyrinops tea', *Biodiversitas*, 23(1), pp. 178–186.

Wangiyana, I. G. A. S., Gunawan, F. and Triandini, I. G. A. A. H. (2023) 'Mapping of Herbal Tea Source on Gapoktanhut Puncak Semaring Production Forest of Mekar Sari Village East Lombok', *Jurnal Hutan dan Masyarakat*, 15(1), pp. 1–13.

Wangiyana, I. G. A. S., Putri, D. S. and Triandini, I. G. A. A. H. (2019) 'Pelatihan Pengolahan Daun Gaharu Menjadi Teh Herbal Untuk Istri Petani Anggota Kelompok Tani Desa Duman', *Logista Jurnal Ilmiah Pengabdian Kepada Masyarakat*, 3(2), pp. 82–89.

Wangiyana, I. G. A. S. and Sami'un (2019) 'Pengolahan Daun Gaharu (Gyrinops Versteegii) Menjadi Teh Herbal dengan Kualitas Warna dan Rasa Yang Disukai', in *Prosiding Seminar Saintek*. Mataram, pp. 156–162.

Wangiyana, I. G. A. S. and Triandini, I. G. A. A. H. (2021) 'Mini-review Teknologi Produksi Teh Herbal Gaharu', *Journal of Agritechnology and Food Processing*, 1(2), pp. 85–92.

Wangiyana, I. G. A. S. and Triandini, I. G. A. A. H. (2022) 'Hedonic test of tree leaf herbal tea using various statistical approaches', *Journal of Agritechnology and Food Processing*, 2(2), pp. 43–53.

Wangiyana, I. G. A. S., Triandini, I. G. A. A. H. and Anita Nugraheni, Y. M. M. (2021) 'Hedonic test of agarwood tea from Gyrinops versteegii with different leaves processing method', *Jurnal Riset Industri Hasil Hutan*, 13(2), pp. 99–110.

Willis, S. *et al.* (2017) 'A Comparison of Selected Phytochemical and Antioxidant Potential of Two Tea Beverages', *Food and Nutrition Sciences*, 8, pp. 1039–1049. doi: 10.4236/fns.2017.811076.

Xuetao, P. (2015) *Innovation Strategies of the Herbal Tea Industry in Guangdong*. Instituto Universitario de Lisboa.