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Knowledge of the Madurese Community-Indonesia Regarding Bioprospection of the Traditional Herb Kamandin Saebo (Glossocardia leschenaultii [Cass.] Veldkamp)

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Abstract

The purpose of this study was to describe the knowledge of the Sumenep Madura community (village elders and gatherers) about the Kamandin Saebo (Glossocardia leschenaultii) plant and its utilization. This study uses observational research that aims to observe a fact at a certain time using a descriptional approach model. The research was conducted in the Sumenep-Madura area, East Java Province. The research was conducted in July 2023-August 2023 by observational method. We discussed the results of information regarding the knowledge of the Sumenep people about the existence and growing areas of Kamandin saebo, a literature search regarding the morphological characterization, benefits, or uses of Kamandin saebo in medicine as conveyed by the gatherers. We also found that Kamandin Saebo is of great value. There are 14 healing functions associated with Kamandin Saebo. The Madurese people believe this plant to have many benefits or even cure all diseases.

Keywords: Bioprospection; Kamandin saebo; Madurese; Traditional ingredients

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INTRODUCTION

Indonesia has a very high biodiversity of medicinal plants. There are around 30,000 species of medicinal plants in Indonesia and only about 940 species of medicinal plants have been used and have been proven to be able to treat certain diseases (Dewi et al., 2021; Tunny, 2022; Widayati & Wulandari, 2018). Medicinal plants have become a necessity for people's lives both as a source of food and for traditional medicine which has been used from generation to generation because of their many proven benefits that can cure a disease (Daeli, 2023; Nurhidayah et al., 2023; Perdani & Hasibuan, 2021; Raodah, 2019). This potential wealth is very important and needs to be bioprospected.

The use of medicinal plants shows the relationship between humans and nature, which is called ethnobotany (Rukmana et al., 2021). Ethnobotany is literally the study of the complex relationship that occurs between humans and the use of plants in the process of cultural development (Domingo-Fernández et al., 2023; Sunariyati, 2018; Supiandi et al., 2019). Besides ethnobotany, there are also studies with the paradigm

of activities carried out in the present and in the future to increase the use value of medicinal plants for health, including their economic value, known as bioprospection. Bioprospecting is taken from the words biodiversity and prospecting (Maulidi, 2020). In terms of meaning, it can be interpreted that bioprospecting is the process of searching for biological resources, especially genetic resources and other biological materials for commercial purposes (Beattie et al., 2011; Bonney, 2006; Pyne et al., 2016; Tvedt, 2020).

Bioprospecting cannot leave behind ethnobotany, namely the study of the relationship between humans and plants for their living needs based on the local wisdom of previous communities. This is because bioprospecting has elements of ethnobiology. Ethnobiology also includes ethnobotany and ethnopharmacology (Afrianto et al., 2020; Ghorbani et al., 2006; McClatchey et al., 2009). Thus, bioprospection remains based on the local wisdom of the ancestors regarding natural materials such as medicinal plants, but is supported by science and technology, with the aim that these natural medicinal plant materials have more value for the present and the future (Astutik et al., 2019; Kusumaputri et al., 2016; Oktavia et al., 2022; Weking et al., 2023).

Bioprospecting is important to be developed so that natural materials such as medicinal plants have more prospects in the future in line with developments in science and technology, but still based on the local wisdom of the former community (Maulidi, 2020). The use of medicinal plant bioprospection must of course be supported by sustainable sustainability or what is often called conservation. Conservation efforts can have a long-term impact on use by preserving it.

The use of plants as medicine in Indonesian society has been carried out by various communities traditionally, meaning without the use of modern machines (Elfahmi et al., 2014; Fokunang et al., 2011; Nayaka et al., 2023). It is also found in Madura, East Java Province. One of them is related to the plant Kamandin Saebo (Glossocardia leschenaultii [Cass.] Veldkamp). Kamandin saebo is an endemic plant found in hilly, mountainous and coastal areas at an altitude of 100 meters above sea level in the Sumenep region, Madura, East Java Province (Abdullah, 2023; Muhanifah, 2023). Kamandin saebo which grows a lot in calcareous soil areas has been used as a herbal medicine for generations, but the evidence of its efficacy is based on empirical evidence (traditional experience of the people) (Nabila, 2023). Traditionally, Madurese people have a close relationship in maintaining their traditions, namely the use of traditional medicines from plants, one of which is Kamandin Saebo. This research is more focused on the growth pattern of Kamandin saebo (Ahmadi, 2023). Thus, it is necessary to make efforts to make Kamandin Saebo a research focus in order to maintain the continuity of its function and existence.

These efforts can be started by exploring local community knowledge regarding the existence and potential of Kamandin Saebo. The local communities referred to are village elders or community leaders and traditional medicine gatherers. Research related to Kamandin Saebo is still very limited. Existing research so far has focused on molecular identification and morphological characterization of Kamandin Saebo (Hariri et al., 2021), growth of Kamandin Saebo (Ahmadi, 2023), growth of Kamandin Saebo seedlings (Nabila, 2023), and the growth response of Kamandin Saebo due to the influence of the concentration of the hormone auxin IAA (Muhanifah, 2023). There has been no research focused on local (Madurean) community knowledge regarding Kamandin Saebo bioprospecting.

Therefore, the purpose of this research is to describe the knowledge of the Sumenep Madura community (village elders and concocters) about the Kamandin saebo plant and its utilization. The results of this study contribute to strengthening ethnobotanical and ethnomedicine exploration (inventory of local knowledge, exploration of biological resources, collection of specimens. In addition, the results of this study can be a starting point in preserving and developing herbal medicine inherited from ancestors into herbal ingredients whose bioactive components are known.

METHOD

This research uses an observational research type that aims to observe a fact (biological, social, and ritual) at a certain time using a descriptional approach model. The research was conducted in the Sumenep-Madura region, East Java Province which includes the East Guluk-Guluk, Central Guluk-Guluk, Payudan Daleman, Lengkong Daya, and West Lengkong regions.

The research was conducted in July 2023-August 2023. The population in this study were people in the Sumenep Regency area. The samples in this research were community members known as village elders, herbal medicine makers, and gatherers or sellers. They are people whose lives are very familiar with the use of Kamandin saebo. The sampling technique used was incidental sampling.

The approach model used is a descriptional approach. This research is intended to determine the use of medicinal plants used by the community. The data collection techniques used in this research are observation, interviews, documentation and inventory. At observation stage, direct observations were made regarding the research location, and this was the beginning of this research to find out the various types of plants planted by the people at the research location. The interview process was carried out with the community at the research location, especially with people who work as gatherers or sellers of traditional medicine. Interviews were conducted to obtain detailed information regarding what types of plants are often used as traditional medicines and how to mix these medicines. This documentation stage is carried out to photograph every activity in this research, whether in the form of photos of plants or photos of activities. Third, inventory. This stage is carried out by looking for the taxonomy of plants that has been obtained from previous interviews, so that the classification of the plant can be known. The data obtained will be analyzed using descriptive analysis. The research flow of this study can be seen in Figure 1.

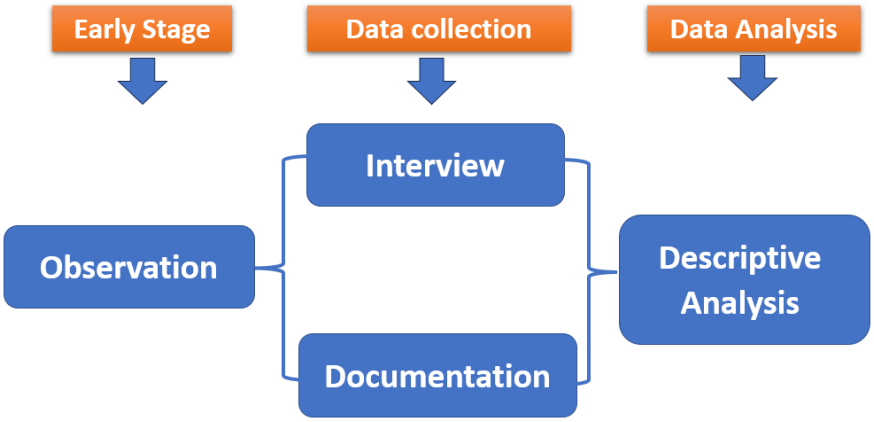

Figure 1. Research flow

RESULTS AND DISCUSSION

Based on the results of observations made by the research team, specifically Kamandin saebo grows in Guluk-Guluk District, Sumenep Regency, where it can be found in East Guluk-Guluk, Central Guluk-Guluk, Payudan Daleman, Lengkong Daya, and West Lengkong. According to the results of interviews with village elders, information was obtained that this plant is also found in other sub-districts adjacent to Guluk-Guluk District, namely Ganding District.

Information regarding the knowledge of the people of Sumenep about the existence and growing areas of Kamandin Saebo was obtained from interviews with elders from Guluk-Guluk village. Village elders in Payudan Daleman provided information that the Kamandin Saebo plant is rare and difficult to find. This grass-like plant is found in the Payudan Dundang Mountains. Based on this, a distribution map of Kamandin Saebo can be shown, as in Figure 2.

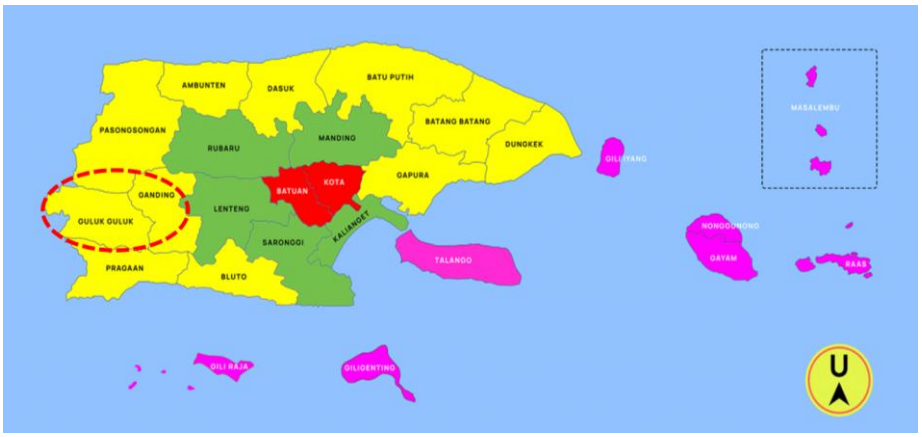

Figure 2. Distribution area of Kamandin Saebo in Sumenep Regency, namely Guluk-Guluk District

The research team conducted a literature search and obtained information that, through morphological characterization, Kamandin Saebo was a species of Glossocardia leschenaultii (Cass.) Veldkamp. The morphology of Kamandin Saebo based on the research team's findings from one of the herbal medicine makers is as shown in Figure 3. Meanwhile, the only information regarding the complete morphology of this plant can be found in previous research publications (Hariri et al., 2021), as in Figure 4.

Figure 3. The morphology of Kamandin Saebo plants

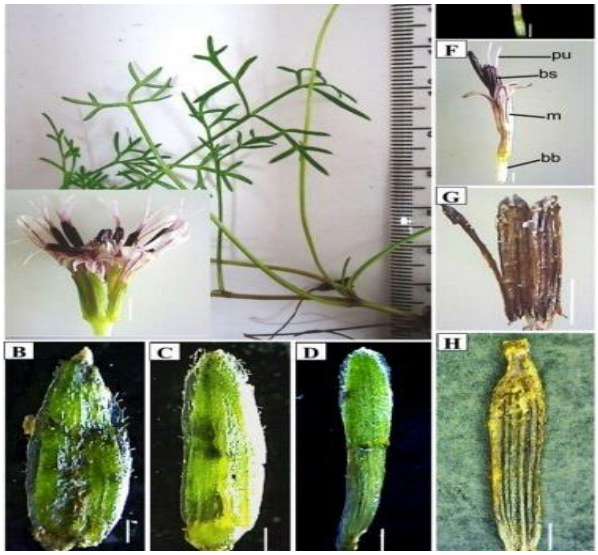

Figure 4. Glossocardia leschenaultii. A. Plant stature with cup inflorescences. Left side. bottom shows the arrangement of florets on the inflorescence; B. Outer filarial; C. Middle filarial; D. Internal phyllaries; E. Ribbon flowers; F. Tube flowers; G. Stamens; H. Longkah fruit. Description: pu=pistil; bs=anther; m=corolla; bb=will bear fruit. Scale line=0.5 mm; draw the arrangement of florets in a cup inflorescence=2 mm (Hariri et al., 2021).

Identification via BLAST- National Center for Biotechnology Information (NCBI) shows that Kamandin Saebo is a member of the Glossocardia genus with a sequence similarity percentage of 92.5%. Further information through morphological characterization shows that Kamandin Saebo is G. Leschenaultii (Cass.) Veldkamp (Hariri et al., 2021).

As for the benefits or uses of Kamandin saebo in medicine, as conveyed by a concoction, the following.

> "Usually we use the Kamandin Saebo herbal concoction, including for stomach ailments mixed with turmeric and ginger, for cancer mixed with ginger, also for external medicine as a balur oil and massage oil. "Massage oil can be used for gout, injuries, sprains, knee pain" (Interview 3/Respondent 3/07/2023).

Meanwhile, other concocters conveyed the following information:

> "We mix Kamandin Saebu to treat back pain, stomach ache, headaches, diarrhea, aches and asthma. "The method of concocting and applying it to sick people can vary" (Interview 4/Respondent 4/07/2023).

From respondents or other gatherers, information on the use of Komandin Saebu was obtained as follows:

> "The Kamandin Saebu potion that we produce can be used to treat hemorrhoids, skin diseases, eye pain and toothache. This can use Kamandin Saebo which has been soaked in oil. Many patients recovered and were helped to overcome their illnesses." (Interview 5/Respondent 5/07/2023).

Based on the results of interviews with these concocters, a summary can be made regarding medicinal uses, parts of the plant, and how to mix Kamandin Saebo, as presented in Table 1.

Table 1. Utilization of Kamandin Saebo in Medicine

No	Medicinal Aims	Plant Parts	How to mix
1	Back pain	All parts (roots and leaves)	For back pain, grind one handful of Kamandin saebo and add young chili leaves, then filter and drink.
2	Stomachache	roots and leaves	For stomach aches, take enough Kamandin saebo, then pound it and filter it, adding a little salt
3	Headaches (dizziness)	Leaves and stems	For headaches, boil a handful of Kamandin saebo, add ginger and coconut milk
4	Diarrhea	All parts of the plant	For diarrhea take one handful, add the leaves of the liman tapak, finely ground, add water then drink
5	Aches	All parts of the plant	The Kamandin Saebo plant is boiled and then drunk
6	Asthma	All parts of the plant	One handful of Kamandin Saebo is ground, mixed with a glass of water, then drunk
7	Kanker	All parts of the plant	Mixed with ginger
8	Hemorrhoids	Stems and leaves	Kamandin Saebo is soaked in oil, dripped on the affected part of the body
9	Gout	Stems and leaves	Kamandin Saebo is soaked in oil, used as massage oil
10	Injuries, sprains and knee pain	Stems and leaves	Kamandin Saebo is soaked in oil, used as massage oil
11	Skin diseases (itching, tinea versicolor, scabies)	Stems and leaves	Kamandin Saebo is soaked in oil, rubbed on the skin
12	Sore eyes	Stems and leaves	The oil soaked in Kamandin Saebo is dripped into the sore eye
13	Toothache	Stems and leaves	The oil soaked in Kamandin Saebo is dripped on the aching tooth
14	Gastric disease	All parts of the plant	Kamandin Saebo is mixed with turmeric and the juice is drunk.

Based on Table 1 it can be seen that in the Madurese community, Kamandin Saebo has a very large value. There are 14 healing functions associated with Kamandin Saebo. Kamandin saebo is widely used to mix various ingredients, according to the meaning of the word "saebo" which in Madurese means one thousand. This plant is believed by the Madurese to have many benefits or even cure all diseases.

Based on research by several academics, referring to herbal concoctions, Kamandin Saebo is a means for treating all kinds of diseases. Kamandin Saebo

contains alkaloids, steroids, and flavonoids which are currently still being studied in depth (Abdullah, 2023). The existence of this plant has been believed to be able to get rid of various diseases since ancient times. Kamandin Saebo is used as medicine using traditional methods so it is believed to have efficacy as an efficacious plant (Setiyorini, 2023).

Based on the observations, it was found that the form of the Kamandin Saebo ingredients which are traded traditionally in the Madurese community are simplicia, liquid (as balur oil or massage oil, which is mixed with oil or in other ingredients there are lots of other spices mixed in), and ingredients in the form of powder, consisting of a mixture of several medicinal plants. One form of potion (type of oil) that is sold traditionally is as presented in Figure 5.

Figure 5. One of the traditionally sold Kamandin Saebo oil products (Collection of Mr. Abdus Shamad, Sumenep).

This is in line with Kementerian Koordinator Bidang Perekonomian (2011) that since hundreds or even thousands of years ago our ancestors have used various types of plants and animals for treatment to maintain their health. This can be traced in evidence through stone tools for making herbal medicine, inscriptions, temple reliefs, ancient manuscripts and other products. In order to pass on the culture of our ancestors, adapted to today's culture, through the use of the same raw materials in a modern way. With various modern approaches, herbal medicine products for health are made in the form of food products, drinks, cosmetics, oils, capsules, etc.

The treatment of various diseases using herbs carried out by the community is a relic and legacy of the ancestors which has been passed down from generation to generation either through oral, written, and direct application to the next generation. Today the use of herbs for medicinal purposes is increasingly recognized by the wider community, however, the community is not well aware of herbs that are specifically used for the treatment of various diseases that have been used by the people of Sumenep-Madura. It is important to understand, recognize, and use medicinal herbs for various diseases to be studied and disseminated as alternative solutions to health problems. This will be of great benefit for the improvement of public health status, both for the people of Sumenep, Madura, and other communities, as well as the

accompanying traditions. Both of these are the potential of the nation's cultural wealth that must be developed and preserved.

The research results are in line with various previous studies that herbal plants are used for healing or preventing various diseases. The use of herbal plants as medicine can be done by drinking, applying or inhaling so that their use can fulfill the working concept of cell receptors in receiving chemical compounds or stimuli (Kumontoy et al., 2023; Sitorus et al., 2011; Widayati & Wulandari, 2018; Yulianto, 2017).

Herbal medicine may be an option to strengthen a person's immune system. Jamu is a traditional Indonesian herbal medicine that has been practiced for centuries in Indonesian society to maintain health and treat disease. Even though there are many modern medicines, herbal medicine is still very popular in rural and urban areas (Kusumo et al., 2020; Rahayu et al., 2020). The manufacture and sale of herbal medicine is a clear example of the intelligence of the Indonesian people who have known and used medicines derived from nature for generations. The process of managing herbal medicine is carried out in a simple way, such as drying it, extracting it into a drink and grinding it into powder and packing it in instant form and the herbal products made are used to maintain health and treat various types of diseases. This traditional herb is believed by the community to increase the body's immunity. As a recipe handed down from ancestors, herbal medicine processing must be maintained and developed (Rahmawati et al., 2022; Welz et al., 2018).

In general, the people of Sumenep Madura view the natural environment as a source that is profitable and gives them life, it is proven that many people have a high dependence on plants or medicinal plants to be used as ingredients for traditional herbal medicine. Traditional herbal medicine for the people of Sumenep Madura cannot be separated from their daily lifestyle, especially if the ingredients taken from plants with medicinal properties must be processed through a ritual process by the herbalist before being used as herbal medicine. This is in line with Parmin et al (2022) that people who have the will to use herbal plants show that there is awareness of the importance of natural medicines that can be produced from their environment. The hereditary and sustainable use of medicinal plants is a form of conservation that can preserve community culture. Medicinal plants have natural medicinal properties that can strengthen the drug resistance of families and communities.

Of course, this potential must continue in the scientification of herbal medicine. There are requirements for herbal medicine to be used in health facilities, namely the availability of herbal medicine that is safe from toxicity tests, has real efficacy that has been scientifically tested or based on empirical data proven by preclinical tests, and is of good quality, namely referring to guidelines that have been applied nationally (Febriyanti et al., 2014), namely Regulation of the Minister of Health of the Republic of Indonesia Number 003/MENKES/PER/I/2010. There is a high demand for using herbal medicine in health services. The Jamu scientification program aims to provide scientific evidence regarding the efficacy and safety of herbal medicine through research and development. Herbal scientification is seen as a breakthrough effort to accelerate downstream research on herbal medicine. As traditional medicine, herbal medicine uses a naturopathic approach, directed at healing rather than getting rid of disease as in allopathic medicine. Conventional medicine, using an allopathic approach, employs radical therapies such as drugs and surgery. Herbal medicine scientification attempts to synthesize naturopathic and allopathic approaches into

integrative medicine. Consequently, clinical outcome evaluation for Herbal scientification uses a holistic approach, as an integrative medical philosophy (Siswanto, 2012).

CONCLUSION

Kamandin Saebo is an endemic plant found in the Sumenep area of Madura, especially in Guluk-Guluk District and Ganding District. Village elders provided information that the Kamandin Saebo plant was becoming rare and difficult to find. For the Madurese people, Kamandin Saebo has enormous value. There are 14 healing functions associated with Kamandin Saebo. Kamandin saebo is widely used to mix various herbs. This plant is believed by the Madurese to have many benefits or even cure all diseases.

RECOMMENDATION

This research is only limited to an initial study of local community knowledge. In this regard, further research is needed regarding the content of the bioactive compound Kamandin Saebo from the results of identification and isolation of secondary metabolites as candidate immunomodulators. Apart from that, it is necessary to develop Kamandin Saebo into herbal medicine that complies with the rules for herbal medicine scientification, namely Regulation of the Minister of Health of the Republic of Indonesia Number 003/MENKES/PER/I/2010.

Author Contributions

conceptualization and methodology, EP and HR; Validation, formal analysis, TIP and ADA; Writing-Draft preparation, MMN. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interests

The authors declare no conflict of interest.

REFERENCES

Abdullah, G. (2023). *Komantin saèbu, flora endemik Madura dalam bayang kepunahan*. Mongabay. https://www.mongabay.co.id/2023/04/04/komantin-saebu-flora-endemik-madura-dalam-bayang-kepunahan/

Afrianto, W. F., Tamnge, F., & Hasanah, L. N. (2020). Review: A relation between ethnobotany and bioprospecting of edible flower Butterfly Pea (Clitoria ternatea) in Indonesia. *Asian Journal of Ethnobiology*, *3*(2), 51–61. https://doi.org/10.13057/asianjethnobiol/y030202

Ahmadi, L. (2023). *Pengaruh ekstrak bawang merah dan air kelapa terhadap pertumbuhan tanaman Kamandin Saebo (Glossocardia leschenaultii)*. Universitas Trunojoyo Madura.

Astutik, S., Pretzsch, J., & Kimengsi, J. N. (2019). Asian medicinal plants' production

and utilization potentials: A review. *Sustainability (Switzerland)*, *11*(19), 1–33. https://doi.org/10.3390/su11195483

Beattie, A. J., Hay, M., Magnusson, B., de Nys, R., Smeathers, J., & Vincent, J. F. V. (2011). Ecology and bioprospecting. *Austral Ecology*, *36*(3), 341–356. https://doi.org/10.1111/j.1442-9993.2010.02170.x

Bonney, S. A. (2006). Bioprospecting, scientific research and deep sea resources in areas beyond national jurisdiction: A Critical legal analysis. *New Zealand Journal of Environmental Law*, *10*(January), 41–91.

Daeli, D. Y. (2023). Studi etnobotani tanaman obat tradisional pada masyarakat di Desa Orahili Kecamatan Sirombu Kabupaten Nias Barat. *TUNAS: Jurnal Pendidikan Biologi*, *4*(1), 1–16.

Dewi, K. P., Bintoro, A., Asmarahman, C., & Duryat, D. (2021). Keanekaragaman jenis tumbuhan berkhasiat obat di Blok Pemanfaatan Hutan Pendidikan Konservasi Terpadu Taman Hutan Raya War Lampung. *JOPFE Journal*, *1*(2), 1–11.

Domingo-Fernández, D., Gadiya, Y., Mubeen, S., Bollerman, T. J., Healy, M. D., Chanana, S., Sadovsky, R. G., Healey, D., & Colluru, V. (2023). Modern drug discovery using ethnobotany: A large-scale cross-cultural analysis of traditional medicine reveals common therapeutic uses. *IScience*, *26*(9), 107729. https://doi.org/10.1016/j.isci.2023.107729

Elfahmi, Woerdenbag, H. J., & Kayser, O. (2014). Jamu: Indonesian traditional herbal medicine towards rational phytopharmacological use. *Journal of Herbal Medicine*, *4*(2), 51–73. https://doi.org/https://doi.org/10.1016/j.hermed.2014.01.002

Febriyanti, R. M., Maesaroh, I., Supriyatna, S., Sukandar, H., & Maelaningsih, F. S. (2014). Analisis farmakoekonomi saintifikasi jamu antihipertensi, antihiperglikemia, antihiperkolesterolemia, dan antihiperurisemia. *Indonesian Journal of Pharmaceutical Science and Technology*, *1*(2), 39–46. https://doi.org/10.15416/ijpst.v1i2.7512

Fokunang, C. N., Ndikum, V., Tabi, O. Y., Jiofack, R. B., Ngameni, B., Guedje, N. M., Tembe-Fokunang, E. A., Tomkins, P., Barkwan, S., Kechia, F., Asongalem, E., Ngoupayou, J., Torimiro, N. J., Gonsu, K. H., Sielinou, V., Ngadjui, B. T., Angwafor, F. 3rd, Nkongmeneck, A., Abena, O. M., … Kamsu-Kom. (2011). Traditional medicine: past, present and future research and development prospects and integration in the National Health System of Cameroon. *African Journal of Traditional, Complementary, and Alternative Medicines : AJTCAM*, *8*(3), 284–295. https://doi.org/10.4314/ajtcam.v8i3.65276

Ghorbani, A., Naghibi, F., & Mosaddegh, M. (2006). Ethnobotany, ethnopharmacology and drug discovery. *Iranian Journal of Pharmaceutical Sciences*, *2*(2), 109–118. http://www.ijps.ir/article_1926_451.html%5Cnhttp://www.ijps.ir/pdf_1926_ce097bc790122e115fe7e22efd21a7e4.html

Hariri, M. R., Irsyam, A. S. D., Setiawan, A. B., Setiawan, E., Irwanto, R. R., & Atria, M. (2021). Identifikasi molekuler dan karakterisasi morfologi Kamandin Saebo, tumbuhan obat dari Pulau Madura. *Biotika*, *19*(2), 41–48. https://doi.org/10.24198/biotika.v19i2.35627

Kementerian Koordinator Bidang Perekonomian. (2011). Roadmap Pengembangan Jamu 2011-2025. In *Kementerian Koordinator Bidang Perekonomian RI*. Kementerian Koordinator Bidang Perekonomian RI.

Kumontoy, G. D., Deeng, D., & Mulianti, T. (2023). Pemanfaatan tanaman herbal sebagai obat tradisional untuk kesehatan masyarakat di Desa Guaan Kecamatan

Mooat Kabupaten Bolaang Mongondow Timur. *Jurnal Holistik*, *16*(3), 1–20.

Kusumaputri, V. S., Maidina, M., & Hendrix, T. (2016). Bioprospeksi tumbuhan obat tradisional dalam peningkatkan potensi obat tradisional berbasis kearifan lokal. *Inovasi Dan Pembangunan: Jurnal Kelitbangan*, *4*(2), 133–146.

Kusumo, A. R., Wiyoga, F. Y., Perdana, H. P., Khairunnisa, I., Suhandi, R. I., & Prastika, S. S. (2020). Jamu tradisional Indonesia: Tingkatkan imunitas tubuh secara alami selama pandemi. *Jurnal Layanan Masyarakat (Journal of Public Services)*, *4*(2), 465–471. https://doi.org/10.20473/jlm.v4i2.2020.465-471

Maulidi, A. S. (2020). *Bioprospeksi tanaman obat pada Komunitas Kudu Herbal Kota Semarang*. Universitas Islam Negeri Maulana Malik Ibrahim Malang.

McClatchey, W. C., Mahady, G. B., Bennett, B. C., Shiels, L., & Savo, V. (2009). Ethnobotany as a pharmacological research tool and recent developments in CNS-active natural products from ethnobotanical sources. *Pharmacology & Therapeutics*, *123*(2), 239–254. https://doi.org/10.1016/j.pharmthera.2009.04.002

Muhanifah, F. (2023). *Respon pertumbuhan Kamandin Saebo (Glossocardia leschenaultii) akibat pengaruh konsentrasi hormon auksin IAA (Indole Acetic Acid)*. Universitas Trunojoyo Madura.

Nabila, S. H. (2023). *Pengaruh perbedaan komposisi media tanam terhadap pertumbuhan bibit Kamandin Saebo (Glossocardia leschenaultii)*. Universitas Trunojoyo Madura.

Nayaka, N. M. D. M. W., Yuda, P. E. S. K., Sanjaya, D. A., Ernawati, D. K., Cahyaningsih, E., Dewi, N. L. K. A. A., & Sasadara, M. M. V. (2023). Ethnobotanical Study of Medicinal Plant Usage During Covid-19 Pandemic: a Community-Based Survey in Indonesia. *Biotropia*, *30*(2), 183–194. https://doi.org/10.11598/btb.2023.30.2.1784

Nurhidayah, D. N., Saprin, Walukou, M. A., & Rabani, A. I. (2023). Kajian etnobotani tumbuhan obat pada masyarakat lokal di Kecamatan Sabulakoa Kabupaten Konawe Selatan. *AMPIBI: Jurnal Alumni Pendidikan Biologi*, *8*(1), 1–7.

Oktavia, D., Pratiwi, S. D., Munawaroh, S., Hikmat, A., & Hilwan, I. (2022). The potential of medicinal plants from heath forest: Local knowledge from Kelubi Village, Belitung Island, Indonesia. *Biodiversitas*, *23*(7), 3553–3560. https://doi.org/10.13057/biodiv/d230731

Parmin, P., Rusilowati, A., & Rahayu, E. F. (2022). Pemberdayaan masyarakat melalui konservasi tanaman obat untuk menunjang penyediaan bahan baku produksi jamu tradisional. *Jurnal Pemberdayaan Masyarakat*, *1*(1), 10–16. https://doi.org/10.46843/jmp.v1i1.263

Perdani, M. S., & Hasibuan, A. K. (2021). Analisis informasi tanaman herbal melalui media sosial ditengah masyarakat pada pandemi Covid-19: Sebuah tinjauan literatur. *Bencoolen Journal of Pharmacy*, *1*(1), 11–25. https://ejournal.unib.ac.id/index.php/bjp/article/download/15589/7585

Pyne, M. E., Narcross, L., Fossati, E., Bourgeois, L., Burton, E., Gold, N. D., & Martin, V. J. J. (2016). Chapter Nine - Reconstituting Plant Secondary Metabolism in Saccharomyces cerevisiae for Production of High-Value Benzylisoquinoline Alkaloids. In S. E. B. T.-M. in E. O'Connor (Ed.), *Synthetic Biology and Metabolic Engineering in Plants and Microbes Part A: Metabolism in Microbes* (Vol. 575, pp. 195–224). Academic Press. https://doi.org/https://doi.org/10.1016/bs.mie.2016.02.011

Rahayu, Y. Y. S., Araki, T., & Rosleine, D. (2020). Factors affecting the use of herbal medicines in the universal health coverage system in Indonesia. *Journal of*

Ethnopharmacology, *260*, 112974. https://doi.org/https://doi.org/10.1016/j.jep.2020.112974

Rahmawati, S., Martiana, S. J., Andriani, N., Aminah, S., & Setiyadi, B. (2022). Pengembangan ekonomi kreatif jamu tradisional herbal hidayah pada proses pembuatan merek di Kecamatan Pamenang, Kabupaten Merangin. *Jurnal Abdi Masyarakat Indonesia*, *3*(1), 1–6. https://doi.org/10.54082/jamsi.570

Raodah, R. (2019). Pengetahuan lokal tentang pemanfaatan tanaman obat pada masyarakat Tolaki di Kabupaten Konawe Sulawesi Tenggara. *Pangadereng : Jurnal Hasil Penelitian Ilmu Sosial Dan Humaniora*, *5*(1), 46–63. https://doi.org/10.36869/.v5i1.25

Rukmana, R., Mukhtar, M., & Zulkarnain. (2021). Kajian etnobotani untuk menggali potensi tanaman obat. *Prosiding Biologi Achieving the Sustainable Development Goals with Biodiversity in Confronting Climate Change*, 232–236. http://journal.uin-alauddin.ac.id/index.php/psb/article/view/24201

Setiyorini, A. (2023). *Komantin Saebu hampir tinggal cerita, Madura terancam tak punya obat mujarab*. Sumenep News. https://sumenep.pikiran-rakyat.com/nasional/pr-2186615507/komantin-saebu-hampir-tinggal-cerita-madura-terancam-tak-punya-obat-mujarab

Siswanto, S. (2012). Saintifikasi jamu sebagai upaya terobosan untuk mendapatkan bukti ilmiah tentang manfaat dan keamanan jamu. *Buletin Penelitian Sistem Kesehatan*, *15*(2), 203–211.

Sitorus, H., Salim, M., & Ambarita, P. (2011). Pola penggunaan tanaman obat tradisional di Desa Segara Kembang dan Desa Tungku Jaya di Kabupaten Ogan Komering Ulu. *Jurnal Pembangunan Manusia*, *5*(1), 1–12.

Sunariyati, S. (2018). Ethnobotanical studies of plants utilization in the gold mining region in central Kapuas, Indonesia. *Biodiversitas*, *19*(1), 215–221. https://doi.org/10.13057/biodiv/d190129

Supiandi, M. I., Mahanal, S., Zubaidah, S., Julung, H., & Ege, B. (2019). Ethnobotany of traditional medicinal plants used by dayak desa community in sintang, West Kalimantan, Indonesia. *Biodiversitas*, *20*(5), 1264–1270. https://doi.org/10.13057/biodiv/d200516

Tunny, R. (2022). Penyuluhan mengenai teknik pengolahan tanaman obat di Desa Tial. *Jurnal Pengabdian Ilmu Kesehatan*, *2*(1), 50–52.

Tvedt, M. W. (2020). Marine genetic resources: A practical legal approach to stimulate research, conservation and benefit sharing. In *Publications on Ocean Development* (Vol. 90, pp. 238–254). Brill. https://doi.org/10.1163/9789004391567_013

Weking, C. J. P., Hafsah, H., & Lestari, T. R. (2023). Study Of Medicine Plants Ethnobotany In Banceuy Indigenous People Subang Regency, West Java. *Media Konservasi*, *28*(1), 8–16. https://doi.org/10.29244/medkon.28.1.8-16

Welz, A. N., Emberger-Klein, A., & Menrad, K. (2018). Why people use herbal medicine: insights from a focus-group study in Germany. *BMC Complementary and Alternative Medicine*, *18*(1), 92. https://doi.org/10.1186/s12906-018-2160-6

Widayati, A., & Wulandari, E. T. (2018). Edukasi manfaat tanaman obat dan pengolahannya dengan metode CBIA di Desa Bulusulur, Kabupaten Wonogiri, Jawa Tengah. *ABDIMAS ALTRUIS: Jurnal Pengabdian Kepada Masyarakat*, *1*(1), 25–30. https://doi.org/10.24071/altruis.2018.010105

Yulianto, S. (2017). Penggunaan Tanaman Herbal Untuk Kesehatan. *Jurnal Kebidanan Dan Kesehatan Tradisional*, *2*(1), 1–7. https://doi.org/10.37341/jkkt.v2i1.37