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LEVEL OF TOXICITY AND PHYTOCHEMICAL SCREENING OF LANSAU TRADITIONAL MEDICINE OF MUNA TRIBE FROM SOUTH EAST SULAWESI

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Abstract:

Lansau as a traditional medicine from Muna ethnic Southeast Celebes consist of 44 kinds of herbal medicine. Lansau related to spiritual philosophic of Muna ethnic adopted from Islamic mysticism. This study aims to investigate the level of toxicity of the 44 kinds of traditional medicinal plants of Lansau, against larval shrimp Artemia Salina L. with BSLT method. Phytochemical screening using Thin Layer Chromatography techniques to determine the compound from each part of the plants consists of alkaloids, flavonoids, tannins, saponins and triterpenoid and toxicity test against Artemia Salina L. larvae of Artemia salina L. Mortality data were analyzed by probit analysis using SPSS 19 to determine the LC_{50} value for each sample. Toxic extract when the value LC_{50} <1000 µg/mL. Results show that the toxicity of the 44 samples tested 27 were toxic. Samples that have the smallest LC_{50} value (38,330 µg/mL) is the leaves of Lantana camara L. while samples which showed the largest LC_{50} value (3383,633 µg/mL) are leaves of Eleusine indica L. Results of 44 plants phytochemical screening showed that all plants contain metabolite secunder alkaloids, flavonoids, tannins, saponins, and triterpenoid but there are compounds that are not found in certain plants.

Keywords: Lansau, screening phytochemical, toxicity, Artemia salina L., LC_{50}.

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1. INTRODUCTION:

Lansau as a traditional medicine from Muna ethnic Southeast Celebes consist of 44 kinds of herbal medicine. Lansau related to spiritual philosophic of Muna ethnic adopted from Islamic mysticism. Lansau has been believed to cure various diseases. Most parts of the plants used was leaves with decoction formulation or infusa. In traditionally used lansau prepared by extracting simpilisia with water at 90 ° C for 15-25 minutes (Ihsan et al, 2016). The plants for Lansau were consisted of *bhangkudu, kamena-mena, patirangka, soni, katapi, ghontoghe, libbho, kaghai-ghai, lansale, daru, sirikaea, sandana, kataba-tabako, sambiloto, kambhadawa, lakoora, kerseni, kusambi, bhea, dana, radhawali, katimboka, wonta, bumalaka, kulidawa, gondu, patiwala ngkadea, komba-komba, ladha, tongkoea, kaghuse-ghuse, kumbou, kaembu-embu, rogili, rogo, kalamandinga, kula, ntanga-ntanga, padamalala, cats whisker, kabhote-bhote, tulasi and kasape*. The plants were obtained from Kontu district, Muna regency Southeast Sulawesi. The plant's determination were performed in Indonesian Institute of Sciences (LIPI) Bogor which included names, species, and families of 44 herbs contained in Lansau. Lansau were already pharmacognostic identified with macroscopic observation (organoleptic and morphology) and microscopic identifications. Results of microscopic examination of the leaves, stems, seeds, and rhizomes provide specificity stomata, trichomes and vascular bundle on each plant. The Macroscopic results were included color, smell, taste, and size of the plants and the microscopic results were included the type of stomata, trichomes and the vessels (Tahir et al, 2016). Traditional medicine has potential toxic. To guarantee safety and effectivity, traditional medicine must be determined with acute toxicity test and phytochemical screening to describe which one of compound had a potential toxic effect.

2. Aim

This study aimed to identified the level of toxicity of Lansau traditional medicinal plants from Muna tribe and to describe secondary metabolite with phytochemical screening.

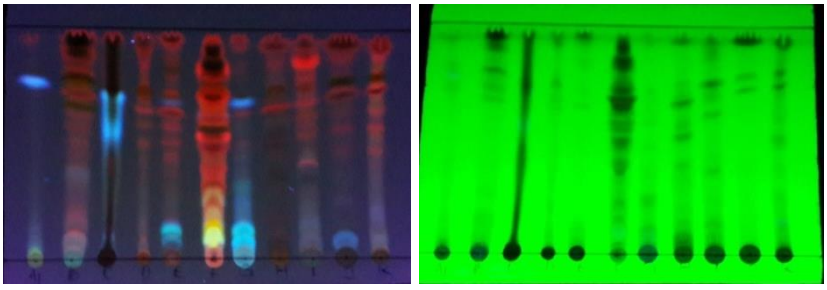
3. MATERIALS AND METHOD:

Phytochemical screening used thin layer chromatography. Toxicity test or mortality data toward *Artemia Salina* L. used *Brine Shrimp Lethality Tes*t (BSLT) for 24 hours with three replication. Data analysis with probit analysis to determine LC_{50} each extract with toxic criteria are LC_{50} <1000 µg/mL. The sample were taken in Muna island at Kontu district. Sample preparation and dried in an oven with temperature 40-50 C and obtain 300 g dried simplisia and then maceration for 3x24 hour used *rotary vacuum evaporator* with the solvent used ethanol 96%. BSLT test used 4 variant concentration extract of lansau 1000 ppm, 500 ppm, 200 ppm, 100 ppm with a negative control.

4. RESULTS:

4.1. Phytochemical Screening

Most of part lansau plants were leaves. Some of lansau plants used stems, seed, fruits, rhizome, and herbs. The plants of lansau consist of alkaloids, flavonoids, tannins, saponins, and triterpenoid especially leaves as a part of plants lansau. Part of lansau rhizome consist of as a table 1.



Picture 1. Phytochemical screening

Table 1. Phytochemical Screening of 44 Lansau Plants

No	Extract of Lansau	Parts Of Lansau Plants	Secondary Metabolites				
			Alkaloid	Flavonoid	Tanin	Saponin	Triterpenoid
1	Sandana (*Pterocarpus indicus*)	Leaves	-	+	++	-	-
2	Katabha-tabhako (*Blumea sp.*)	Leaves	++	++	++	-	-
3	Sambiloto (*Andrographis paniculata*)	Leaves	+++++	+	-	++	+++
4	Kambadhawa (*Sesbania grandiflora*)	Leaves	-	+++	-	-	+
5	Lakoora (*Eleusine indica*)	Herbs	-	-	+	+	-
6	Kerseni (*Muntingia calabura*)	Leaves	+	++	+	+	+
7	Kusambi (*Schleichera oleosa*)	Leaves	-	++	+	+	+++
8	Dana (*Imperata cylindrical*)	Rhizomes	-	-	+	++	++
9	Bhea (*Areca catechu*)	Seed	+	-	+	++	+
10	Radhawali (*Tinospora crispa*)	Cortex	+	-	+	-	+
11	Katimboka (*Drynaria sparsisora*)	Cortex	-	-	+	-	-
12	Ladha (*zingiber sp*)	Rhizomes	-	+	-	+	-
13	Kumbou (*Artocarpus teysmannii* Miq.)	Cortex	-	+	-	-	-
14	Kaghuse-ghuse (*Dalbergia stipulacea* Roxb)	Leaves	+	+	+	+	+
15	Wonta (*Scleria laevis* Retz)	Herbs	+	+	-	+	-
16	Komba-komba (*Chromolaena odorata* Miq.)	Leaves	+	+	-	+	+
17	Patiwala Ngkadea (*Lantana camara* L.)	Leaves	-	+	+	+	+
18	Tongkoea (*Alstonia scholaris*R.Br.)	Leaves	+	+	-	+	+
19	Gondu (*Crescentia cujete* L.)	Leaves	+	+	-	-	-
20	Saubandara (*Senna alata* Roxb.)	Leaves	+	+	+	+	+
21	Bumalaka (*Psidium guajava* L.)	Leaves	+	+	-	+	+
22	Kulidawa (*Tectona grandis* L.f.)	Cortex	-	-	+	-	-
23	Kumis kucing (*O. stamineus* B.)	Leaves	+	+	+	+	+
24	Rogili (*P. betle*)	Leaves	-	+	+	-	+
25	Padamalala (*C.citratus*)	Leaves	-	+	+	-	+
26	Ntanga-ntanga (*J. curcas)*	Leaves	-	+	+	+	-
27	Kasape (*F. stroblifera*)	Leaves	-	+	+	+	+
28	Kalamandinga (*L. leucocephala*)	Leaves	-	+++	++	++	-
29	Rogo (*P. cardifolia*)	Leaves	-	+	++	-	+
30	Tulasi (*O. tenuiflorum*)	Herbs	-	+	+++	+	+
31	Kabote- bote (*R. tuberose*)	Leaves	+	+	+	-	-
32	Kaembu-embu (*B. balsamifera*)	Leaves	-	+	+++	++++	+
33	Kula (*A. altilis*)	Leaves	-	+	++	-	+
34	Bhangkudu (*M. Citrifolia* L)	Fruits	-	-	-	+	+
35	Kamena-mena (*Clerodendrum* sp.)	Leaves	+	+	+	-	-
36	Patirangka (*Impatiens balsamina* L)	Leaves	-	-	+	+++	-
37	Soni (*Dillenia* cf. *Celebica* H.)	Leaves	-	+	+	+	+
38	Katapi (*Sandoricum koetjape* Merr.)	Leaves	+++	+	+	+	+
39	Libbho (*Ficus septica* Burn.f.)	Leaves	-	+++	-	-	-
40	Ghontoghe (*Kleinhovia hospita* L.)	Leaves	+	-	-	-	-

41	Daru (*Averrhoa bilimbi* L.)	Leaves	+	+	+	+	-
42	Lansale (*Hyptis capitata* Jacq.)	Leaves	-	+	-	-	+
43	Kaghai-ghai (*phyllanthus niruri* L.)	Leaves	-	+	+	-	+
44	Sirikaya (*Annona muricata* L.)	Leaves	++	+	+	+	-

Table 2. Result of LC_{50} level Each Plants of Lansau

No.	Name of Plants	Parts Of Lansau Plants	% Mortality					LC_{50} (µg/mL)
			0	100	200	500	1000	
1.	Ladha	Rhizomes	3	33,33	40	63,33	70	172,070
2	Kumbou	Cortex	0	13,33	16,66	26,66	36,66	1199,856
3.	Sau Bandara	Leaves	3	36,66	46,66	46,66	66,66	203,434
4.	Wonta	Herbs	0	23,30	26,60	30	33,33	1281,795
5.	Kaghuse-ghuse	Leaves	0	46,66	56,66	66,66	86,66	60,235
6.	Gondu	Leaves	0	13,33	16,66	26,66	30	1234,170
7.	Komba-komba	Leaves	0	33,33	40	50	76,66	270,439
8.	Patiwala Ngkadea	Leaves	3	36,66	43,33	73,33	90	38,330
9.	Tongkoea	Leaves	3	16,66	23,30	26,66	30	2085,246
10	Bumalaka	Leaves	0	13,33	16,66	23,33	26,66	1038,785
11	Kulidawa	Cortex	0	16,66	23,33	26,66	30	1731,681
12	Bhangkudu	Fruit	0	6,6	10	26,6	30	2659,724
13	Kamena-mena	Leaves	0	26,6	33,3	36,6	50	1288,053
14	Patirangka	Leaves	0	3,3	16,6	26,6	40	1449,126
15	Soni	Leaves	0	40	43,3	60	63,3	272,368
16	Katapi	Leaves	0	3,3	6,6	16,6	30	2524,423
17	Libho	Leaves	0	46,6	50	66,6	93,3	155,607
18	Ghontoghe	Leaves	0	3,3	10	33	40	1234,572
19	Daru	Leaves	0	10	23,3	40	46,6	1003,310
20	Lansale	Leaves	0	43,3	56,6	60	73,3	156,000
21	Kaghai-ghai	Leaves	0	43,3	60	83,3	93,3	132,023
22	Sirikaea	Leaves	0	63,3	76,6	90	93,3	51,046
23	Sandana	Leaves	0	26,67	26,67	63,33	73,33	354,498
24	Kataba-tabako	Leaves	0	23,33	60	86,67	96,67	177,577
25	Sambiloto	Leaves	0	3,33	36,67	80	100	268,512
26	Kambadhawa	Leaves	0	6,67	13,33	56,67	56,67	625,879
27	Lakoora	Herbs	0	3,33	13,33	56,67	23,33	3383,633
28	Kerseni	Leaves	0	26,67	46,67	63,33	83,33	252,252
29	Kusambi	Leaves	0	33,33	46,67	56,67	63,33	316,567
30	Dana	Rhizomes	0	26,67	60	86,67	100	168,467
31	Bhea	Seed	0	3,33	33,33	96,67	100	234,429
32	Radhawali	Cortex	0	3,33	16,67	76,67	86,67	323,53
33	Katimboka	Cortex	0	3,33	20	63,33	67,67	450,535
34	Kumis kucing	Leaves	0	6,6	33,3	43,3	46,6	608,30
35	Rogili	Leaves	0	6,6	10	16,6	20	1834,793
36	Padamalala	Leaves	0	16,6	16,6	30	33,3	153,987
37	Ntanga-ntanga	Leaves	0	13,3	20	23,3	30	1155,567
38	Kasape	Herbs	0	23,3	26,6	50	53,3	512,408
39	Kalamandinga	Leaves	0	33,3	43,3	100	100	83,676
40	Rogo	Leaves	0	10	13,3	26,6	43,3	933,583
41	Tulasi	Herbs	0	26,6	30	46,6	53,3	537,030
42	Kabote-bote	Leaves	0	6,6	6,6	26,6	20	1394,647
43	Kaembu-embu	Leaves	0	16,6	13,3	33,3	43,3	871,417
44	Kula	Leaves	0	16,6	16,6	30	33,3	1300,518

4.2. Toxicity Test with Brine Shrimp Lethality Test (BSLT) method

Toxicity test is a simple bioassay for a natural product used brine shrimp (Meyer et al, 1982). Brine shrimp lethality test (BSLT) used *Artemia salina, Leach*, because had a high sensitivity with toxic material. DMSO is a surfactant as a solvent. Brine shrimp lethality test is an early toxicity test especially for anticancer activity with cell lethality parameters (Rang et al, 2003). The result shows that toxicity effect linear with concentration. Samples that have the smallest LC_{50} value (38,330 mg/mL) is the leaves of *patiwala ngkadea* - *Lantana camara* L. and leaves of *sirikaea* - *Annona mucirata* L. (LC_{50} value is 51,046 µg/mL). Samples that show the highest LC_{50} value (3383,633 µg/mL) is *lakoora Eleusine indica* (L.) Gaertn herbaceous.

Part of lansau rhizome *ladha* and *dana* were toxic but for cortex (*kulidawa* and *kumbou*) are not toxic LC_{50} > 1000 µg/mL). Part lansau from fruit (*bhangkudu*) was not toxic with LC_{50} value was 2659,72 µg/mL, but for seed (*bhea*) was toxic with LC_{50} value is 234,429 µg/mL.

Part of lansau consist of herbs namely *tulasi* and *kasape* are toxic with LC_{50} value is 537,830 µg/mL and 512,408 µg/mL, but *wonta* and *lakoora* are not toxic (LC_{50} >1000 µg/mL).

5. CONCLUSION:

a. Phytochemical screening of lansau was alkaloid, flavonoid, tannin, saponin dan triterpenoid
b. Toxicity test of the 44 plants of lansau, 27 are toxic (LC_{50} <1000 µg/mL)

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