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Exploration and Identification of Medicinal Plants in The Kesuma Bangsa Herbal Garden Lampung

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Abstract: Medicinal plants are plants that contain a substance that is used as one of the ingredients for treatment. The use of medicines derived from plants or natural sources is more common because it is cheaper and has fewer side effects. Identification of medicinal plants in the Kesuma Bangsa Herbal Garden was carried out with the aim of finding out the types of medicinal plants and parts of the plants used as medicine to treat diseases. The method used in this study was a descriptive method with a sampling technique using an exploratory technique where researchers made direct observations and then collected data by recording and photographing using a camera. The results showed that there were 20 species from 18 plant families that were used and processed as traditional medicines, where the types of medicinal plants that were commonly found were from the Araceae and Euphorbiaceae families. The leaf part with a percentage of 40% was the most widely used as traditional medicine.

Keywords: Identification, medicinal plants, traditional medicine.

Introduction

Indonesia is one of the countries that is the center of world biodiversity and is known as a megabiodiversity country. Abundant biodiversity is a natural wealth that is useful as the main capital for national development and as the lungs of the world that are needed both now and in the future. This great biodiversity holds the potential for medicinal plants that can be explored and utilized further. Biological resources have long been used by humans for medical purposes. There are at least around 5,100 plant species used by people as Chinese herbs. It is estimated that around 80% of the world's population still depends on traditional medicine (Anggraini, 2018; Siboro, 2019).

Indonesia is also known as a multiethnic country. Indonesia has around 300-700 ethnicities or tribes spread across various provinces. Lampung Province is a multicultural province with the diversity of existing tribes, marked by the original Lampung culture that blends and even mixes with other tribes. Lampung Province is one of the areas that has biodiversity where there are various types of plants with various potentials, one of which is as a medicinal plant. Traditional medicine is a natural ingredient or concoction derived from plants that has been used for generations to treat various types of diseases based on experience. Traditional knowledge possessed by a tribe or ethnic group is passed down from generation to generation, including the use of plants as traditional medicine (Silalahi, 2016; Yatobie, 2018; Arumugam et al. 2011).

Compared to the use of chemical drugs, the use of drugs derived from plants or conventional or natural treatments is more common because it is cheaper and has fewer side effects. Given that it has been proven to be useful in treating diseases and its use is more cost-effective, safe, efficient, and effective. Public education about this is now necessary to instill a preference for medicinal plants as an alternative therapy that is comparable to health services (Yasir, 2017).

The use of natural ingredients, especially medicinal plants, is currently increasing.

Medicinal plants that have been processed as traditional medicines have been used by humans since ancient times, especially in the lower middle class. Many types of medicinal plants have been processed and packaged in a modern way. The use of products from modern processing of medicinal plants is currently developing and used as a healthy and natural lifestyle (Kartika, 2015).

Based on the potential of traditional medicinal plants and their commercial use, taxonomic studies and conservation of medicinal plant species are important to do. The acceleration of the loss of species from their habitats and their exploitation throughout the world adds to the urgency of research into the identification of traditional medicinal plants. Around 15,000 species of medicinal plants are threatened with extinction worldwide. Experts estimate that the Earth loses at least one potential drug every two years (Belinda, 2008).

Along with the increasing demand for herbal medicines, research and development of medicinal plants has become very important to meet these needs. Many studies have shown that herbal medicines have great potential in treating various diseases. The results of research by Leksikowati et al. (2020) entitled Ethnobotany of Medicinal Plants of Local Communities in West Lampung Regency, namely medicinal plants used by the Lampung tribe in West Lampung Regency, total 50 species divided into 22 families. The most widely used part of the plant is the leaves, with a percentage of 43.55% (27 species).

Research by Slamet and S. Hafidhawati (2018) entitled Ethnobotany Study and Identification of Medicinal Plants of the Walio Sub-Ethnic Community, Baubau City, Southeast Sulawesi, stated that there are 126 species from 57 plant families that are used as medicine in the Walio sub-ethnic community. In the journal Pharmacy, Science, and Health, written by Henny et al. (2019), it was stated that the types of plants used as medicinal ingredients by the Muna Tribe through the use of leaves, roots, stems, rhizomes, and seeds, most of which have been researched and have medicinal properties, have the prospect of being developed into raw materials for the traditional medicine industry.

Kesuma Bangsa Herbal Garden is an educational herbal plant tourism park related to education and research located in Pujo Rahayu Village, Pesawaran Regency, Lampung Province. In the Kesuma Bangsa Herbal Garden there is a collection of medicinal plants; it can be said to be one of the plants that contains a substance that can be used as one of the ingredients for treatment. This medicinal plant has a function to prevent or treat a type of disease. This research was conducted with the aim of identifying medicinal plants in the Kesuma Bangsa Herbal Garden, Lampung. Through this research, it is expected to find important information about the characteristics of plants, their properties, and the right ways to use them for health.

With all the potential that exists, this research is expected to not only be a scientific study but also a concrete step to support the sustainability of the use of medicinal plants wisely and responsibly. The exploration and identification of medicinal plants in the Kesuma Bangsa Herbal Garden in Lampung, with all the challenges and opportunities that exist, is a very valuable effort in creating a healthier society through an approach based on local wisdom and the diversity of natural resources.

Material and Methods

Materials

A digital camera was used to take pictures of medicinal plants, the PlantSnap and PictureThis digital applications to identify, and stationery.

Methods

This study uses a descriptive exploratory approach to reveal information about the types of traditional medicinal plants. Field data was obtained by describing the types of traditional medicinal plants, which include the parts of the plants used as medicine to treat diseases. The method of collecting images of medicinal plants was carried out by exploring every corner of a location. Every time a medicinal plant was found, a picture was taken immediately.

Data analysis

The data obtained were analyzed descriptively and then explained more concisely and clearly in the form of tabulations and graphs by attaching images of observation results so that the information or data written was more valid in strengthening the research results by referring to the medicinal plant taxonomy book from Tjitrosoepomo (2010).

Results and Discussion

Traditional medicinal plants

Identification of medicinal plants in the Kesuma Bangsa Lampung Herbal Garden found 18 families with different species. The use of these medicinal plants is based on the experience of the local community to treat various diseases. There are two families of Fabaceae that are widely used by the community from the species Clitoria ternatea and Caesalpinia pulcherrima, which can relieve stomach disorders and constipation. Many types of medicinal plants are also found growing wild in the garden, so they are easy to reach when needed (Table 1). Descriptions of plants used as medicinal plants by the community include morphology, including roots, stems, twigs, rhizomes, sap, leaves, flowers, and fruits.

Lavender (*Lavandula angustifolia*)

Lavender (*Lavandula angustifolia*) is a plant with a height of 1-2 m, and its appearance is like grass and is often referred to as giant grass. The arrangement of flowers gathers in the middle with 6-8 flowers in each cluster. Small purple flowers with a length of 2-8 cm with bluish at the tip of the leaf and emit a fragrant aroma. The leaves are 2-6 cm in size and 4-6 mm wide, with parallel veins, short leaf stalks, and green, and grow at the end of the flower stem. The stem is grayish brown or dark brown with bark that has an elongated pattern according to the wood of the stem (WHO, 2007). Visually, the pandan leaf plant is as in **Figure 1.**

Bunga Telang (*Clitoria ternatea*)

Bunga Telang (*Clitoria ternatea*) (**Figure 2**) is a shrub that grows creeping, has a stem with fine hairs, and at the base of the woody stem, the old stem will be dull white while the young stem is green. Butterfly pea flowers have compound leaves with pinnate leaf veins, have 3-9 leaves, are green, have short stems, are oval or elliptical, and the base of the leaves is pointed while the tip is blunt. Butterfly pea flowers have a shape that resembles a butterfly, with green flower clusters, while the flower crown is indigo blue with a sprinkling of white in the middle. In addition, butterfly pea flowers have flat, elongated pods that are green when young and brownish when the pods are ripe (Utami, 2008).

Figure. 1. Lavender (*Lavandula angustifolia*)

Figure. 2. Bunga Telang (*Clitoria ternatea L.*)

Figure. 3. Keji beling (*Strobilanthes crispa*)

Keji beling (Strobilanthes crispa)

Keji beling, or kidney leaves (*Strobilanthes crispa*) (**Figure 3**), is a shrub herb with a taproot and can reach a height of 1-2 m. The stem is segmented, round, coarsely haired, and green in color. Monopodial branches can touch the ground and can be separated from the parent plant. The leaves are single, with short petioles, and opposite leaves. The shape of the leaf blade is lanceolate, elongated to oblong, with serrated edges, tapering tips and bases, and rough surfaces. The leaf veins are pinnate and green, and the taproot is light brown. The leaf part is used as a traditional medicine to treat kidney and back pain by boiling young leaves. Compound flowers, spike-shaped and in the axils of the protective leaves (Saita *et al.*, 2023).

Table 1. Types of medicinal plants in the Kesuma Bangsa Herbal Garden

No.	Local Name	Scientific Name	Familiy	Organ used	Benefits of the plant
	Lavender	*Lavandula angustifolia*	Lamiaceae	Flower	Asthma, Stomach Ache, Prevent Mosquito Bites, Overcome Anxiety.
2.	Bunga Telang	*Clitoria ternatea*	Fabaceae	Flower	Bloating and constipation
3.	Keji Beling	*Strobilanthes crispa*	Acanthaceae	Leaf	Kidney stone dissolver
4.	Alamanda	*Allamanda cathartica*	Apocynaceae	Leaves and flowers	Fever, smooth bowel movements, and prevent malaria complications
5.	Minyak Kayu Putih	*Melaluca cajuputi*	Myrtaceace	Leaves and twigs	Anti-inflammatory, antibacterial, analgesic, and sedative
6.	Jahe	*Zingiber officinale*	Zingiberaceae	Rhizome	Back pain, colds, lower cholesterol
7.	Serai	*Cymbopogon citratus*	Poaaceae	Stem	Wound and infection healing medicine
8.	Cocor bebek	*Kalanchoe pinnata*	Crassulaceae	Leaf	Eye pain medicine and analgesic (relieves pain)
9.	Jarak pagar	*Jatropha curcas*	Euphorbiaceae	Sap	Mouth ulcers
10.	Lidah buaya	*Aloe vera*	Asphodelaceae	Fruit	Wound healing, brightens and moisturizes the skin
11.	Kembang Merak	*Caesalpinia pulcherrima*	Fabaceae	Flowers, leaves and roots	Stomach disorders to uterine dysfunction
12.	Maja	*Aegle marmelos*	Rutaceae	Leaves, fruit and roots	Medicine for diarrhea, scabies and boils
13.	Kedondong	*Spondias dulcis*	Anacardiaceae	Fruit and leaves	Medicine for burns, ulcers, sore skin, dysentery and coughs
14.	Sedap malam	*Polianthes tuberosa*	Agavaceae	Flower	Antidepressant, increases relaxation, and prevents insomnia
15.	Belimbing wuluh	*Averrhoa bilimbi*	Oxalidaceae	Flowers and leaves	Cough and diarrhea
16.	Kitolod	*Isotoma longifolora*	Campanulaceae	Flowers and leaves	Eye pain medicine and analgesic (relieves pain)
17.	Katuk	*Sauropus androgynus*	Euphorbiaceae	Leaf	Breast milk (ASI) stimulant
18.	Kembang sepatu	*Hibiscus rosa-sinensis*	Malvaceae	Leaf	Fever

19.	Tapak liman	*Elephantopus scaber*	Asteraceae	Leaves and roots	Hemorrhoids, prolapsed intestines and appendicitis
20.	Sirsak	*Annona muricata*	Annonaceae	Fruit, leaves, stems and roots	Treat ulcers or boils, worms and digestive disorders

Alamanda (*Allamanda cathartica*)

Alamanda (*Allamanda cathartica*) (**Figure 4**), have a shrubby habitus, 4-5 m high. The stem is woody, round, lying, and has nodes; each node has a circular leaf, four to five strands, sap, and monopodial branching; young branches are green, purple above, and greenish white. Single leaves, oval, flat edges folded downwards, the tip and base are tapered, thick, pinnate veins, green. Compound flowers, bunch shape, bisexual, at the tip of the branch and leaf axil, cylindrical stalk, short, green, lanceolate petals, smooth surface, green, stamens attached to the crown, alternate crowns on the curve, cylindrical pistil stalk, two-lobed pistil head, yellow, trumpet- or funnel-shaped crown, flat surface, yellow. Box fruit, round, diameter ± 1.5 cm. Triangular seeds, whitish green when young, black when old. Taproot, dirty white. (Heyne, 1987).

Figure. 4. Alamanda (*Allamanda cathartica*)

Eucalyptus oil (*Melaluca cajuputi)*

The habitus of eucalyptus oil (*Melaluca cajuputi)* is in the form of a shrub or tree, with a taproot, woody stem parts, and bark that is easy to peel off. Single leaves do not have stipules, are opposite, alternate, or scattered, have flat edges, and contain essential oil glands (Lutfiasari, 2018). Visually, the eucalyptus oil plant is as in **Figure 5.**

Jahe (*Zingiber officinale*)

Jahe or Ginger plant (*Zingiber officinale*) (**Figure 6**) is a pseudo-stemmed plant, 30 cm to 1 m high, upright, unbranched, composed of leaf sheaths, round, pale green in color, and reddish at the base of the stem. Ginger roots are round, slender, fibrous, and white to light brown in color. This plant produces compound flowers in the form of panicles that appear on the surface of the soil in the form of narrow sticks or ovoids and are very sharp (Wardana, 2002). Ginger plants form rhizomes whose size depends on the type, rather flat, and appear to have nodes (Rismunandar, 1988).

Figure. 5. Eucalyptus oil (*Melaluca cajuputi)*

Figure. 6. Ginger (*Zingiber officinale*)

Serai (*Cymbopogon citratus*)

Serai or Lemongrass (*Cymbopogon citratus*) plants are clumps with soft, yellowish-white and purplish stems, stiff and easily broken, growing upright. The leaves are green and stemless, rough with a rough texture. This plant has a strong aroma with pointed leaf tips. This plant has fibrous roots with short rhizomes (**Figure 7**) (Saita et al., 2023).

Figure. 7. Lemongrass (*Cymbopogon citratus*)

Cocor bebek (*Kalanchoe pinnata*)

Cocor bebek (*Kalanchoe pinnata*) (**Figure 8**) is a perennial plant that stores water and grows about 1 to 1.5 meters. The leaves are thick, green, fleshy, and have distinctive serrations. The stems are tall and hollow (Rajskhar et al., 2016). The leaves are oval, long-stemmed, with a blunt tip and rounded base. Compound flowers, often with leaf buds and adventitious roots (Biswas, 2011).

Figure. 8. Cocor bebek (*Kalanchoe pinnata*)

Jarak pagar (*Jatropha curcas)*

Jarak pagar or Jatropha hedge (*Jatropha curcas)* is a shrub that can reach a height of 1-7 meters and has irregular branches. The woody stem is cylindrical, and if cut, will release sap. Single leaves spread throughout the stem. The leaf veins are finger-shaped with 5-7 main leaf veins. The flowers of the castor plant are compound flowers in the form of panicles, yellowish green in color, unisexual, and monoecious (**Figure 9**) (Warganegara & Restina, 2016).

Figure. 9. Jarak Pagar (*Jatropha curcas)*

Lidah Buaya (*Aloe vera)*

Lidah Buaya (*Aloe vera)* (**Figure 10**) is a perennial plant with leaves in clusters that can grow up to 1 m. The long leaves are shaped like spurs, thick and fleshy, brittle, have small serrated edges, pointed tips, the base hugs the stem, and the surface is speckled, green in color, gathered at the end of the stem. Compound inflorescences in reddish-yellow clusters. If the thick, fleshy aloe vera leaves are peeled, there is a yellow liquid that tastes bitter (if processed into a medicine called "aloes") and the inside produces a thick gel (if processed into a medicine called "aloe vera gel"). Propagation by separating the shoots. (Dalimartha, 2008).

Figure. 10. Lidah Buaya (*Aloe vera*)

Kembang Merak (*Caesalpinia pulcherrima*)

Kembang Merak or the peacock flower (*Caesalpinia pulcherrima*) has a shrubby habitus. Its height is only around 2 to 4 m. Its branches are quite numerous, although the diameter is not too large. The leaves of the peacock flower plant are compound leaves with two double pinnates. The leaflets are elliptical with rounded tips and flat edges. This plant has a campagnat-type tree architecture model (**Figure 11**) (Nurchayati &

Ardiansyah, 2021).

Figure. 11. Kembang Merak (*Caesalpinia pulcherrima*)

Maja (*Aegle marmelos*)

Maja (*Aegle marmelos*) (**Figure 12**) is a shrub with green fruit skin and has a very hard shell. The mahogany tree can grow up to 20 meters high, and its wood is very hard. Maja plant propagation can be generative (seeds) or vegetative (grafting) (Rismayani, 2013). The stem is woody, round, branched, thorny, and yellowish white (BPOM RI, 2008). The branches of the mimosa tree have many thorns that grow on the leaf twigs. The leaves are alternate and have offspring; the leaves have long stems, and the edges have translucent points (Utami, 2008). Maja flowers are in the form of bunches that emerge from the leaf axils, clustered, and the flower petals are triangular, greenish to white, and fragrant. The fruit is rather round and green in color; the skin of the fruit is woody and hard, and the seeds are 6-10 pieces in the clear flesh of the fruit (Sunarto, 1992).

Figure. 12. Maja (*Aegle marmelos*)

Kedondong (*Spondias dulcis*)

Kedondong or ambarella (*Spondias dulcis*) has a woody stem, hard and strong, that grows upright. The branching of the stem is sympodial, and the surface of the stem is smooth and greenish white. The leaves are compound type; the widest part is in the middle of the blade, elliptical, the base of the leaf is pointed, and the tip is pointed and green (Rakhmawati & Yunianta, 2015). Ambarella plants have compound flowers, in the form of panicles; the stems are monopodial branches, the number of stamens is eight, yellow, and the flower crowns are 4-5, lanceolate, and the flower color is yellowish white (Prasojo, 1984). Ambarella fruit is oval; the true fruit is a single type of fleshy fruit that is yellowish green (**Figure 13**) (Hermanto, 2013).

Figure. 13. Kedondong (*Spondias dulcis*)

Bunga sedap malam (*Polianthes tuberosa)*

Bunga sedap malam (*Polianthes tuberosa)* (**Figure 14**) are funnel-shaped and fragrant, 25 cm long, single or double flowers supported by spikelets (Yadav & Bose, 1989). Tuberose leaves are long and flat, shiny green on the top and light green on the leaf surface. Tuberose tubers are pseudo-stems that change shape and function as food reserves, have roots that spread in all directions, and fibrous roots are visible coming out of the main stem. (Rukmana, 1995).

Figure. 14. Bunga sedap malam (*Polianthes tuberosa)*

Belimbing wuluh (*Averrhoa bilimbi*)

Belimbing wuluh or starfruit (*Averrhoa bilimbi*) (**Figure 15**) is a plant with a height ranging from 10 m to 15 m with a stem that is not too large, rough with bumps, and has a diameter of about 30 cm. has hairy leaves with a pinnate shape with 21-45 pairs of leaflets. The leaflets have short stalks, pointed tips, rounded bases, and flat edges; they are green, and the bottom is rather light in color, has few branches, and young branches have fine hair like light brown velvet. The flowers are panicles, small, star-shaped, reddish-purple in color, with 10-30 mm long petals that grow on stems or other branches. Starfruit is round, oval, or faceted, 4-6.5 cm long, yellowish green in color, and has a sour taste (Alhassan & Ahmed, 2016).

Figure.15. Starfruit (*Averrhoa bilimbi*)

Kitolod (*Isotoma longifolora*)

Kitolod (*Isotoma longifolora*) (**Figure 16**) is an annual plant, upright, about 50 cm tall, branched from the base, hairy, with white sap that tastes sharp and poisonous (Eff, 2016). The leaves are green with serrated edges, have white flower crowns, and reddish-brown seeds (Paramitha et al., 2015).

Figure. 16. Kitolod (*Isotoma longifolora*)

Katuk (*Sauropus androgynus)*

Katuk (*Sauropus androgynus)* (**Figure 17**) is a shrub 2.5-5 meters tall. The stem is woody, round with clearly visible leaf scars. The stem is light green when young and dark green when old. Compound leaves, oval with pointed tips and blunt bases. The leaf edges are flat with pinnate veins, compound flowers, and roots in the form of taproots and dirty white (Napitupulu et al., 2008).

Figure. 17. Katuk (*Sauropus androgynus)*

Kembang Sepatu *(Hibiscus rosa-sinensis)*

Kembang Sepatu *(Hibiscus rosa-sinensis)* is an annual shrub about 3 meters tall. The stem is round and woody. When young, it is purple, and when old, it is dirty white. Single leaves with serrated edges, pointed tips, and blunt bases. The petals are 5 in the shape of a bell and are green. The crown consists of 5-20 pink crowns. The taproot is light brown (**Figure 18**) (Napitupulu et al., 2008).

Figure. 18. Kembang Sepatu *(Hibiscus rosa-sinensis*)

Tapak liman (*Elephantopus scaber)*

Tapak liman (*Elephantopus scaber)* is a perennial shrub with a height of more than 80 cm. The stem is woody, cylindrical, and forked;

branches are green in color, and the stem has white hair. The leaves are single, funnel-shaped, the edges of the leaves are serrated, the tips are blunt, and the bases are pointed. The surface of the leaves is rough and hairy, the veins of the leaves are pinnate, and the leaves are green. The flower petals are triangular, hairy, and consist of five strands, green in color; the crown is tubular, reddish purple, sometimes white. The fruit is hard, hairy, and black. The cone-shaped seeds are blackish brown in color. The taproot is white (BPOM RI, 2008).

Sirsak (*Annona muricata)*

Sirsak or soursop (*Annona muricata)* is a woody plant that has a brown stem, is round in shape, and has many branches. The growth of the stem is upright. Single leaves are oval or lanceolate, with a pointed tip and a tapering base. The morphology of soursop flowers is that the petals are small, whitish yellow, and have hairy stamens. Soursop flowers are single flowers and are composed of hemicylis. Soursop fruit has a hard, dark green skin and has a rough surface with quite sharp spots. The soursop root system is a taproot with a round root morphology and is light brown in color (Prayogo, 2013). Visually, the tapak liman and sirsak plant is as in **Figure 19 and 20.**

Figure. 19. Tapak liman (*Elephantopus scaber)*

Figure. 20. Sirsak (*Annona muricata*)

The percentage of plant parts used as medicinal plants by the community includes roots, stems, fruits, twigs, leaves, flowers, rhizomes, and sap. The parts of the leaves are the parts that are widely used to be processed as medicine, as seen in (**Figure 21**).

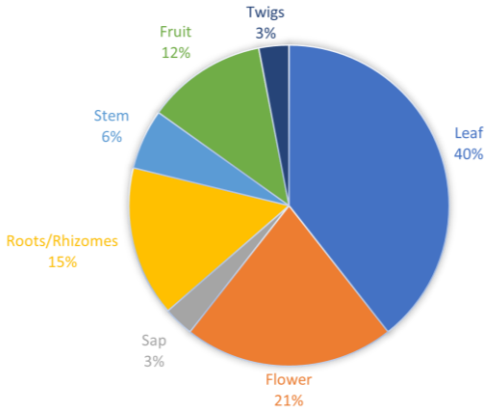

Figure 21. The percentage of plant parts used as medicinal plants

The results of this study are supported by research by Haziki & Syamswisna (2021) on the community in Setapuk Kecil Village, Singkawang, that the most widely used part is the leaves. The Penguluh Tribe in Sarolangun was reported by Has et al. (2020) to also use the most dominant leaves. The results of research by Azmin et al. (2019) also revealed the same thing in the community in Lambitu District, Bima. All parts of the plant will be used for medicine that is believed by the people of Semerap Village.

Conclusion

There are 20 species from 18 plant families that are used and processed as traditional medicine, where the types of medicinal plants that are commonly found are from the Araceae and Euphorbiaceae families. The parts of the plant that are used as medicine by the community around the Kesuma Bangsa Herbal Garden to be processed as traditional medicine are leaves, roots, stems, fruits, twigs, flowers, rhizomes, and sap. The part of the plant that is widely used is the leaves, which reach 40%.

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