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Ethnopharmacological survey of medicinal herbs in Tolaki-Mekongga Tribe of Kolaka Regency and East Kolaka Regency, Southeast Sulawesi, Indonesia

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Abstract
Background: This research aims to collect and preserve ethnopharmaceutical knowledge based on the customs of the Tolaki-Mekongga tribe in treating various diseases experienced by people in the Tolaki-Mekongga tribal area.
Methods: In this study, descriptive-qualitative methods have been used for the research objectives to be achieved. Qualitative methods have been used to identify plants as traditional medicines by interview, while quantitative methods have been used for the classification of medicinal plants, use of therapeutic plant organs, medicinal plant use formulations, determination of a group of plants as candidates for herbal medicine, phytopharmaca candidates, and even endemic plant as drugs candidates for tropical and infectious diseases.
Results: The results obtained 158 medicinal plant species, although most of these medicinal plants were used by other tribes, and the Tolaki-Mekongga tribe only uses as many as ten medicinal plant species as local wisdom in the region. According to the survey results, it was found that the parts of the plant that were commonly used were roots, root water, stems, leaves, flowers, seeds, fruits and rhizomes. The processing of plants used as medicinal plants generally still uses traditional methods. Based on the questionnaires and field surveys, several things were found: through questionnaire data, as many as 133 respondents obtained online and offline were identified 158 plant species used by the Tolaki-Mekongga tribe to treat 112 types of diseases. A literature search shows that among the 158 plant species, several plants are not only used by the Tolaki-Mekongga people but also by other tribes in Indonesia and the world, but this study provides essential information and found that ten medicinal plant species are only used by the species of Tolaki-Mekongga partly have not been identified, namely: (tawa nggateba/kateba: local name), *Kleinhovia hospita L.*, (tawa tamaseu: local name), (bajakah: local name), (tawa tanggedaso: local name), chlorophyll trees (spesies unidentified), (saumompai: local name), (katolanondoke: local name), *Discidia albifora*, and *Discidia major*.
Conclusion: Data on endemic plants in the Kolaka and East Kolaka districts were obtained, which were used as medicinal plants and even as foodstuffs in the region and have the potential for herbal and phytopharmaca studies, so that phytochemical and pharmacological studies were needed to identify bioactive compounds.

Keywords: Ethnopharmaceutical, tolaki-mekongga, herbal medicine, traditional medicine

Introduction
Exploration and ethnopharmaceutical research on medicinal plants globally and in Indonesia are still being carried out to find various new drugs, herbs, and Phyto-pharmacy, especially for treating tropical and infectious diseases, are still major health problems in the world, especially in Indonesia. Recently, exploration and ethnopharmaceuticals of medicinal plants have been carried out in Southeast Sulawesi (Buton and Muna tribes) (Jumiarni and Komalasari, 2017) [1], (Kasmawati, Ihsan, and Suprianti, 2019) [2], ethnopharmaceuticals of the Binongko tribe (Indrayangingsih, Ibrahim, and Anam, 2015) [3], and even ethnopharmaceuticals of the Tolaki Konawe and South Konawe tribes have obtained 17 plant species and two species endemic plants: *Sterculea cf. oblongata R.Br.* and *Talinum triangular Willd* which is not found in other areas (Ruslin and Sahidin, 2008) [4] and also research on the diversity of medicinal plants in regions in Indonesia (Kusmana and Hikmat, 2015) [5]. However, the exploration and ethnopharmacy of the Tolaki-Mekongga tribe had never been carried out by previous researchers.

Researchers have explored and ethnopharmaceuticals in medicinal plants recently, including the ethnopharmaceuticals of the ethnic Albanians Basilicata Utara, Italy (Pieroni *et al.*, 2002) [6], anti-cancer ethnopharmaceuticals (Hendrick and Bremner, 2006) [7], the ethnopharmaceuticals of the Sahara Desert (Volpato, Rossi, and Dentoni, 2013) [8], the ethnopharmaceuticals of the Indus River (Mussarat *et al.*, 2014) [9], ethnopharmaceutical residents of the Goleen Valley, Chitral, Pakistan (Jan *et al.*, 2017) [10], and others.

Ethnopharmacy is an interdisciplinary science concerning the study of traditional medicines or pharmacy-related to an ethnicity's cultural characteristics and in individual human communities. Recently, there have been many ethnopharmaceutical studies to find herbal, herbal and phyto-pharmacy products, including: Xinjiang herbal tea (Bai *et al.*, 2019) [11], traditional medicine in Guangdong, China (He, Hu, and Wang, 2014) [12], herbal medicine in Israel (Said *et al.*, 2002) [13], ethnobotany in Western Cape Rasta (Philander, 2011) [14], ethnomedicine in Malayali and Narikuravar, India (Silambarasan, Sureshkumar, and Ayyanar, 2017) [15], ethnopharmacological studies of Argemone Mexicana (Gayoor *et al.*, 2019) [16], herbal medicine in Mexico (Valdivia-Correa *et al.*, 2016) [17], ethnopharmacology for new drug development (Carvalho *et al.*, 2018) [18], modern ethnomedicinal techniques (Heidari, 2017) [19], phytotherapy and ethno-botany plant diversity in Kashmir (Yaqoob *et al.*, 2017) [20], traditional medicine used by Albanians, Macedonians (Rexhepi *et al.*, 2013) [21], medicinal plants in Europe (Quave, Pardo-De-Santayana, and Pieroni, 2012) [22], survey of medicinal plants used by the people of Eritrea (Yemane, Medhanie, and Reddy, 2017) [23], ethnopharmaceutical plants used by indigenous people Nigeria (Ajibesin, Bala, and Umoh, 2012) [24], ethnobotany study of medicinal plants by the population of Juruena, Brazil (Bieski *et al.*, 2015) [25], ethno-botanical medicinal plants used by the Hausa tribe in Kaduna, Nigeria (Aishatu *et al.*, 2017) [26], ethnopharmaceutical plants used by traditional healers for the treatment of diseases in Kano and Jigawa, Northern Nigeria (Adoum, 2016) [27], ethnopharmaceuticals in Muara Kilis-Jambi, Indonesia (Perawati, 2019) [28], and herbal medicine used for infertility treatment by traditional healers in rural West Palestine (Jaradat and Zaid, 2019) [29] and others. This research involves the study of the identification, classification and categorization of medicinal plants' existence, the parts of the plants used, how to use them, the socio-medical aspects of the Tolaki-Mekongga tribe implied in the use of these medicinal plants (ethnomedicine). In Indonesia, there are 30,000 types of plants, and 7000 of them have medicinal properties. Indonesia's biodiversity ranks second after Brazil (Jumiarni and Komalasari, 2017) [1]. Among the biodiversity is in the area of the Mekongga tribe: Kolaka and East Kolaka districts, which are the center of the Mekongga Kingdom. Previous researchers have never carried out Ethnopharmaceutical research in the Mekongga Kingdom. However, ethnopharmaceutical analysis of the Tolaki tribe in Konawe, which is about the Tolaki-Mekongga tribal region in Southeast Sulawesi Province, has been carried out and obtained 17 medicinal plants are the same as other regions in Indonesia and the world. However, some things are very encouraging because there are two endemic plant species: *Sterculea cf. oblongata R.Br.* and *Talinum triangular Willd*, which is not found anywhere else in the world (Indrayangingsih, Ibrahim, and Anam, 2015, Ruslin and Sahidin, 2008, Kusmana and Hikmat, 2015) [3-5].

The object of ethnopharmaceutical research on medicinal plants from the Tolaki-Mekongga tribe community is to rediscover the last traces of knowledge about traditional medicine preserved by the diversity of medicinal plants as local wisdom the Tolaki-Mekongga tribe. In this field project, it is possible to analyze medicinal plants that are endemic and non-endemic but can grow in Kolaka and East Kolaka, Southeast Sulawesi, Indonesia. Fieldwork and research data collection were carried out during the May-November 2021 period.

Previous researchers have never conducted a survey of medicinal plants in the Tolaki-Mekongga tribal area. The level of use of medicinal plants in the Tolaki-Mekongga region is high. Still, phenomenally it shows that these traditional medicines can diminish and disappear from the daily habits of the Tolaki-Mekongga tribe due to globalization and modernization. Meanwhile, there is currently increasing interest worldwide in traditional herbal medicines. Through this research, various species of medicinal plants can be collected. Likewise, knowledge about the drug's function could be collected as a basis for taking raw materials or research objects for isolation and activity testing of medicinal compounds from various medicinal plants, which are considered potential wisdom of the Tolaki-Mekongga tribe. Therefore, the knowledge base and local understanding significantly increase the possibility of ethnobotany and ethnopharmacology for the discovery of new drugs, herbs, and Phyto-pharmacy. This is one of the main motivations for conducting a medical survey using medicinal plants. The urgency of surveying medicinal plants was recorded their identities and operated by preserving medicinal plant genetic resources in the Tolaki-Mekongga areas, Kolaka Regency and East Kolaka Regency. This study aims to collect broader and more extensive data from the indigenous people of the Tolaki-Mekongga tribe and people from other tribes who have lived and settled in Kolaka and East Kolaka districts for decades. The data and information obtained serve as a basis for searching for potential bioactive compounds as candidates for new drugs in the form of herbs, herbs and Phyto-pharmacy, and modern medicine.

Methods and Experimental Design

The research was conducted in 2 districts, namely Kolaka Regency and East Kolaka Regency, in 20 sub-districts and 57 villages, as shown in Figure 1.

Methods and Experimental Design

This study's variables include the types of medicinal plants (local names, scientific names), plant efficacy, plant organs used, and how to use them. The analysis in this research is descriptive-qualitative. Data collection involved respondents from various educational, ethnic, religious, and professional backgrounds through direct, semi-structured, structured interviews using direct and online questionnaires http://lppm.usn.ac.id/questionnaire/index.php. In the first phase of the field study, the community was asked to recall all medicinal plants and natural remedies used in the past. More specific information is recorded, then developed through semi-structured and structured interviews designed explicitly through a questionnaire.

Several respondents were asked to explain precisely how to use and present traditional medicine for each type of plant and disease, even for the diverse kinds of medicinal plants. During the interview, several fresh plant specimens or dry samples were shown to the respondents. If a plant was quoted without a reference and the species is not known, then ask the

respondent to be interviewed directly in the field to indicate the type of medicinal plant. Each non-cultivated plant species recognized by the population as being used for traditional medicine is all collected and identified by researchers. The species type is traced either through literature or appropriate software.

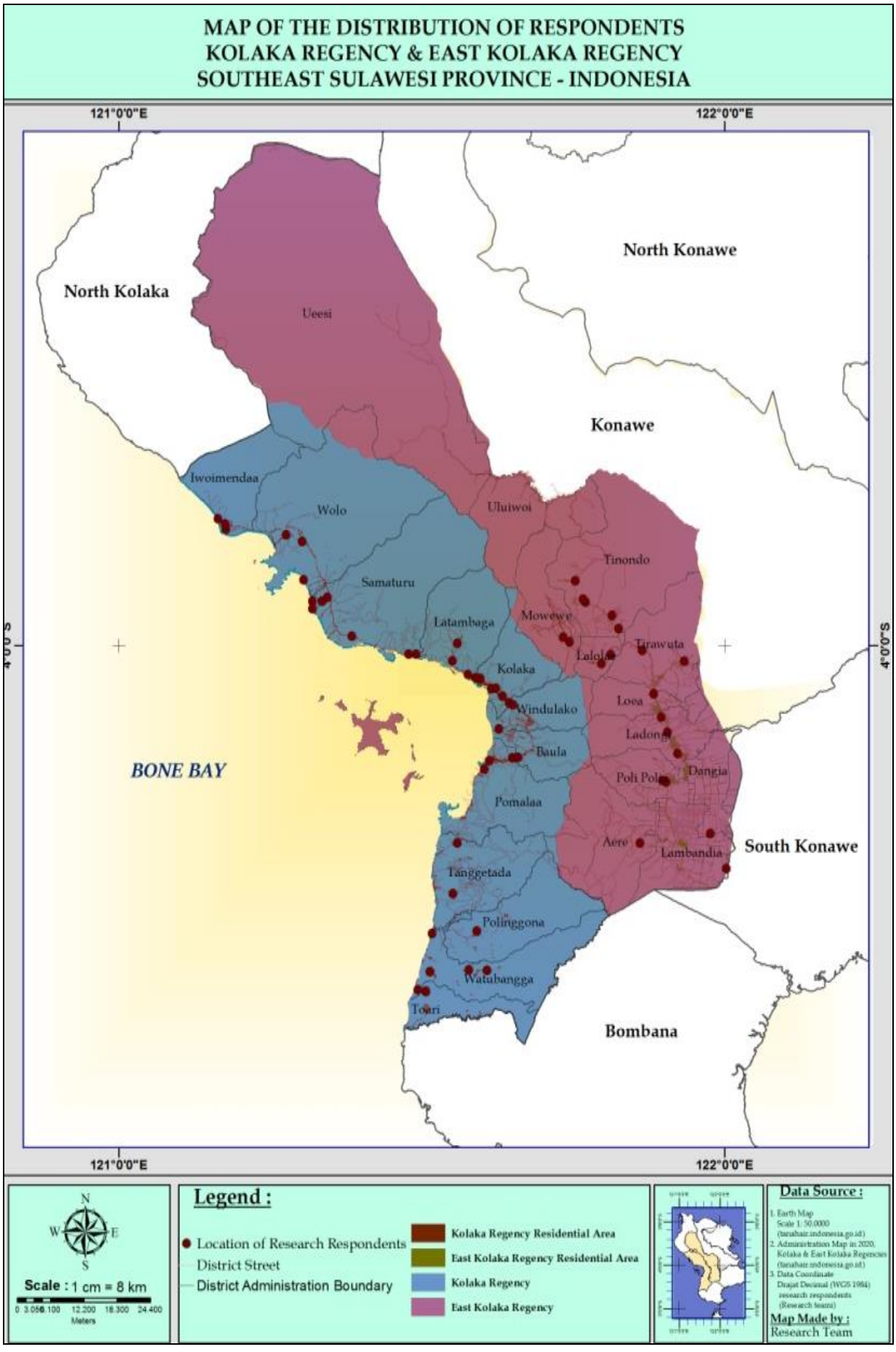

Fig 1: Distribution of respondents in Kolaka Regency and East Kolaka Regency

Data and information on other traditional medicines used in local community medicine were also collected. Generally, only two or more respondents from each village were selected. Each practitioner filled out the questionnaire covering several aspects such as herbal sources and characteristics of medicinal plants, the community's socio-economic conditions, education, resources, breadth of knowledge, and readiness as respondents. Each respondent to traditional medicine practitioners was first asked about the primary disease being treated, then asked about the plant species used to treat certain conditions. After that, the respondents were asked to identify plant species from their plant collections in the garden and the wild plants' yard. The respondents mentioned the types of plants, then checked and confirmed based on literature and using software through photos or directly photographed. Respondents who have little knowledge about plant species identification in the field help researchers identify medicinal plant species.

Results

The ethnopharmaceutical study is one approach that can be used to find new medicinal plants, herbs, and Phyto-pharmacy. Through ethnopharmaceutical studies, various plants' screening was carried out through interviews and questionnaires to informants, traditional practitioners, and patients (Ningsih, 2015) [30]. Based on this, respondents from multiple backgrounds were selected, including legal practitioners, patients, academics, traditional elders, and others from the Tolaki-Mekongga tribe and other tribes who have lived in the Kolaka Regency and East Kolaka Regency for a long time. The ethnopharmaceutical data was collected through semi-structured and structured interviews with as many as 133 respondents. The number of offline respondents was 78 people consisting of 34 women and 44 men, while the number of online respondents was 55 consisting of 38 women and 17 men. Of the 133 respondents who were interviewed, 49 respondents were over 40 years old, the remaining 84 were under 40 years old, and especially from families who still have a strong connection with the local wisdom of the Tolaki-Mekongga tribe, Kolaka Regency and East Kolaka Regency, Southeast Sulawesi Indonesia. The ethnopharmaceutical survey results from 133 respondents who live in the Tolaki-Mekongga tribe area revealed that the community uses as many as 158 species of medicinal plants to treat 112 types of diseases.

Lately, traditional medicine has been in demand by society, where previously it has been replaced by modern medicine. Generally, phytotherapy was popularly used for diseases: pharyngitis, gastritis, indigestion, nephrolithiasis, but the Tolaki-Mekongga people still use phytotherapy as drugs for cancer, internal medicine, Tuberculosis, Malaria, cholesterol, hypertension, gout arthritis, diabetes, and several other diseases as shown in Table 1.

Table 1: Ethnopharmaceuticals of the Tolaki-Mekongga tribe which intersect with other tribes in the world

Species	Part used	Uses in the local Popular medicine	Preparation
Moringa oleifera Lamk	Leaf	stomach ache, cholesterol	Pound 3 stalks and mix with kerosene, then rub on the stomach
	Leaf, stem	Renal Failure	Boiled then drunk
	Sap	Ulkus cornea, Kalazion, Dakrioadenitis, Presbyopia	Extracted then applied
Allium ascalonicum Linn	Rhizome	Hand, Foot, and Mouth Disease, Avian Influenza, Influenza, diarrhea, Headache, Acne Vulgaris	Extracted with water then drunk
	Flower	Maag	Pounded and squeezed, then drunk
Averrhoa bilimbi	Fruit	Pertussis, DHF, Typhoid Fever, Yellow Fever, Hypertension	Squeezed and drunk the water or eaten immediately
	Root	Tonsils	Boiled then drunk
Jatropha curcas	Bark	Tooth Ache, Nosebleed, diarrhea, DHF, Typhoid Fever, Yellow Fever, Dysentery	Chopped then attached to the child's head; the leaves are brewed with hot water and then drink
	Leaf	hypertension, stomach ache	Brewed with hot water then drink
	Sap	toothache, Stomatitis	Inserted in the tooth cavity
Citrus aurantifolia	Fruit	DHF, Typhoid Fever, Yellow Fever, Pertussis, Tuberculosis	Squeezed the water then drunk
Kaemeria gelanga L.	Rhizome	Varicella/Chickenpox, Herpes zoster, dysentery, DHF., Typhoid Fever, Yellow Fever, Pertussis, Tuberculosis, launch breast milk	Grated, squeezed the water and mixed with honey and eggs, then drunk
Ocimum sanctum	Leaf	Diabetes	As fresh vegetables
Curcuma demostica	Rhizome	antibiotics, dysentery, DHF, Typhoid Fever, Yellow Fever, hypertension, smooth menstruation, Maag, Dyspepsia	Grated added hot water and then drunk
		remove scars	Applied directly to the wound
Coriandrum sativum	Fruit	DHF, Typhoid Fever, Yellow Fever,	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Piper nigrum	Fruit	malaria	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Alpinia galanga (L.) *Willd*	Rhizome	Tinea Versicolor, itchy, Neurodermatitis	Grated then rubbed on the itchy skin
Allium sativum L.	Rhizome	Fibromyalgia	Grated and mixed with VCO, then used as a massage ingredient
		hypertension, Maag	Pounded and squeezed the water, then drunk
Tinospora crispa	Stem	hemorrhoid, rheumatics, diabetes, Maag	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Curcuma xanthorrhiza Roxb	Rhizome	as orexigenic, stamina, Apendisitis, types, DHF, Typhoid Fever, Yellow Fever,	Grated and boiled with water, then drunk
Curcuma heyneana	Rhizome	Headache dan Kalazion, Dakrioadenitis, Presbyopia	Boiled with water, then drunk
Benincasa hispida	Fruit	Thypus	As a vegetable
Peperomia pellucida	all parts of the plant	Tuberculosis, Arthritis Gout, rheumatics	Boiled with water, then drunk
Lannea cormendalica (*Houtt.*) *Merr.*	Bark	antimicrobial, antibacterial,	Boiled with water, then drunk
		Ulkus cornea	Extracted and then attached to the wound
		Asma Bronkhiale	Squeezed and mixed with honey and eggs, then drunk
Cucurbita moschata Duch	Flower	Diabetes, hyperglycemic	Processed into cakes or vegetables

Syzygium polyanthum	Leaf	Diabetes, hyperglycemic, Stomatitis	Boil with 300 ml of water to the remaining 200 ml of water, then drink it
Momordica charantia L.	Fruit	DHF, Typhoid Fever, Yellow Fever, Malaria	As a vegetable
	Leaf	Pertusis, Tuberculosis	Squeezed, then drunk
Piper betle L.	Leaf	vaginal discharge, stomach ache	Boiled with water, then drunk
		bromhidrosis, hemorrhage, nosebleed	Extracted and dissolved in water, then used for bathing
Annona muricata L.	Leaf, fruit	cancer, cholesterol, internal disease, Ulkus cornea, stomach ache	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Annona squamosa L.	fruit, Leaf	Maag, Malaria	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Breynia cernua	Leaf	carsinoma mammae, Cervical Cancer, dan tumor	Cooked in 3 cups of water to 1 cup of the remaining water, then drunk
Cassia alata L.	Leaf	itchy skin, constipation	Pounded then affixed to the skin
Blumea balsamifera (L.) *D.C.*	Leaf	Pertussis, Tuberculosis	Cooked in 3 cups of water to 1 cup of the remaining water, then drink it
Bidens pilosa L.		Ulkus cornea, Febrile convulsion	Extracted and then placed on the skin
Borreria laevis Griseb	Leaf	Aches, Ulkus kornea	Digested and attached to the part that hurts
Coleus hybridus	Leaf	Pertussis, Tuberculosis	Squeezed leaves, mixed with honey, then drunk
Ananas comosus (L.) *Mer*	unripe fruit	Bronkitis	As juice
Phaleria macrocarpa (*Scheff*) *Boerl*	Kulit buah	Cancer, tumor	Cooked in 3 cups of water to 1 cup of the remaining water, then drunk
		internal disease, Pertussis, Tuberculosis, Headache, flu	Dried in the sun, after dry boiled then drunk
Punica granatum L.	Fruit	carcinoma mammae, tumor	The fruit is eaten
Catharanthus roseus (L.) *G. Don*	root, Leaf	diabetes, hypertension	Boiled then drunk
Orthosiphon aristatus (*Blume*) *Miq.*	Leaf	Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure, diabetes, constipation, back pain Urethritis	Boiled then drunk
Andrographis paniculata (*Burm.f.*) *Nees.*	Leaf	malaria, diabetes, DHF, Typhoid Fever, Yellow Fever, hypertension	Squeezed with hot water then drunk
Amaranthus dubius Martex Thell	Leaf	Diarrhea	Squeezed with hot water then drunk
Gynura procumbens (*Lour.*) *Merr.*	Leaf	hard to breathe	Boiled then drunk
Apium graveolens L.	Leaf, stem	Hypertension, cholesterol	Boiled then drunk
Areca cathecu L.	unripe fruit	Hypertension, Vaginal Candidiasis, uterine cleanser	Pounded and squeezed then drunk
	Seed, root	Pertussis, Tuberculosis	Pounded and squeezed then drunk
Physalis angulata L.	Leaf, fruit	diabetes, hypertension, blain, Asma Bronkhiale	Boiled then drunk, or the fruit is eaten
Eleutherine bulbosa	Rhizome	cancer, tumor, cholesterol, stroke, Acute Coronary	Boiled, then drunk
Anredera cordifolia (Ten.) Steenis	Leaf	internal disease, stamina, Arthritis Gout	Boiled, then drunk
Zingiber officinale Roscoe	Rhizome	stamina, Faringitis, DHF, Typhoid Fever, Yellow Fever, internal disease, Pertussis, Tuberculosis, Menorrhagia, Headache, uterine infection, stroke, inflammation	Grated, squeezed, added honey, then drunk
Artocarpus altilis (*Parkinson ex F.A.Zorn*) *Fosberg*	Leaf	Maag, diabetes	Boiled then drunk
Cocos nucifera L.	fruit	Hypertension	Drunk
	VCO	cholesterol, Maag, Asma Bronkhiale, tumor, fracture	Drunk
	root	Inkontinensia Urine	Boiled then drunk
	young coconut water	Hypertension, bronchitis	Drunk
	unripe fruit	Stomatitis	Smeared
Morinda citrifolia L.	Fruit	hypertension, Pyelonephritis, Acute Renal Failure, chronic, tumor, Maag	Boil, then drink the water
	Fruit	internal disease	Be eaten
Phyllanthus urinaria L.	root, Leaf, fruit	Diabetes, hypertension, malaria, cholesterol, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure, stamina, Critical limb ischemia, Urethritis, Menorrhagia	Boiled then drunk
Kalanchoe pinnata L.	Leaf	fever, blain, toothache, Headache, Ulkus cornea	Chopped then attached to the child's head
Garcinia mangotana L.	rind	cancer, tumor	Boiled, then drunk
Pterocarpus indicus Willd	Leaf	DHF, Typhoid Fever, Yellow Fever,	Boiled, then drunk
Ficus septica Burm.	Root, Leaf	DHF, Typhoid Fever, Yellow Fever,	Boiled, then drunk, affixed to the baby's forehead
Drynaria sparsisora (*Desv.*) *T. Moore*	Rhizome	Pharyngitis, internal disease, cancer, tumor, DHF, Typhoid Fever, Yellow Fever,	Pounded and boiled then drunk
Zingiber officinale Var. Rubrum.	Rhizome	DHF, Typhoid Fever, Yellow Fever, fracture, poisoned	Grated then extracted with water and mixed with honey
		Pharyngitis	Boiled and mixed with a little ginger
Lantana Camara L.	Leaf	Ulkus cornea, DHF, Typhoid Fever, Yellow Fever, tumor	Shaken and then squeezed on the fresh wound
Sida rhombifolia L.	Stem, Leaf	internal disease, Pertussis, Tuberculosis	Boiled then drunk.
Loranthus sp. Jack.	Leaf, bark	Appendicitis, cancer, tumor	Boiled then drunk
Strobilanthes crispus L.	Leaf	Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure, Urethritis	Boiled then drunk
Persea americana Mill	Fruit, Leaf	Arthritis Gout, cholesterol, Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure, hypertension	Boiled then drunk
Sauropus androgynus	Leaf	increase breast milk	As a vegetable
Stachytarpheta jamaicensis L.	Leaf, flower	Pertussis, Tuberculosis, Tonsils, inflammation	Boiled then drunk
Hibiscus rosa sinensis L.	Leaf, flower	Tuberculosis	Boiled then drunk
Ageratum conyzoides L	all parts of	Tuberculosis, increase the production of breast milk, Ulkus	Boiled then drunk

	the plant	cornea, rheumatics	
Ocimum basillicum L.	Leaf	Tuberculosis	Boiled then drunk
Aegle marmelos (L.) *Correa*	Root	syphilis, goitre, thyroiditis	Boiled then drunk
Tridax procumbens	Leaf, flower	Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure, hypertension, cholesterol	Boiled then drunk
Nikotiana tobacum L.	Leaf, flower	Ulkus cornea	The water is diluted and then dripped on the fresh wound
Boesenbergia pandurate (*Roxb.*) *Schlecht.*	Rhizome	Tumor	Grated, squeezed the water, mixed with honey, then drunk
Curcuma aeruginosa Roxb.	Rhizome	antiseptic, cancer, tumor	Squeezed, mixed with honey, then drunk
Curcuma zedoaria (*Berg.*) *Roscoe*	Rhizome	stamina, cancer, prostate, internal disease, tumor	Squeezed, mixed with honey, then drunk
Impatiens Platypetala Lindl.	Leaf, flower	Stamina	Boiled then drunk
Solanum nigrum	Fruit	increase breast milk	As a vegetable
Chromolaena odorata	root, stem, shoots	Ulkus cornea, itchy skin, diabetes	As a vegetable
Citrus aurantiifolia	Fruit	Pertusis, Tuberculosis	Squeezed, mixed with honey, then drunk
Muntingia calabura	Fruit	hypertension, diabetes	Buah dimakan
Calotropis gigantean	Leaf, flower, stem	scabies, blain	Boiled then drunk
Graptophylullum pictum	Leaf	hemorrhoid, constipation, Menorrhagia	Boiled then drunk
Zingiber Montanum	Rhizome	Maag, itchy,	Boiled then drunk
Psidium guajava L.	Leaf	gastroenteritis, stomach ache	Boiled and added salt, then drunk
	Fruit	dengue fever	Blend then drink
Carica papaya L.	Leaf	DHF, Typhoid Fever, Yellow Fever, Pertussis, Tuberculosis, Malaria	Boiled or squeezed water mixed with honey and then drunk
Anacardium occidentale L.	Leaf	Gastroenteritis	Boiled then drunk
Cymbopogon Nardus (L.) *Rendl*	Stem	Rheumatics	Boiled then drunk
Cordyline fruticosa (L.) *A Chev*	Leaf	Bleeding	Boiled then drunk
Erythrina subumbrans Merr.	Leaf	Hypertension, DHF, Typhoid Fever, Yellow Fever,	Squeezed and drunk the water
Ceiba pentandra	Leaf	Gastroenteritis	Boiled then drunk
Euphorbia hirta L.	Leaf, stem	Constipation, itchy, internal disease	Boiled then drunk
Aquilaria malaccensis	Stem	Hypertension, Malaria	Boiled then drunk
Manihot esculenta	Leaf	Blain	Squeezed then drop into the wound
Sesbania sesban (L.) *Merr.*	Leaf	Fracture	The leaf extract is attached to the sick body part
Mimosa pudica Linn	Leaf, root	Pertussis, Tuberculosis	Boiled then drunk
Curcuma longa Linn. syn.	Rhizome	DHF, Typhoid Fever, Yellow Fever, haemorrhoid, Menorrhagia, Maag, liver,	Boiled then drunk
Abelmoschus manihot	Leaf	Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure	Boiled then drunk
Axonopus compressus (*Swartz*) *Beauv*	Shoots	Ulkus cornea	The juice of young leaves was then placed on the wound
Caesalpinia crista	Fruit	Internal disease, cancer, malaria,	As juice drink
Arenga pinnata	Fruit	Liver	As juice drink
Abelmoschus esculentus (L.)	Fruit	Constipation, cholesterol,	As a vegetable
Leucas Lavandufolia Smith	Leaf	Pertussis, Tuberculosis	Boiled then drunk
Hedyotis corymbosa L.	all parts of the plant	Pertussis, Tuberculosis,	Boiled then drunk
Swietenia mahagoni (L.) Jacq.	Seed	Hypertension, Malaria	Pounded, dried then boiled, then drunk the boiled water
Cinnamomum Burmannii	Stem	DHF, Typhoid Fever, Yellow Fever, uterine disease,	Boiled then drunk
		Cosmetics	It is ground as a powder
Bouea macrophylla Griffith	Leaf	stomach ache	Boiled then drunk
Passiflora foetida	Leaf	Bronchitis, diabetes	Boiled then drunk
Pogostemon cablin	Oil	Ulkus cornea	Smeared
Ceiba pentandra	Leaf	Inflammation	Boiled then drunk
Musa acuminate	fruit, Leaf	Diabetes	Edible fruit, boiled then drunk
	sap, stem,	Ulkus kornea	Diteteskan langsung pada luka
Ziziphus mauritiana	Leaf, fruit	Diabetes	Edible fruit, boiled then drunk
Jatropha gossypifolia L.	Leaf, fruit	Constipation	Boiled then drunk
Cosmos caudatus	Leaf, flower	Maag	Boiled then drunk
Manilkara zapota	young fruit	Typus	Grated, squeezed and then drunk
Amaranthus spinosus	Leaf	Diarrhea, blain, cholesterol,	Boiled then drunk
Stachytarpheta jamaicensis L.	Leaf	Ulkus cornea, hypertension, Pertussis, Tuberculosis, cancer, Maag, Arthritis Gout, Tonsils, vertigo, Urinary Tract Infection	Boiled then drunk
Cyclea barbata Miers	Leaf	Malaria, meteorismus	As a vegetable
Hippobroma longiflora G.Don	Leaf	Kalazion, Dakrioadenitis, Presbiopia	Soaked with water, filtered, then used for washing the eyes
Mangifera indica L.	Bark	Toothache	Boil and use the water to rinse your mouth
Syzygium aromaticum	Fruit	Headache	Boiled then drunk
Syzygium aqueum	Shoots	Gastroenteritis	Boiled then drunk
Parameria laevigata	Bark	Vaginal seal	Boiled then drunk
Quercus infectoria	Fruit	Internal disease, Vaginal seal,	Boiled then drunk
Caesalpinia sappan L.	Stem	Diabetes, Internal disease	Boiled then drunk
Cuminum cyminum	Seed	DHF, Typhoid Fever, Yellow Fever,	Boiled then drunk
Nigella sativa L.	Seed	Internal disease, DHF, Typhoid Fever, Yellow Fever,	Boiled then drunk

Amomum compactum soland ex Maton	Seed	Cholesterol	Boiled then drunk
Gliricidia sepium	Leaf	DHF, Typhoid Fever, Yellow Fever,	Boiled then drunk
Solanum torvum	Fruit	Arthritis Gout	As a vegetable
Centella asiatica	Leaf	DHF, Typhoid Fever, Yellow Fever,	Boiled then drunk
Portulaca L.	Leaf	Asma, haemorrhoids	Boiled then drunk
Anredera Cordifolia (*Ten*). *Steenis*	Leaf, flower	Ulkus cornea, Maag, Arthritis Gout	Boiled then drunk
Aegle marmelos (L.) Corr.	Root	diabetes, itchy, internal disease	Boiled then drunk
Anredera Cordifolia	Leaf, flower	cancer, constipation, blain, inflammation, diabetes	As a vegetable
Alstonia scholaris, (L.) *R. Br.*	bark, Leaf	Pertussis, Tuberculosis, rheumatics, DHF, Typhoid Fever, Yellow Fever, cancer, Malaria	Squeezed the water, then drunk
Hibiscus tiliaceus L.	Leaf	DHF, Typhoid Fever, Yellow Fever,	Boiled and drunk
Paederia scandens Merr.	Leaf	Ulkus cornea	Rubbed by hand then placed on the wound
Jatropha multifida L.	sap	Ulkus cornea	Dripped on the wound
	Leaf	Stroke, DHF, Typhoid Fever, Yellow Fever, Dengue Fever	Boiled then drunk

Besides, there are several plants in the Tolaki-Mekongga tribe area in the Kolaka and East Kolaka districts that are considered rare. Many of these species were threatened with extinction, including species of (barakah: local name), *Kleinhovia hospita L.*, (tawa nggateba/kateba: local name) have also been studied (Ruslin and Sahidin, 2008) [4], and (tawa anggedaso: local name), (tawa tamaseu: local name), *Jatropha multifida L.*, (saumompai: local name), (katolanondoke: local name), *Discidia albifora*, *Discidia major* and (bajakah: lacal name) that presented in Table 2.

Table 2: The medicinal plants used by the Tolaki-Mekongga tribe have not been used in other tribes

Species	Local name/Indonesia	Part used	Uses in the local Popular medicine	Preparation
Unidentified	Tawa nggateba /kateba	Leaf	Ulkus cornea	Extracted then applied to the wound
Kleinhovia hospita L	Tawa tokulo/ tohulo	Leaf	Diabetes, cholesterol	As a vegetable
Unidentified	Tamaseu	Leaf	Diabetes, cholesterol	As a vegetable
Unidentified	Bajakah	Root water, wood	Cancer, stamina, malaria	Boiled, filtered, then drunk
Unidentified	Tawa tanggedaso	Leaf	Hepatitis, internal disease, Tuberculosis	As a vegetable
Unidentified	Klorofil	Leaf	Tingling sensation, chest pain, hypertension, Ulkus cornea	Boiled then drunk
Unidentified	Saumompai	Leaf	Malaria, cancer, DHF, Typhoid Fever, Yellow Fever,	Boiled then drunk
			Ulkus cornea	Squeezed, then placed on the wound
Unidentified	Katolanondoke	Stem	Cancer, Malaria, DHF, Typhoid Fever, Yellow Fever, tumor, Ulkus cornea Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure	Boiled then drunk
Discidia albifora	Sohoha kopu hobine	All parts of the plant	Internal disease, cancer, Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure,	The plant parts are dried and then boiled, then drunk
Discidia major	Sohoha kopu moane	All parts of the plant	Internal disease, cancer, Hydronephrosis, Pyelonephritis, Acute Renal Failure, Chronic Renal Failure	The plant parts are dried and then boiled, then drunk

Table 1 and Table 2 reported who 158 plant species were used in the Tolaki-Mekongga people's phytotherapy. Among these medicinal plants, most of them were also used by other tribes, and the Tolaki-Mekongga tribe only uses as many as ten species of medicinal plants as local wisdom in the region (Table 2). The survey results indicated the high dependence of the population on medicinal plants to meet their health needs. Knowledge of traditional medicine is limited to traditional healers and traditional elders. However, teachers, lecturers, and students still document many medicinal plants, even though most youths have forgotten conventional medicine's conventional customs. Safeguard measures should be taken to conserve multipurpose medicinal plant species from overexploitation.

Based on the results of questionnaires and field surveys, it was found that seven endemic plant species in the Kolaka and East Kolaka districts were used as medicinal plants and even at the same time as foodstuffs in the region, including *Kleinhovia hospita L*, (tawa Tanggedaso: local name), (tawa tamaseu: local name), *Anredera Cordifolia* (*Ten*). *Steenis*, *Anredera CordifoliaI*, and Tolaki-Mekongga typical (bajakah: local name) drink water from the stem when cut (Table 2). Some medicinal plants traditionally used by the Tolaki-Mekongga tribe intersect with medicinal plants used by other tribes in Indonesia and other countries, as shown in Tables 1 and 2.

Based on the results of the field survey, Tables 1 and 2, there are 33 respondents (24.81%) recommending 28 species (17.72%) of the total plants used to treat diabetes, there are 37 respondents (27.82%) suggesting 34 species (21.52%) used to treat internal diseases, as many as 28 respondents (24.81%) recommended 21 species (13.29%) be used to treat high blood pressure (hypertension), there were 36 respondents (37.07%) suggesting 20 species (13.29%) were used to treat coughs, 24 respondents (15.197%) recommended 21 species (13.29%) used to treat cancer, 19 respondents (12.03%) suggested 17 species (10, 76%) was used to treat malaria, there were 24 respondents (15.197%) suggested that 21 species (13.29%) be used to treat cancer, there were 18 respondents (11.39%) recommended 19 species (11.95%) used to treat tumor

disease, as many as 19 respondents (12.0 3%) suggested 17 species (10.76%) used to treat ulcer disease, there were 12 respondents (9.02%) suggested 9 species (5.70%) used to treat gout, 19 respondents (12.03%) recommend that 17 species (10.76%) be used to treat ulcer disease, there are 28 respondents (21.05%) suggesting 21 species (13.29%) to be used to treat cholesterol, as many as 13 respondents (8.23%) recommend nine species (5.70%) used to treat kidney disease. Less than ten respondents suggested plant species and other diseases.

The survey results through questionnaires found that most people use drugs in the form of stew, eaten directly, drunk, extracted plant parts, oil, sap, processed into vegetables, processed into juice, syrup, baking ingredients, and in the form of fresh fruit. The treatment has been given directly to the patient's body, such as wounds, flatulence, skin diseases, boils or swollen body parts, scabies, etc. The types of disease in this medicine are following ethnopharmaceuticals in Mount Ungaran, Central Java, Indonesia (Utami *et al*., 2019) [31]. According to the current survey, only in a few extraordinary cases were some wild medicinal plants used by the Tolaki-Mekongga tribe as vegetable ingredients, including tokulo/tohulo/ndokulo (*Kleinhovia hospita L*.) and tawa tamaseu (local name). In some cases, medicinal plants are traditionally used as drinks in wilderness areas, including wild plants bajakah (local name). The wood material is used as anti-cancer drugs as shown in Table 2.Some of the processed drugs are Virgine Coconut Oil (VCO), which was fermented from the flesh of coconut fruit (*Cocos nucifera L*.). Other causes of plant parts being used directly without treatment include the *Jatropha multifida L*., where the sap was directly used as a wound medicine, and the *Jatropha curcas* was directly used as a dental medicine.

Discussion

The survey results show that many plant species were still were used to treat various diseases; it was used even many plants that grow wild as medicine and food for the community. The survey was carried out extensively on several Tolaki-Mekongga medicinal practitioners, academics, and the general public. Some of the species survey conducted in the Tolaki-Mekongga tribe area included: 28 species (17.72%) of the total plants used to treat diabetes, including *Cocos nucifera L.*, *Citrus aurantiifolia*, *Tinospora crispa*, *Syzygium Palyanthum*, *Orthosiphon aristatus*, *Muntingia calabura*, and other; it was used as many as 34 species (21.52%) to treat internal diseases in including *Boesenbergia pandurate* (*Roxb.*) *Schlecht*, *Eleutherine bulbosa*, *Kaemeria gelanga*, *Strobilanthes crispus L.*, *Euphorbia hirta L.*, *Annona muricata L.*, *Lannea cormendalica* (*Houtt.*) *Merr.*, *Allium ascalonicum Linn*, and others, it waaas used as many as 21 species (13.29%) to treat hypertension, include *Syzygium Paly anthum*, *Muntingia calabura*, *Annona muricata L.*, Erythrina subumbrans Merr., Aquilaria malaccensis, Areca cathecu L., chlorophyll tree (unidentified) , *Averhoa belimbi Linn.*, and others, as many as 20 species (13.29%) were used to treat coughs including: *Momordica Charantia L.*, *Psidium guajava L.*, *Averhoa belimbi Linn.*, *Zingiber officinale Var. Rubrum.*, *Leucas Lavandufolia Smith*, *Zingiber officinale Roscoe*, *Stachytarpheta jamaicensis L.*, and others, there are 21 species (13.29%) used to treat cancer, including *Curcuma aeruginosa Roxb.*), *Garcinia mangotana L.*, *Drynaria sparsisora* (*Desv.*) *T. Moore*, and others; it was used as many as 17 species (10.76%) to treat malaria, including *Alstonia scholaris*, (*L.*) *R. Br.*, *Strobilanthes crispus L.*, bajakah (unidentified), *Carica papaya L.*, *Momordica Charantia L.*, *Psidium guajava L.*, *Andrographis paniculata*, *Annona squamosa L.*, *Swietenia mahagoni* (*L.*) *Jacq.*, *Aegle marmelos L.*, *Cyclea barbata Miers*, and others, it was used as many as 17 species (10.76%) to treat tumors, including *Punica granatum L.*, VCO from *Cocos nucifera L.*, *Boesenbergia pandurate* (*Roxb.*) *Schlecht*, *Eleutherine bulbosa*, *Alstonia scholaris*, *Muntingia calabura*, *Aquilaria malaccensis*, *Curcuma zedoaria* (*Berg.*) *Roscoe*, *Morinda citrifolia*, *Loranthus sp. Jack.*, and others, it was used as many as 19 species (12.03%) to treat ulcers, including VCO from *Cocos nucifera L.*, *Ageratum conyzoides L.*, *Zingiber Montanun*, *Tinospora crispa*, *Lannea cormendalica* (*Houtt.*) *Merr*, *Allium ascalonicum Linn*, *Kleinhovia hospita L.*, *Curcuma demostica*, *Anredera cordifolia*, *Anredera Cordifolia* (*Ten*). *Steenis*, *Curcuma zedoaria* (*Berg.*) *Roscoe*, *Morinda citrifolia*, *Physallis peruviana L.*, *Annona squamosa L.*, *Curcuma aeruginosa Roxb.*, *Stachytarpheta jamaicensis L.*, *Cosmos caudatus*, *Allium sativum L.*, and others, it was used as many as ten species (6.32%) to treat gout, including *Persea americana Mill*, *Syzygium Palyanthum*, *Orthosiphon aristatus*, *Annona muricata L.*, *Anredera cordifolia*, *Anredera Cordifolia* (*Ten*). *Steenis*, *Peperumia pellucida HB & K*, *Stachytarpheta jamaice nsis L.*, *Eleutherine bulbosa*, and *Ceiba pentandra; it was used* as many as 21 species (13.29%) to treat cholesterol; including *Eleutherine bulbosa*, *Persea americana Mill*, *Syzygium Palyanthum*, *Muntingia calabura*, *Annona muricata L.*, Tawa Tamaseu (unidentified), *Kleinhovia hospita L.*, *Moringa oleifera*, *Momordica Charantia L.*, chlorophyll trees (*unidentified*), *Andrographis paniculata*, *Abelmoschus esculentus L.*, *Cymbopogon citratus*, *Apium graveolens*, *Amaranthus spinosusI*, *Tridax procumbens*, and *Amomum compactum soland ex Maton*, as many as 9 species (5.70%) are used to treat kidneys, including *Eleutherine bulbosa*, *Orthosiphon aristatus*, *Strobilanthes crispus L.*, *Moringa oleifera*, *Abelmoschus manihot*, *Discidia albifora*, *Discidia major*, *Phyllanthus niruri*, and *Tridax procumbens*, it was used as many as 11 species (6.96%) for stamina, include *Ricinus communis*, *Piper betle L.*, *Curcuma longa Linn. syn.*, *Anredera cordifolia*, *Anredera Cordifolia* (*Ten*). *Steenis*, *Moringa oleifera*, *Curcuma xanthorrhiza Roxb*, *Curcuma zedoaria* (*Berg.*) *Roscoe*, *Cymbopogon citratus*, *Zingiber officinale Roscoe*, *Phyllanthus niruri*, and *Impatiens Platypetala Lindl.* The plant species used to treat other types of diseases demonstrated by the ten respondents below can be seen in Tables 1 and 2.

Knowledge of ethnopharmaceuticals is maintained and preserved, mostly plant species starting to take steps and need further studies on these plants' cultivation. Several plants are starting to step or endangered species in the Tolaki-Mekongga tribe area. This requires cultivation and a record of ethnobotany and ethnopharmacology to maintain the traditional medicine of the Tolaki-Mekongga tribe in the Kolaka and East Kolaka districts.

Conclusion

Based on the results of the research and discussion, it can be concluded several things, including (1) ethnopharmacy research of the Tolaki-Mekongga tribe has been carried out in 57 villages, 20 Districts in Kolaka Regency and East Kolaka Regency; (2) through questionnaire data as many as 133 respondents obtained online and offline, 158 species of plants used by the Tolaki-Mekongga tribe were identified to treat 112 types of diseases, (3) through literature searches showed that among these 158 plant species, there were several In

addition to being used by the Tolaki-Mekongga people, other tribes in Indonesia and in the world are also using it, (4) but this study provides essential information, and it was found that ten medicinal plants only were used by the Tolaki-Mekongga tribe, some of which have not been successfully identified, namely: tawa nggateba/kateba (unidentified), *Kleinhovia hospita L*., tamaseu (unidentified), bajakah (unidentified), tawa Tanggedaso (unidentified), chlorophyll tree (unidentified), saumompai (unidentified), katolanondoke (unidentified), *Discidia albifora*, and *Discidia major*.

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