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Analysis of Botanical Composition and Potential of Kelakai Leaves (*Stenochlaena palustris)* of Peat Swamp Plants in Central Kalimantan as Medicinal Plants

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ABSTRACT

Central Kalimantan has a typical peatland habitat which is dominated by Kelakai (*Stenochlaena palustris*). Various kinds of plants from the Kelakai genus are, for example, the Stenochlaena genus, but the benefits are less known, namely Kelakai. Kelakai is a plant that has clearly visible main characteristics such as stems, roots and leaves. The purpose of this study was to analyze the botanical composition and potency of Kelakai growing on peatlands of Central Kalimantan as a medicinal plant. This research method was an exploratory method supported by laboratory experiments which aimed to determine its potential as a medicinal plant and wound epithelialization under controlled conditions. The data on the botanical composition of Kelakai were analyzed using descriptive analysis, where the sample was obtained by purposive random sampling, while the potency data was analyzed using the *Oneway* Anova test and then Duncan's 1% test was performed. The wound is on the abdomen 2 cm long. The treatment given was applying Kelakai extract gel with different concentrations on a regular basis every day for 3 days. The results showed that Kelakai on peat swamp land in Central Kalimantan was the most dominant, so it can be concluded that its botanical composition can be a source of forage. The nutritional content of the Kalakai swamp green is quite high, so the Kelakai leaf extract gel has proven potential and can be recommended as an effective wound healing drug at a concentration level of 35%, with the optimal concentration in wound healing at a concentration level of 40%.

Keywords: *Botanical Composition, Kelakai, Peat Swamp,*

1. INTRODUCTION

Indonesia has a very abundant biodiversity. One of Indonesia's abundance is plants. These plants have characteristics, ways of breeding, different forms, different habitats and benefits. The benefits of plants are certainly very many for living things. One of which is as food, decoration. Therefore, they can be used as medicinal ingredients (Arini & Kinho, 2012).

Plants used in medicine certainly have different properties. These properties can be seen from the compounds contained in these plants. Central Kalimantan is a province located on the island of Borneo which has a peat soil habitat. Peat soil is a collection of piles of organic matter, such as saturated water, anaerobic which can result in a decomposition of organic matter over time, until the accumulation of organic matter forms into peat soil overgrown with wild plants (N. Hujjatusnaini et al., 2021).).

Central Kalimantan mostly consists of swamp land, with a very wide expanse of almost 90% or almost reaching the swamp area generally has a high acid content, where the presence of iron is high, and will affect the botanical composition and nutritional content . This supports the potential of Central Kalimantan with a variety of potential crops (Noor Hujjatusnaini et al., 2022.)

Wild plants are dominated in peat soil areas, namely by plants from the genus Stenochlaena, which are generally still under-exploited. One of the genus Stenochlaena which is known to have many benefits but its benefits are underexploited is Kelakai. Kelakai is generally only consumed as food by the surrounding community, and minimal information is used as a raw material for treatment. Based on several previous studies, the Kelakai plant has been scientifically proven to be used as a medicinal ingredient, because it contains certain secondary metabolites that have medicinal properties (Adawiyah & Rizki, 2018).

The lack of documentation of the efficacy of Kelakai as a raw material for medicines makes knowledge about the efficacy of this plant disappear (Indah et al., 2021) confirming this is due to the rapid development of technology in the medical field. Knowledge about the efficacy of plants is one of the main factors for the lack of information obtained at this time, where as the next generation, in order to be more developed following the development of synthetic drugs, it is hoped that this information will not disappear from the times (Widyastuti et al., 2021). To be able to achieve this goal, various studies related to the exploration of the benefits of medicinal plants are needed, one of which is Kelakai. Exploration of the benefits of medicinal plants aims to find out what compounds are in them, their benefits, and their properties.

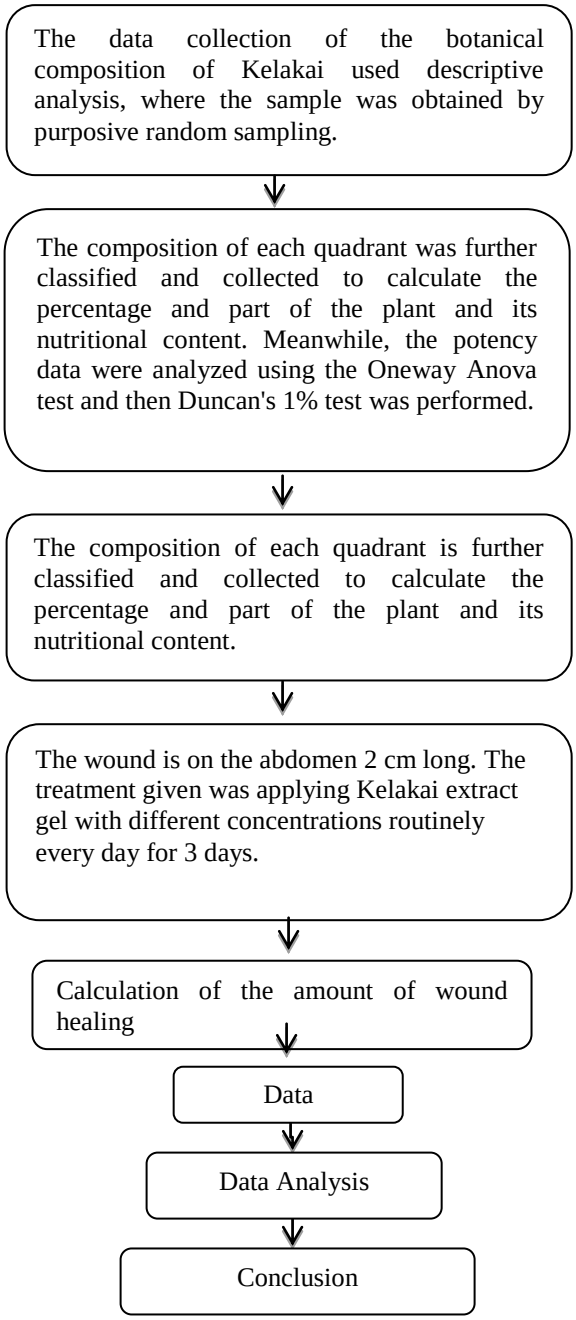
Wounds are a process of loss of tissue in parts of the body where the tissue is damaged which was initially closed, then injured and infected by bacteria (Handayani et al., 2015). Wounds to the tissue can be caused by punctures, incisions or triggered by certain diseases, one of which is wounds caused by high blood sugar levels of a person with diabetes. et al., 2019). In addition, there is

a metabolic system disorder from fat, body protein and carbohydrates, resulting in a lack of insulin production needed by the body in the process of converting glucose into energy and fat synthesis (Rachmawani & Oktarlina, 2017). Wound recovery is a process in which tissue regenerates to form new tissue which is better known as epithelialization. Factors that can be used to speed up recovery are adequate nutrition and an immune system that is immune. Efforts to help the wound recovery period are to improve the nutritional status of someone who is injured and can also increase his immune system (Rina Sugiarti Dwi Gita, 2019).

The lack of information and knowledge from the public about the efficacy of Kelakai (Stenochlaena palustris) in a sustainable manner means that there is a need for literature on the benefits of the Kelakai plant. Research conducted by Saputri & Putri (2017) found that 96% ethanol extract in Kelakai has the most effective properties for wound healing. with a concentration of 20% in rat skin. The compounds contained in the 96% Kelakai ethanol extract function to help the wound healing process such as flavonoids, saponins and tannins. Kelakai extract was declared effective as a wound healing drug. The final findings of this study used a concentration of 40% and it is hoped that there is potential in the Kelakai extract gel as wound healing and can be scientifically documented.

2. MATERIAL AND METHOD

This research is an exploratory study supported by laboratory experiments which aims to determine its potential as a medicinal plant and wound *epithelialization* under controlled conditions, with the aim of knowing the effectiveness of the Kelakai extract gel with 10 treatments. The research was conducted at the Ecology Laboratory, State Islamic Institute of Palangka Raya, Central Kalimantan. The flow chart for the implementation of the research is shown below.



Picture 1 . Research Flowchart Swamp Land Determination and Field Measurement

The initial stage of the study was carried out by determining the swamp land as a sampling location. The research sample was taken using a purposive sampling method, in which the area was determined based on the objectives and considerations of the study. The field measurement method refers to Susetyo et al., (1972), in which samples were selected by randomization, stratification and systematically. Furthermore, the first sample was determined randomly, where the tiling was carried out with an area of 1 m2, the second plot was taken with a distance of 10 straight steps to the right, these two plots then became 1 cluster.

The second cluster was determined as far as 100 m from cluster I. Next, the forage contained in the plot was cut completely and then observed for its botanical composition. The forage that had been collected was then weighed for its fresh weight.

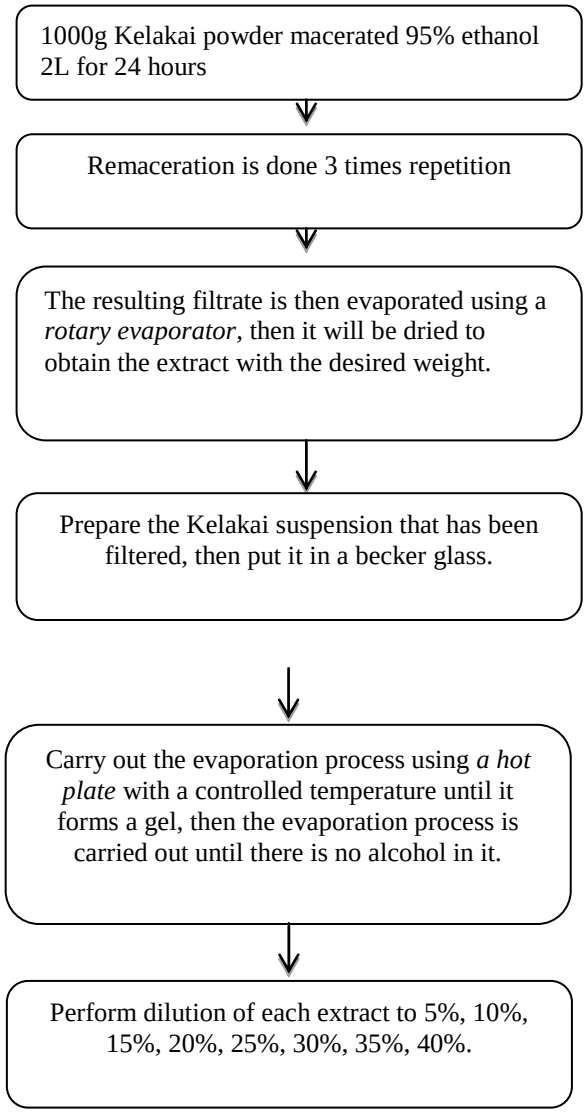
Determination of Botanical Composition and Forage Production

Botanical composition is the proportion of a plant species to all the plants that grow with it. To calculate the production of swamp forage, both in fresh form and in dry form per unit area and a certain time, the following formula can be used:

P= (B2-B1)/ la(t2-t1)
In Which:
P=Production
B= Parameters measured la
T =Time
La = Area

Making Simplicia Kelakai

Kelakai sorted and washed, then dried in the sun. If it has dried then weighed and mashed until it becomes like a powder. The process of extracting macaque leaves is presented in detail as shown in Figure 2.



Picture 2 . Diagram of Extraction and Gel Preparation Extract

Identification of Chemical Compounds

The secondary metabolites were identified using the standard simplicia quality examination. The chemical compounds identified included alkaloids, saponins, flavonoids, tannins, and steroids, starch, aleurone, catechol. Chemical compounds were examined by adding appropriate reagents or reagents. Analysis of the tests carried out is to see whether there is a color change after the addition of reagents in accordance with those written in the literature.

Data Analyis

Data on the botanical composition of Lakai with descriptive analysis, the composition of the quadrants was classified and collected to calculate the percentage and plant parts and nutritional content. *Epithelialization* potential was measured from the wound found on the abdomen as long as 2cm. The data were observed after the treatment was given, namely for 1x24 hours, 2x24 hours, and 3x24 hours. The epithelialized potentiation data were analyzed using the *Oneway Anova* test and then Duncan 1% test was performed.

3. RESULTS AND DISCUSSION

The results of the study are presented in Table 1 which includes the botanical composition, and the nutritional content contained in the Kelakai leaves, which is supported by Figure 3.

Picture 3 . Kelakai Plants

Table 1 Botanical Composition and Ingredients Kelakai Leaf Nutrition

	Characteristic	Swamp Forage of Kelakai Plants (%)
Botani Composition	Root	7
	Stem	45
	Leaf	52
Nutritional Content	Water content	10,45
	Fat	0,50
	Protein	8,40
	Fiber	25.12
	Ash	12,72

The data presented in Table 1 shows that the botanical composition in the form of forage. Kalakai is most dominant in the leaves as much as 52%, stems 45% and roots 7%. Kelakai has erect stems and leaves, there is a clear boundary between stems and leaves, which is included in the category of compound leaves. Kalakai is a swamp plant that belongs to the Poaceae family. Hujjatusnainiet al., (2021) reported that swamps in Central Kalimantan are overgrown by a fairly diverse plant vegetation with more than 12 varieties of plant species, 7 of which are classified as grasses. The botanical composition in the peat swamps of Central Kalimantan can be a source of forage, which tends to be more stable.

According to (Kusumaria, 2019) that the level of stability of plant communities in certain lands is strongly influenced by the biotic and abiotic environment, so that plants that are less adaptive to such conditions will be replaced by other species. The results of the vegetation analysis further illustrate that Kalakai survives more on land areas that are a bit far from the water source. Considering the factors that affect the stability of dominant growth in a habitat, the composition of the biomass must be considered.

The content in mantle that is able to treat wounds is a compound of tannins, alkaloids, flavonoids and has antioxidant activity. According to research (Fahruni et al., 2018) several pharmacological effects produced by Kelakai are alkaloids as anti-inflammatory, anticancer, antitoxin, burn medicine, aphrodisiac, heart medicine and others. Alkaloids are secondary metabolites that are often found in most plant groups, one of which is the Kelakai plant, as shown in Table 2.

Table 2 Extract Phytochemical Test

		Reactor	Observation Description	Result
Parameter	Alkaloid	Meyer	There is a yellowish precipitate	+
		Dragendorff	There is an orange precipitate	+
	Flavonoid	Uap NH_3	Does not appear typical yellow color	-
	Saponin	H_2O	There is foam ± 12 minutes	+
		HCl 0,5N	No sediment	+
	Tannin	$FeCl_3$ 1 N	Looks dark blue	
		H_2SO_4	There is a yellowish brown precipitate	
	Steroid	Liebermann Burchard	No green	–
	Aleuron	L_2 0,1N	Appear brown in cell	–
	Pati	L_2 0,1N	Appear brown in cell	–
	Ketokol	Vanili 10%	Appear typical red in cell	+

Table 3 Extract Antioxidant TLC Test

		Solvent Distance	Distance Spot Stain	Value of Rf Extractethanol
Comparison of Eluen (N-Butanol : Etil asetat)	9 : 1	80	-	-
	8 : 2	80	-	-
	7 : 3	80	-	-
	6 : 4	80	-	-
	5 : 5	80	-	-
Comparison of Eluen (Kloroform : Etil asetat)	9 : 1	80	80	0.89
	8 : 2	80	80	0.89
	7 : 3	80	70	0.83
	6 : 4	80	-	-
	5 : 5	80	-	-

The TLC results in Table 3 above show that the eluent that is more suitable for the properties of secondary metabolites in the Kelakai leaf extraction material is a non-polar eluent (Chloroform: Ethyl Acetate) with a ratio of 9:1, 8:2, and 7:3. The data depiction in Table 4 describes the eluent more clearly if it is in the right solvent. The ethanolic extract of the Kelakai leaf has a tendency to be non-polar, so that a fairly good and clear stain profile is obtained and the stain results are clearly visible, and the Rf value of the TLC test results can be calculated quantitatively.

Based on the results of data recapitulation, it is known that the treatment in this study had a significant effect on alloxan-induced wound healing in mice with a significance of 1% during the entire treatment. Furthermore, the concentration of the extract gel was optimal and effective. On the first day, where P10 was not significantly different when viewed from treatment levels P8 and P9, but it was significantly different when compared with P1 to P7. It can be concluded that P10 is a more optimum concentration in alloxan-induced wound healing in mice than P1 to P7. This observation will then be continued on the second day.

On the second day, the concentration of P10 was not significantly different from the level of treatment P8 and P9, but it was significantly different when compared to P1 to P7. It can be concluded that the concentrations of P8 and P9 had the same wound healing effectiveness as P10. This observation will then be continued to the third day. On the third day, the concentration of P10 was not significantly different from the treatment level and P9, but it was significantly different when compared to P2 to P8. However, this concentration was significantly different when compared to P10 or 40% concentration. This indicated that the 40% concentration was

effective and optimal in wound healing in alloxan-induced mice for 72 hours of treatment.

The treatment concentration of 35% is the concentration that is effective in healing the cut wounds of the test animals, which is expressed as the effective concentration of P9 (35%). It can be concluded that P9 is significantly different from the concentration level of P1 to P8. *Kelakai* has the ability to heal cuts in test animals which is more optimum at a concentration level of 40% (P10). The content contained in Kelakai are flavonoids, saponins, and tannins. This is in accordance with the research of Saputri & Putri (2017), it is known that 96% ethanol extract in *Kelakai* has the most effective efficacy for wound healing with a concentration of 20% on rat skin. So that the compound content of Kelakai can act as an antibacterial from wound healing, against fungi, and as an astringent that functions as a wound shrink (Saputri & Putri, 2017). Concentration of 40% can be concluded as the optimal concentration in the recovery of mouse incisions. where that the optimum concentration is defined as the optimal concentration in influencing the test object (Friska et al., 2021). The lowest concentration is able to heal cuts. The effectiveness of wound healing in test animals at a concentration of 35% was found in this study.

4. CONCLUSION

Central Kalimantan has a fairly diverse vegetation of plant species. The botanical composition of Kelakai on peat swamp land in Central Kalimantan is the most dominant, where the leaves (52%), stems (45%) and roots (7%), can be concluded Central Kalimantan's peat swamps can be a source of forage. The nutritional content of the Kalakai swamp green is categorized as quite high, so the Kelakai leaf extract gel has proven potential and can be recommended as an effective wound healing drug at a concentration of 35%.

REFERENCE

Ardiansyah, A., Hujjatusnaini, N., Amin, A. M., & Indahsari, L. I. N. (2021). Antibacterial Effectiveness of Methanol Extract Combination Formula 3: 2: 1 of Tambora Leaf (Ageratum conyzoides), Sembalit Angin Leaf (Mussaenda frondosa L), Turmeric Rhizome (Curcuma longa L) on the growth of Staphylococcos aureus. *Sainstek: Jurnal Sains dan Teknologi*, *13*(1), 1-6.

Adawiyah, R., & Rizki, M. I. (2018). *5788-12516-1-Pb*. *05*(01), 71–77.

Arini, D. I. D., & Kinho, J. (2012). The pteridophyta diversity in Gunung Ambang Nature Reserve North Sulawesi. *Info BPK Manado*, *2*(1), 17–40.

Fahruni, F., Handayani, R., & Novaryatiin, S. (2018). Potensi Tumbuhan Kelakai (Stenochlaena palustris (Burm.F.) Bedd.) asal Kalimantan Tengah sebagai Afrodisiaka. *Jurnal Surya Medika*, *3*(2), 144–153. https://doi.org/10.33084/jsm.v3i2.114

Friska, Y. D., Hujjatusnaini, N., Ayatussa'adah, & Amin, A. M. (2021). The Potential Of Purple Leaves Ethanol Extract (Graptophyllum pictum L.) Against The Growth Of Staphylococcus aureus and Candida albicans. *Jurnal Agronomi Tanaman Tropika (JUATIKA)*, *3*(2), 196–207.

Handayani, E., Mundarti, & Rofiah, S. (2015). Factors Influence with Healing Perineum Laceration of Post Partum Mother Faktor yang Mempengaruhi Penyembuhan Luka Perineum Pada Ibu Post Partum Esti Handayani Mundarti Siti Rofiah Jurusan Kebidanan Magelang Poltekkes Kemenkes Semarang pada semua persalin. *Jurnal Kebidanan*, *11*(3), 1041–1047.

Himawan, D., Mahmudah, R. L., & Fatmawati, A. (2019). *p-ISSN : 2085 – 0204 e-ISSN : 2656 – 1808 Jurnal Ilmiah Kesehatan Sekolah Tinggi Ilmu Kesehatan MajapahiT*. *1*.

Hujjatusnaini, N., Erawati, D., Melisa, M., Nor, F., Shartono, D. F., Harlyani, Y., & Zulham, M. (2021). Ethnomicology of Basidiomycota fungus species in Central Kalimantan open forests. *Journal of Physics: Conference Series*, *1869*(1). https://doi.org/10.1088/1742-6596/1869/1/012167

Hujjatusnaini, Noor, Muh, A., Feyby, H., &

Perditson, A. (n.d.).(2022)*Inovasi Minuman Tepache Berbahan Baku Kulit Nanas (Ananas comosus L. Merr.) Tersuspensi Probiotik Lactobacillus casei (Innovation of Tepache Beverages Made from Pineapple Skin (Ananas comosus (L.Merr.) Suplemented Probiotic Lactobacillus* . 47–54.

Indah, B., Hujjatusnaini, N., Amin, A. M., & Indahsari, L. I. N. (2021). Methanol Extracts Formulation of Tambora Leaves (Ageratum conyzoides L.), Sembalit Angin Leaves (Mussaendafrondosa L.) and Turmina Rhizome (Curcuma longa) as Candida albicans Antifungal. *Sainstek : Jurnal Sains dan Teknologi*, *13*(2), 105. https://doi.org/10.31958/js.v13i2.3473

Kusumaria, W. T. (2019). Implementasi Kebijakan Nasional Dan Daerah Terhadap Pengelolaan Hutan Berbasis Perubahan Iklim Melalui Instrumen Mitigasi Perubahan Iklim (Studi Kasus Di Kabupaten Mukomuko). In *Tesis*.

Rachmawani, N. R., & Oktarlina, R. Z. (2017). Khasiat Pemberian Buncis (Phaseolus vulgaris L.) sebagai Terapi Alternatif Diabetes Melitus Tipe 2. *Jurnal Majority*, *6*(1), 71–76.

Rina Sugiarti Dwi Gita, S. D. (2019). Potensi biskuit fungsional dengan substitusi tepung daun kelor dan tepung ikan gabus dalam mempercepat kesembuhan luka dan meningkatkan sistem imunitas. *Prosiding Seminar Nasional SIMBIOSIS IV,* 68–73.

Saputri, R., & Putri, A. N. (2017). Potensi Ekstrak Etanol Herba Lampasau (*Diplazium esculentum* SWART) Sebagai Penyembuh Luka Sayat Pada Kulit Tikus. *Borneo Journal of …*, *01*(01), 57–66. http://www.jurnalstikesborneolestari.ac.id/index.php/borneo/article/view/53

Widyastuti, R., Hujjatusnaini, N., Septiana, N., & Amin, A. M. (2021). Antimicrobial Potential Combination Formulation of 1:2:3 Methanol Extract of Tambora Leaf (Ageratum conyzoides L), Sembalit Angin Leaf (Mussaenda frondosa L), and Turmeric Rhizome (Curcuma longa) Against Escherichia coli. *Sainstek : Jurnal Sains Dan Teknologi*, *13*(2), 121. https://doi.org/10.31958/js.v13i2.3465