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Medicinal Plants from Local Wisdom Sasak with Phytochemistry Course

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Abstract — Phytochemistry course is a compulsory course in Bachelor of Pharmacy which should combine theory and practice. Phytochemistry courses are divided into Phytochemistry 1 and Phytochemistry 2 courses in the form of theory (2 credits) at several leading universities in Indonesia. The curriculum in the Pharmacy department or study program at universities in Indonesia does not all combine theory and practice in Phytochemistry Courses (University of Indonesia, Bandung Institute of Technology, Udayana University) although there are several universities using a 1 credit practicum in it such as UGM, UNAIR, and UNPAD. The purpose of this study is to model the practicum of Phytochemistry Course based on the local wisdom of the Sasak Tribe in West Nusa Tenggara Province by taking samples of medicinal plants from each regional district in NTB. This research is a literatured study with studies from various articles and practicum methods. By taking samples of mangosteen skin, betel leaves, castor bean, single garlic, soursop leaves, bay leaves, banten leaves, bebele leaves, tamarind leaves, and telang flowers. Practicum can develop higher-order thinking skills, this is because through practicum activities students are guided to carry out processes that can support thinking skills. The application of practicum will also link local wisdom, not only accept as a whole but can independently determine the sample of medicinal plants for extraction, so as to develop thinking skills in decision making in determining alternative compounds to be used.

Keywords: Medicinal Plants; Local Wisdom Sasak; Phytochemistry Course.
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1. Introduction

Phytochemistry is a branch of science that studies the isolation or separation and extraction of active substances in plants using chemical methods.Secondary metabolites contained in plants, how to isolate, identify compounds, standardize extracts and simplisia and the pharmacological benefits of these compounds.Phytochemistry courses are compulsory courses in undergraduate pharmacy majors. Phytochemistry courses are divided into Phytochemistry 1 and Phytochemistry 2 in the form of theory (2 credits). Phytochemistry courses must be presented in practicum with isolation or separation and extraction of active substances in plants using chemical methods. The curriculum in the department or study program of Pharmacy in Higher Education in Indonesia does not all combine theory and practice in Phytochemistry courses (University of Indonesia, Bandung Institute of Technology, Udayana University, and Mulawarman University) although there are several universities using practicum 1 credit in it such as UGM, UNAIR, and UNPAD. The development of a practicum model for Phytochemistry based on the local wisdom of the Sasak Lombok Tribe in West Nusa Tenggara Province by taking samples of medicinal plants commonly used by the Sasak people for treatment from each regional district in West Nusa Tenggara. Asmaningrum revealed that the practicum method based on local wisdom is a method that utilizes local wisdom in the region, especially in this paper the Sasak Lombok West Nusa Tenggara Tribe as a medium in learning, one of which is traditional medicine that has been hereditary trusted by the Sasak people from plants or plants [16].

2. Methodology

In this research plan, the author uses a literature study research method. The data sources come from scientific articles analyzed in this article are (1) data on extract methods of active compounds of medicinal plants (2) data on extract purification methods.

3. Results and Discussion

3.1 Identification of Sasak Tribal Medicinal Plants, Benefits, and Regional Potential

Indonesia is a tropical country that has been known as a producer of various agricultural commodities, including medicinal plants. Fertile soil conditions, good climate and supported by flora diversity make Indonesia a potential producer of

natural medicine commodities. Traditional medicine is a hereditary legacy of ancestors who became the nation's culture so that its use is based on experience passed down from generation to generation. Traditional medicine is also known as alternative medicine without knowing the content contained in these medicinal plants as well as medical drugs [13]. There are no less than 25 types of medicinal plants that are still used to treat diseases in the Sasak community in West Lombok. While the Sasak people treat various diseases using around 76 types of plants, but of the various types of plants there are some that are not used in general in the West Lombok Regency area but are specifically used elsewhere [8]. While the treatment and traditional medicines of the Sasak tribe are the results of the translation of the Usada lontar manuscript and the information of the Sasak people on Lombok Island has the potential to be developed as alternative medicine and treatment [25].

In this experiment, 15 medicinal plant samples were selected to be tested first, including:

1. Mangosteen peel

Mangosteen is a tree fruit plant that comes from tropical forests in Southeast Asia. Mangosteen skin contains xanthone compounds which are bioflavonoids as antioxidant, antibacterial, antiallergic, antitumor, antihistamine, and anti-inflammatory properties [19]. Mangosteen plants grow best in areas with fertile, loose soil and contain organic matter. The degree of soil acidity (pH range of good soil is 5-7. Mangosteen is widely found in the West Lombok Regency area in Narmada and Lingsar sub-districts. The potential of mangosteen fruit in NTB is quite extraordinary and the quality is also not inferior to other regions. Agricultural products in Batu Kumbung Village, Lingsar District, West Lombok Regency, West Nusa Tenggara (NTB) will be sent to Dubai, United Arab Emirates (UAE).

2. Betel Leaf (Piper betle, L)

In betel leaves there are glycoside compounds, steroids, triterpenoids, flavonoids, tannins, and anthracinones. These compounds contain activity as antimicrobials that can fight Staphylococcus aureus, Eschericia coli and Candida albicans fungi. The three bacteria are bacteria that cause various diseases of the teeth and gums and cause unpleasant odors in the mouth [6]. Essential oil from betel leaves contains 30% phenol and some of its derivatives. Kavikol is the most component in essential oil that gives betel a distinctive odor [18].

One of the cultural heritages that still exists in the midst of the Sasak tribe until now is the mamaq tradition. The term mamaq by the ancestors of the Sasak people is an activity of chewing areca nut, lime, betel leaf, tobacco, and ending with nyusut. After removing the remnants of the ingredients used in mamaq, there will be a fresh and pleasant taste on the teeth like after brushing your teeth. This is due to the natural properties contained in betel leaves which are antiseptic or toxic to germs. Because betel leaves were often used by ancestors to clean teeth long before brushes or toothpaste were present [1].

3. Castor Leaf (Ricinus counmmunis)

Castor leaves are wild plants a year and are commonly found in forests, vacant lots, in coastal areas, but are often also bred in plantations. Distance is a shrub plant that has single leaves between 7-9 fingers with a diameter of 10-40 cm. Castor leaves in the Sasak community are generally used as a baby fever reliever by mixing castor leaves that have been kneaded and mixed with telon oil or eucalyptus oil and then attached to the baby's fontanel. Traditionally, this is believed to be able to reduce fever in infants by the general public without knowing the content contained in castor leaves. Castor leaves contain alkaloid compounds, astragain, phytonutrients, nicotiflorin, kaempferol, and quercetin which are very good for the health of the body [5].

The results of the research state that the leaves, fruits, and stems of Jatropha contain an alkaloid compound called jatrofin which has anticancer activity. In addition, there are also tannin compounds found in the stems and stalks of Jatropha leaves which contain 18% [4]. In other studies, medically Jatropha leaves have met the requirements of Indonesian Medical Materials based on the results obtained are organoleptic tests, 17.29% water soluble compound content, 11.38% ethanol soluble compound content, and chemical content identification results which positively contain alkaloids, flavonoids, saponins, triterpenoids, steroids, and tannins. Jatropha also shows activity as a vasorelaxant [14].

4. Tungal Garlic

Is a plant that grows in highland areas, this plant is widely developed in the Sembalun area under the foot of Mount Rinjani. The benefits are very diverse, one of which is to increase stamina to immunostimulants. Garlic has several varieties, one of which is single garlic [10]. This single garlic consists of one suing because this onion grows in an unsuitable environment [24]. Several studies have proven that garlic has antimicrobial effects and can inhibit the growth of gram-negative and gram-positive bacteria, yeast and fungi [25]. Garlic contains vitamin C which acts as an antioxidant and effectively counteracts free radicals. Single garlic is widely used as a medicine for internal diseases, traditionally the Sasak people make medicine with clean peeled garlic and then soaked in pure honey for at least 2 weeks to one month. After soaking the garlic that has been soaked is consumed as medicine.

5. Soursop Leaf (Annona muricata Linn)

Soursop leaves are a natural type of plant that contains tannins, alkaloids, saponins, and flavonoids that function as antibacterial [22]. This plant is an annual plant that can bear fruit throughout the year, so it is easily available. Soursop leaves are commonly used to prevent and treat abscesses, hypertension, liver disease, headaches, and diabetes. Soursop leaves are traditionally used to treat acne, soursop leaf extract also has anti-inflammatory activity. In general, Sasak people believe boiling a few soursop leaves can reduce high blood pressure [15].

6. Salam Leaf (Syzygium polyanthum)

Is a plant that contains alkaloids, saponins, quinones, phenolics, triterpenoids, steroids, and flavonoids. Phenolic compounds are antioxidants that play a role in preventing cell damage and cellular components reactive free radicals [21]. Young Salam leaves are often found in the Sasak community used as urap to treat gout and pain in the joints.

7. Banten leaf (Lannea coromandelica)

Banten leaf is a hereditary medicine that has long been used by the Sasak people as a fever medicine for both babies and adults by pounding several banten leaves that are not too old and then attached to the fontanel or smeared on the body, this is believed to reduce heat in the body or when the heat in the body will quickly cool down. In previous research, it was found that the chemical compounds in banten leaves are flavonoids, alkaloids, saponins, terpenoids, phenols, and tannins which have benefits as anti-inflammatory, anticancer, anti-arthritic, antioxidant and antibacterial [23].

8. Bebele leaf (Sasak language) or Horse Foot or Pegagan (Centella asiatica L)

is one of the plants that can be utilized. Bebele leaves in addition to being a deep heat medicine can also be used as a vegetable, which is the material for making urap. Bebele leaves grow wild in yards, plantations and fields that are found in Southeast Asia, one of which is in Indonesia because of its tropical climate. In Sasak language it is called bebele leaf, in Javanese language it is called horse foot leaf (tapak kuda) and antanan. Bebele or horse foot leaves contain saponins, steroids, and phenolic compounds [12]. Sasak people generally concoct bebele leaves by squeezing and mixing shallots and then rubbing them on the body as a medicine for wounds and internal heat. In addition, bebele leaves or horse feet/pegagan/antaman are also used as tuberculosis drugs, this is due to the content of triterpenes which are secondary metabolites that have the potential to inhibit pathogenic bacteria which are the source of tuberculosis bacteria [7].

9. Tamarind leaves (Tamarindus indica L)

has many contents, namely fat, protein, fiber, tartic acid, as well as secondary metabolites such as alkaloids, tannins, saponnins, and flavonoids [3]. Sasak people generally use tamarind leaves by boiling with water for bathing to relieve itching due to caterpillar or insect bites.

10. Telang flower (Clitoria ternatea L.)

Telang flowers are not only used as ornamental plants but also function as traditional medicines (Purba, 2020). Telang flowers (Clitoria ternatea L.) are known to contain flavonoids, anthocyanins, flavonol glycosides, kaempferol glycosides. Telang flower extract has very strong antioxidant activity because it contains phenolics in it. Phenolic compounds can reduce free radicals formed into species that are no longer reactive [2]. Traditionally, people usually make telang flowers as tea, by drying telang flowers and manually brewed as tea which is believed to restore stamina.

11. Kersen leaf (Muntingia calabura L.)

is a plant that has the benefit of protecting and maintaining the health of the body. Kersen leaves contain terpenoids, saponins, flavonoids and steroids [9]. In general, kersen leaves have a function as anti-inflammatory. Sasak people generally believe that processing kersen leaves by boiling then drinking the steeping water can reduce high blood pressure. making herbal tea made from kersen leaves which contains tannins, saponins, flavonoids which have effects as analgesics, antipyretics, anti-inflammatory, antioxidants and antibacterials.

12. Katuk Leaf (Sauropus androgynus)

Traditionally, Indonesian people generally believe that consuming katuk leaves by boiling them as a clear vegetable can increase breast milk production. Katuk leaves contain vitamins A, B, C, K, and pro-vitamin A (Betacarotene), calcium phosphorus, iron, and fiber which function as antioxidants. It also contains steroids and polyphenols that can increase levels of prolactin, the hormone that facilitates breast milk. The chemical content in katuk leaves helps meet the mineral needs of breastfeeding mothers, increase endurance, protect cell structure, increase the effectiveness of vitamin C, anti-inflammatory, prevent bone loss and as a natural antibiotic [20].

13. Cat Whisker Leaf (Orthosiphon stamineus B)

is a natural material that has high antioxidant activity. This plant is very easy to grow so it is easily planted by the community [22]. Cat whisker leaves have long been used as medicine in the community to treat various diseases. One of them is diuretic, stone urine, hypertension and rheumatism. Sasak tribe people usually make medicinal concoctions from cat whisker leaves then cook with water. After lukewarm the boiled water is drunk. It is believed to cure diseases of the urinary tract such as wreaths and kidney stones.

14. Fennel Fruit (Foeniculum vulgare)

is an annual herb native to the Mediterranean and Southern Europe. Wildly, fennel grows on the Mediterranean coastline, Egypt. Then cultivated almost all over the world and vulgare is the only species of its genus. Fennel contains flavonoids and essential oils, flavonoids are phenolics that are strong antioxidants. The Sasak people have traditionally used fennel fruit as a remedy for stomach pain by mashing and smoothing fennel mixed with a little galangal and then applied to the sore stomach (in

Sasak language “dedel”). Fennel fruit has antihyperglycemic activity that can be utilized to maintain glucose levels in patients with diabetes mellitus.

15. Ginger (Zingiber offcinale Rosc.)

is a spice plant that originated in South Asia and spread throughout the world, including Indonesia. Ginger contains alkaloid, flavonoid, phenolic, triterpenoid, and saponin compounds. Ginger is useful as an antioxidant, analgesic, antibacterial, antiviral and anti-inflammatory [17]. Ginger rhizome plants are hereditary in Indonesian society used as an ingredient to make herbal medicine, in traditional medicine ginger is also used as an alternative treatment such as sprains, by growing ginger and applying it to the sprained part.

3.2 Practical Steps (Extracting Active Compounds) from medicinal plants

Students are divided into 15 groups to test the extraction of medicinal plants, with steps:

a. The sample plants are dried until they change color.
b. If it is dry, the sample is ground until smooth, to make it easier to bind the compounds contained.
c. The sample is weighed (500gr).
d. Store in a closed container or place (with methanol solvent for 3 x 24 hours), the purpose of adding methanol solvent to attract polar, non-polar, and semi-polar compounds because it is universal.
e. Filter the sample and then take the extract.
f. Putting the filtrate into the evaporator flask and obtained a thick extract through evaporation

3.4 Extract Purification Process

After extracting active compounds from medicinal plants, the extract purification process is continued with the steps:

a. Thick methanol extract dissolved with hot distilled water
b. Cool
c. Filtered
d. The resulting precipitate was redissolved with methanol
e. The resulting filtrate was added to activated carbon compounds that had been heated in an oven for 4 hours.
f. Add activated carbon little by little
g. Stir the mixture
h. Leave the filtrate until clear
i. Filter with two-layer filter paper
j. Clear filtrate is evaporated again with vacuum to dry
k. KLT test

3.4 Practicum Method Based on Local Wisdom

Why practicum method?

Practicum method based on local wisdom is a method that utilizes the wisdom of science is important in our modern society because many problems are related to science and technology [16]. Practicum can develop high-level thinking skills, this is because through practicum activities students are guided to carry out processes that can support thinking and decision-making skills [7]. In addition, the application of practicum will also link local wisdom, not only accept as a whole but can independently determine the sample of medicinal plants for extraction, so as to develop thinking skills in decision making in determining alternative compounds to be used. This will also create more meaningful learning and better understanding of the material because the material is associated with the habits of the people around them.

4. Conclusion

From the above description it can be concluded:

1. In the practicum of the Phytochemistry course, it is necessary to add practicum credits because students can choose their own isolation of medicinal plant extractions by practicum methods.
2. The plants used as samples are plants that are generally easy to find around the place of residence, especially the Sasak Lombok Tribe.
3. The methods used in practicum include extraction and purification.

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