

Ethnomedicine In Nias Island

Nilsya Febrika Zebua^{1*}, Nerdy Nerdy², Kanne Dachi³, Muflihah Fujiko⁴, Abdi Wira Septama⁵

Nilsya Febrika Zebua^{1*}, Nerdy Nerdy², Kanne Dachi³, Muflihah Fujiko⁴, Abdi Wira Septama⁵

¹Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Tjut Nyak Dhien, Medan, INDONESIA.

²Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Tjut Nyak Dhien, Medan, INDONESIA.

³Department of Pharmaceutical Technology, Faculty of Pharmacy, Universitas Tjut Nyak Dhien, Medan, INDONESIA.

⁴Department of Pharmacology, Faculty of Pharmacy, Universitas Tjut Nyak Dhien, Medan, INDONESIA.

⁵Research Center for Pharmaceutical Ingredient and Traditional Medicine, National Research and Innovation Agency (BRIN), Kawasan PUSPITEK Serpong, Tangerang Selatan, Banten, INDONESIA.

Correspondence

Nilsya Febrika Zebua

Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Tjut Nyak Dhien, Medan, INDONESIA.

E-mail: nf.zebua@gmail.com

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ABSTRACT

Background: Medicinal plants have an important role in the traditional medicine system of the Nias people, which has been passed down from generation to generation. Although there has been some ethnobotanical research in Indonesia, especially in Nias, studies regarding people's knowledge, use and perception of medicinal plants on this island are still very limited. **Objective:** to investigate the knowledge, use and perceptions of the Nias community towards medicinal plants. **Design:** The research population involved communities in various areas of Nias, and samples were taken randomly from several villages or communities. Data collection methods include questionnaires, interviews, and observations to detail the use of medicinal plants, local knowledge, and factors that influence the choice and use of medicinal plants. The research variables involve the demographic characteristics of respondents, education level, access to health information as independent variables, while the dependent variables include the use of medicinal plants and knowledge about medicinal plants. **Results:** As a result of data collection on respondents on Nias Island, there were 50 medicinal plants that people have often used for generations to treat diseases. Data analysis involved analyzing factors related to the use of medicinal plants. It is hoped that this research will provide a better understanding of the use of medicinal plants in Nias and contribute to the preservation of local knowledge and the development of public health strategies. **Conclusion:** Most of the empirical data submitted by the local Nias community is in accordance with research that has been carried out, however, there are 13 plants that need to be explored further because the empirical data does not match. **Key words:** ethnomedicine, ethnobotanical, medicinal plant, Nias.

INTRODUCTION

Indonesia is a tropical country made up of several islands. Massive tropical woods can be found in Indonesia. The gorgeous life found in the jungles of Indonesia is relatively diverse. There are a lot of species in Indonesia. Out of 40,000 plant species, there are about 30,000 in the world. Of the total, 26% is planted, and the remaining 74% is let to grow naturally in the forest. Indonesia's rainforests are thought to cover 143 million hectares, of which 80% of the world's medicinal plant species—28,000 of which are employed as medicinal plants—are planted.¹

North Sumatra is one of Indonesia's provinces rich in natural resources in the form of biodiversity of plant species that need to be preserved and cultivated because most of them are still found in lowland forests. The use of these plants is not only to meet the necessities of life but can also be used to improve people's nutrition so that they live healthy and are not susceptible to disease. It is true that every part of the plant, whether roots, stems, leaves, flowers, or seeds, contains chemicals that can be used as medicine. One of the tribes in North Sumatra that uses plants as herbal medicine is the Nias tribe.²

Given the broad scope of ethnobotanical research, the researchers limited their analysis to household medicinal plants. Regarding family medicinal plants, Nias has great potential for cultivating family medicinal plants. Good and fertile soil conditions make it easier for medicinal plants to grow. The Community uses medicinal plants to maintain health, improve nutritional status, green the environment, and increase income. Everyone

considers plants important in meeting daily needs, and increase income.³

Current developments and progress require everyone to have good health. People often use instant methods, namely manufactured medicines, to achieve health. The use of factory-produced drugs is not strictly prohibited; however, to achieve the desired results, consumers should follow the advice and recommendations of their doctor. Even continuous use of drugs can cause side effects that are dangerous to consumers' health. One of the side effects of constant drug use is liver and kidney damage. Meanwhile, synthetic drugs are increasingly used in the current era of globalization and technology because they are easy to obtain and can be taken anywhere. In ancient times, to treat various diseases, people still used traditional methods and medicines.⁴

This problem may also not be separated from the process of eliminating the transmission of local knowledge or its heritage. The reason is the parents who knew about this have also died. This situation is exacerbated by the increasingly widespread influence of global culture. Apart from that, changes in environmental ecology are also consider to play a role in influencing cultural changes in local communities. Some of the plants that will be used no longer grow around the house or in the forest. So, gradually, local knowledge began to decline. The lack of exploration and documentation of local knowledge regarding the use of these plants exacerbates this situation. This exploration is very difficult to carry out because there are still difficulties in terms of documentation, methods, and tools, and it requires an initial stage of inventory various types of plants.⁴ Nias Island, as part of Indonesia, has

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extraordinary natural wealth, including a diversity of medicinal plants which have become the cultural heritage of the local community.

The area of Nias Regency is 1,004.06 km² and has a population of 700,000 people, parallel and located to the West of Sumatra Island and surrounded by the Indian Ocean. According to geographical location, Nias Regency is located on the line 0012'-0032' North Latitude (N) and 970-980 East Longitude (E). The majority religion in this area is Protestant Christianity. Nias is currently divided into four districts and one city: Nias Regency, South Nias Regency, West Nias Regency, North Nias Regency, and Gunungsitoli City. Nias Island is part of the province of North Sumatra. Nias is an island located west of Sumatra Island, Indonesia. This island is inhabited by most of the Nias tribe (Ono Niha), who still have a megalithic culture.⁵

The natural/plain conditions of Nias Regency are mostly steep hills and mountains above. Sea water height ranges from 0 to 800 m, including lowlands rising to hills and mountains, increasing by 24%, from hilly land to hills, 28.8% of hills reaching peaks, 51.2 % of the total land area. Due to these natural conditions, 67 small, medium, and large river flow zones are found in most subdivisions. Because Nias district is near the equator, annual rainfall is quite high. Because heavy rain every year causes the natural conditions of Nias Regency to become very humid and wet, the average number of rainy days per month is 23 days. Apart from that, the climatic conditions of Nias Regency are also greatly influenced by its location, which the Indian Ocean surrounds.⁵

Medicinal plants have an important role in the traditional medicine system of the Nias people, which has been passed down from generation to generation. Although there has been some ethnobotanical research in Indonesia, especially in Nias, studies regarding people's knowledge, use and perception of medicinal plants on this island are still very limited. The importance of this research can be seen from several aspects. Preserving Local Knowledge: This research aims to identify and document the local knowledge of the Nias community regarding medicinal plants. This knowledge is often an integral part of cultural identity and can help in preserving local wisdom. Community Empowerment: Knowing the medicinal plants used by the Nias community can provide a basis for developing community empowerment programs in the health sector. This can support local efforts to increase access to traditional medicine that has been proven effective. Public Health: Medicinal plants often play a significant role in treating disease and maintaining public health. This research can provide a deeper understanding of how medicinal plants are used in the health context of the Nias community. Nature Conservation: Identifying medicinal plants used by the people of Nias can also provide insight into the potential for sustainable use of these plants and support nature conservation efforts. Further Research: The results of this research can be a basis for further research, including ethnopharmacological research, development of traditional medicine, or even the development of health policies based on local knowledge.⁶

Therefore, this research aims to (1) collect and document the ethnobotanical knowledge of local communities who lived in the research area before they became extinct and (2) explore the use of plants by the community in relation to current research on these plants. This helps increase indigenous people's knowledge regarding the potential use of medicinal plants and the importance of medicinal plants for current and future socio-economic interests.

MATERIAL AND METHODS

Data collection

Data Collection Method is questionnaire, interviewed, and observation. Designed a questionnaire that includes questions related to medicinal plant use, local knowledge, and treatment preferences. Interviewed community leaders or local experts to gain additional insight. Direct

observation of the practice of using medicinal plants. Research Objectives is Assessed the knowledge, use and perception of the Nias community towards medicinal plants. Identify the most commonly used medicinal plants. Analyzed the factors that influence the selection and use of medicinal plants. The research was conducted by researchers from August to September 2023 located on Nias Island, North Sumatra, Indonesia.

Inclusion and exclusion

Inclusion factor: (a) Medicinal Plant Species: selected medicinal plants that are relevant to local medicinal traditions and have potential medical value. Informative data regarding plant characteristics, plant parts used, processing methods, and growing places. (b) Local residents: involving local residents who have traditional knowledge about medicinal plants and their uses. Researchers divided respondents based on age levels, namely 0-30 years, 31-60 years, and 61-70 years, both men and women. (c) Geographic Location: Geographical areas were selected that represent the diversity of medicinal plants in Nias Island, North Sumatra. (d) Age and Gender: This research was conducted on parent informants who were believed to know about plants from Nias which have medicinal properties.

Exclusion factor: (a) Irrelevant Plants: Excluded plants that have no medical value or are not relevant to the research objectives. (b) Unrepresentative Region: Avoided areas outside Nias Island. (c) Lack of Traditional Knowledge: Exclusion of individuals who do not have traditional knowledge of medicinal plants.

Data analysis

Identification of informants used snowball sampling, namely a technique for selecting key respondents based on previous respondents' suggestions. Plant identification was carried out at the Medanense Herbarium to obtain the scientific names of local Nias plants. Quantitative analysis was carried out by calculating the frequency of quotations and the ratio of informant agreement. Calculation of quotation frequency to determine the frequency of use of medicinal plants. Citation frequency is calculated using the formula.⁷

$$\text{Citation Frequency (\% CF)} = (N / T) \times 100$$

N = number of respondents who mentioned the names of medicinal plants.

T = Total number of respondents

RESULT

There are 50 plant species used as medicine by the people of Nias Island, North Sumatra. The results showed that the types of plants used as traditional medicine by the people of Nias Island were 50 species belonging to 26 families. The plants used for their properties are different. Several types of plants used as medicine have more than one medicinal property. The plants used have properties for treating one type of disease and more than one type of disease.

The results of research conducted on Nias Island, North Sumatra, using snowball sampling showed that of the various types of plants that grow on Nias Island, there are 50 plants that can be used as traditional medicine. The most abundant family of medicinal plants is Asteraceae 11.76%, Lamiaceae 9.8%, Acanthaceae 7.84%, Malvaceae 7.84%, Euphorbiaceae 5.88%, Zingiberaceae 5.88%, Fabaceae 5.88%, Piperaceae 3.91%, and Poaceae 3.91%.

The method of preparing medicinal plants used by the people of Nias Island to treat diseases consists of several techniques, including boiling, roasting or burning, pounding or grinding. Most medicinal plants are

processed by boiling or squeezing in warm water and then drinking, while 15.7% of medicinal plants are used topically. Plants that are applied to sick parts of the body are processed by roasting them briefly over a fire and then rubbing them on the sick part of the body, namely *Ricinus communis*, *Etilingera elatior*, and *Crinum asiaticum*. Apart from that, for topical use it is processed by pounding and then compressing, namely *Rhinacanthus nasutus*, *Polygonum minus huds*, *Ocimum basilicum*, *Cordyline fruticosa*, *Ageratum conyzoides*, and *Caesalpinia pulcherrima*.

The medicinal plants used by the people of Nias Island are taken from several habitats, including some that are deliberately planted in home gardens and some that grow wild in the forest (Figure 1). The people of Nias have had knowledge of medicinal plants from generation to generation, so many have planted them in their yards. Based on questionnaires and interviews conducted with respondents spread across 5 regions on Nias Island. Knowledge of medicinal plants is more widely understood by female respondents aged 61-70 years with data that can be seen in Tables 1 and 2.

Table 1. Plant Determination Results.

No.	Family Name	Scientific Plant Name	Local Plant Name	% CF
1.	Acanthaceae	<i>Graptophyllum pictum</i> L. Griff	Mbulu Nazalou	36.13
2.	Acanthaceae	<i>Rhinacanthus nasutus</i>	Mbulu Lada-Lada	34.25
3.	Acanthaceae	<i>Andrographis paniculata</i>	Mbulu Kanina	57,46
4.	Acanthaceae	<i>Justicia gendarussa</i> Burm.f.	Liolio	27.90
5.	Acorus	<i>Acorus calamus</i>	Sarango	7.65
6.	Amaryllidaceae	<i>Crinum asiaticum</i>	Mbulu Galeta	77.90
7.	Annonaceae	<i>Annona muricata</i> L.	Bulu Garoto	68,79
8.	Arecacea	<i>Areca catechu</i> L.	Fino Kumoyo	54,87
9.	Asparagaceae	<i>Cordyline fruticosa</i>	Gendruo Soyo	55,15
10.	Asteraceae	<i>Elephantopus scaber</i>	Mbulu Gambala Dano	27,88
11.	Asteraceae	<i>Ocimum basilicum</i>	Mbulu Sulasi	57.33
12.	Asteraceae	<i>Pluchea indica</i>	Mbulu Faga-Faga /Lama-Lama	64,77
13.	Asteraceae	<i>Ageratum conyzoides</i>	Mbangu-Mbangu	63,29
14.	Asteraceae	<i>Adenostemma lavenia</i> (L.) Kuntze)	Sefe-Sefe	33.82
15.	Astereceae	<i>Blumea balsamifera</i>	Mbulu Gomboyu	43.24
16.	Bignoniaceae	<i>Oroxylum indicum</i>	Mbulu Mboli	36,14
17.	Costaceae	<i>Costus speciosus</i>	Hendrifo	23,25
18.	Crassulaceae	<i>Kalanchoe pinnata</i>	Mbulu Zidini	57.48
19.	Cucurbitaceae	<i>Momordica charantia</i>	Foria	50.47
20.	Cycadaceae	<i>Diplazium esculentum</i>	Laehuwa	58,76
21.	Euphorbiaceae	<i>Ricinus communis</i>	Lafandru	74.63
22.	Euphorbiaceae	<i>Euphorbia hirta</i>	Famato Mbagi Zusu Gorobao	49.30
23.	Euphorbiaceae	<i>Excoecaria cochinchinensis</i>	Mbuli Mbali-Mbali Angi	14.32
24.	Fabaceae	<i>Erythrina variegata</i>	Mbulu Ndara/Lara	46.76
25.	Fabaceae	<i>Cassia alata</i>	Zosa	60.89
26.	Fabaceae	<i>Caesalpinia pulcherrima</i>	Mbulu Mara	67.54
27.	Goodeniaceae	<i>Scaevola taccada</i>	Mbulu Balanasi	21.76
28.	Lamiaceae	<i>Vitex pinnata</i> L	Mbulu Mali-Mali Mao	29.08
29.	Lamiaceae	<i>Coleus atropurpureus</i> Benth	Mbulu Zari-Zari	53.46
30.	Lamiaceae	<i>Orthosiphon stamineus</i>	Sogambi Mao	69,71
31.	Lamiaceae	<i>Clerodendrum paniculatum</i>	Sobulu Mara Mara	57,88
32.	Malvaceae	<i>Hibiscus tiliaceus</i> L.	Mbulu Zule	76,89
33.	Malvaceae	<i>Gossypium hirsutum</i> L	Afasi Ndrawa	77,46
34.	Malvaceae	<i>Urena lobata</i>	Hefuyu'a	34,33
35.	Malvaceae	<i>Hibiscus rosa-sinensis</i>	Soma Soma	77,68
36.	Moraceae	<i>Artocarpus altilis</i>	Suku	85,42
37.	Moringaceae	<i>Moringa oleifera</i>	Mbulu Muru	88.53
38.	Myrtaceae	<i>Syzygium polyanthum</i>	Daun Salam	58.40
39.	Phyllanthaceae	<i>Phyllanthus urinaria</i>	Siduku Ana	44.39
40.	Piperaceae	<i>Peperomia pellucida</i> L. Kunth	Tima-Tima / Ceremi	56,49
41.	Piperaceae	<i>Piper betle</i> Linn	Dawuo	89.78
42.	Poaceae	<i>Cymbopogon citratus</i>	Sare Lahia	34.78
43.	Poaceae	<i>Coix lacyma-jobi</i> L.	Taigua	77.45
44.	Polygonaceae	<i>Polygonum minus</i> Huds.	Mbulu Famato Gahe Buyuwu	54,62
45.	Rutaceae	<i>Murraya paniculata</i>	Mbulu Kamuna	26.17
46.	Solanaceae	<i>Solanum erianthum</i>	Mbulu Sikaco	49.02
47.	Urticaceae	<i>Urtica dioica</i> L.	Lato	74,38
48.	Zingiberaceae	<i>Etilingera elatior</i>	Silimo	54,63
49.	Zingiberaceae	<i>Elettaria cardamomum</i>	Tugala	87.90
50.	Zingiberaceae	<i>Curcuma xanthorrhiza</i>	Undre Gaza	93.48

Table 2. Usage of Medicinal Plant in Nias.

No.	Scientific Plant Name	Usage	Preparation	Empiric Benefit	Part of Plant
1.	<i>Acorus calamus</i>	Oral	Boiled	Wound, Pain	Rhizoma
2.	<i>Adenostemma lavenia</i> (L.) Kuntze)	Oral	Boiled	Fever, Cough, Chills	Folium
3.	<i>Ageratum conyzoides</i>	Oral	Boiled	Toothache	Herb
4.	<i>Andrographis paniculata</i>	Oral	Boiled	Malaria	Folium
5.	<i>Annona muricata</i> L.	Oral	Boiled, Grinded	Immune System	Folium
6.	<i>Areca catechu</i> L.	Oral	Boiled	Anthelmintic	Fructus
7.	<i>Artocarpus altilis</i>	Oral, Topikal	Boiled, Grinded	Blood Pressure, Diabetes	Folium
8.	<i>Blumea balsamifera</i>	Topikal	Boiled, Heated	Anthelmintic	Folium
9.	<i>Caesalpinia pulcherima</i>	Topikal	Grinded	Fever	Flos
10.	<i>Cassia alata</i>	Oral	Boiled	Anthelmintic, Constipation	Folium
11.	<i>Clerodendrum paniculatum</i>	Oral	Chopped	Anti-Inflammatory	Flos
12.	<i>Coix lacyma-jobi</i> L.	Oral	Boiled	Lower Blood Pressure	Herb
13.	<i>Coleus atropurpureus</i> Benth	Oral	Boiled	Bloated	Folium
14.	<i>Cordyline fruticosa</i>	Oral	Boiled	Hemorrhoids	Folium
15.	<i>Costus speciosus</i>	Oral	Boiled	Bloated	Flos
16.	<i>Crinum asiaticum</i>	Topikal	Heated	Break Blood, Dislocated	Folium
17.	<i>Curcuma xanthorrhiza</i>	Oral	Boiled	Diarrhea, Fever	Rhizoma
18.	<i>Cymbopogon citratus</i>	Oral	Boiled, Grinded	Treat Anemia	Caulis
19.	<i>Diplazium esculentum</i>	Oral	Boiled	Rheumatic Disease	Folium
20.	<i>Elephantopus scaber</i>	Oral	Boiled	Kidney Disease	Herb
21.	<i>Elettaria cardamomum</i>	Oral	Boiled	Digestion, Antibacterial	Fructus
22.	<i>Erythrina variegata</i>	Oral	Boiled	Menstrual Pain	Folium
23.	<i>Etlingera elatior</i>	Oral	Chopped	Inflammation, Fever, Cough	Flos
24.	<i>Euphorbia hirta</i>	Oral	Boiled	Digestive, Respiratory	Herb
25.	<i>Excoecaria cochinchinensis</i>	Oral	Boiled	Itching, Parasite Killer	Folium
26.	<i>Gossypium hirsutum</i> L	Topikal	Heated	Fractures, Ulcers, Scabs,	Folium
27.	<i>Graptophyllum pictum</i> L. Griff	Topikal	Boiled, Heated	Launch Blood Clots	Folium
28.	<i>Hibiscus rosa-sinensis</i>	Topikal	Heated	Heartburn, Urinary Tract	Folium
29.	<i>Hibiscus tiliaceus</i> L.	Oral	Boiled	Cold Medicine	Folium
30.	<i>Justicia gendarussa</i> Burm.f.	Oral	Boiled	Prevent Constipation	Folium
31.	<i>Kalanchoe pinnata</i>	Oral, Topikal	Boiled, Grinded	High Fever	Folium
32.	<i>Momordica charantia</i>	Oral	Boiled	Reduces Cholesterol Levels	Fructus
33.	<i>Moringa oleifera</i>	Topikal	Grinded	Launch Menstruation	Folium
34.	<i>Murraya paniculata</i>	Oral	Boiled	Chest Pain, Heart	Folium
35.	<i>Ocimum basilicum</i>	Oral, Topikal	Grinded	Fever	Folium
36.	<i>Oroxylum indicum</i>	Oral	Boiled	High Fever, Stomach Aches	Folium
37.	<i>Orthosiphon stamineus</i>	Oral	Boiled	Kidney Stone	Folium
38.	<i>Peperomia pellucida</i> L. Kunth	Oral	Boiled	Enhance Fertility	Herb
39.	<i>Phyllanthus urinaria</i>	Oral	Boiled	Back Pain	Herb
40.	<i>Piper betle</i> Linn	Oral	Boiled	Cathartic	Folium
41.	<i>Pluchea indica</i>	Oral, Topikal	Boiled	Hypertension	Folium
42.	<i>Polygonum minus</i> Huds.	Topikal	Grinded	Sprains, Fracture	Folium
43.	<i>Rhinacanthus nasutus</i>	Topikal	Grinded, Heated	Anthelmintic, Skin Disease	Folium
44.	<i>Ricinus communis</i>	Oral	Boiled	Colds, Flatulence	Folium
45.	<i>Scaevola taccada</i>	Oral	Boiled	Diabetic	Folium
46.	<i>Solanum erianthum</i>	Oral	Boiled	Stomach Ache	Folium
47.	<i>Syzygium polyanthum</i>	Oral	Boiled	Cathartic	Folium
48.	<i>Urena lobata</i>	Oral	Boiled	Rheumatism	Radix
49.	<i>Urtica dioica</i> L.	Oral	Boiled	Arthritis, Muscle Pain	Herb
50.	<i>Vitex pinnata</i> L	Oral	Boiled	Kidney, Pertussis, Fever	Folium

DISCUSSION

The people of Nias use *Acorus calamus* as a painkiller for wounds by pounding or boiling it. According to research results, *Acorus calamus* can affect the nerves or have a sedative effect.⁸

The people of Nias believe that the juice of *Adenostemma lavenia* (L.) Kuntze leaves can treat fever and cough. The results of the literature but no scientific evidence has reported its antibacterial properties from

Adenostemma lavenia (L.) Kuntze.⁹ The research results showed anti-nociceptive, anti-diarrheal, antipyretic, thrombolytic and anthelmintic effects.¹⁰

Ageratum conyzoides is used by the people of Nias to treat toothache by grinding it with whiting and then placing it on the affected area. This healing effect is related to research phytoconstituents *Ageratum conyzoides* have shown diverse pharmacological properties including antimicrobial, anti-inflammatory, analgesic, antioxidant, anticancer, antiprotozoal, antidiabetic, spasmolytic, allelopathy, and many more.¹¹



Figure 1. Map of Nias Island.⁵

Andrographis paniculata is used by the people of Nias as an antimalarial. Based on research that has been conducted, the activity of n-hexane, menthol and dioctyladipate extracts is related to inhibiting heme polymerization in the treatment of malaria.¹²

The people of Nias use the leaves and fruit of *Annona muricata* to improve the immune system. This is in accordance with research on immunosuppressive effects of *Annona muricata* L Leaf extract on cellular and humoral immune responses in male wistar rats.¹³

The decoction of *Areca catechu* L. is used by the people of Nias as an anthelmintic. The results of research on this plant are that it is anti-inflammatory anti-melanogenesis.¹⁴ Research on *Areca catechu* L. as an anthelmintic has been widely recorded in Indonesia.¹⁵

The people of Nias use *Artocarpus altilis* leaves to treat diabetes and hypertension. Research results show that *Artocarpus altilis* can influence Levels of Blood Glucose and Insulin Expression.¹⁶ *Artocarpus altilis* and also provides cardio-protection.¹⁷

Blumea balsamifera is believed by the people of Nias as anthelmintic by drinking a decoction of its leaves. Research results as an anthelmintic are very limited in Indonesia, namely that it can kill *Ascaridia galli* worms.¹⁸ Research shows that *Blumea balsamifera* has antibacterial, antioxidant and anti-inflammatory effects.¹⁹

The people of Nias use *Caesalpinia pulcherrima* flowers as an antipyretic. Based on research, *Caesalpinia pulcherrima* has antioxidant, antibacterial, haemolytic activity and anticancer activity.²⁰

Cassia alata is used by the people of Nias to treat constipation and is an anthelmintic. Based on research, *Cassia alata* can stimulate gastrointestinal function recovery geriatric.²¹

The people of Nias use *Clerodendrum paniculatum* flowers as an anti-inflammatory medicine and a urinary laxative. However, the results of the research did not find such records. *Clerodendrum paniculatum* flower has antidiabetic and antilipidemic effect²² and hepatoprotective activity.²³

The people of Nias use *Coix lacryma-jobi* L. as an antihypertensive drug. This is in line with research that has discovered a new antihypertensive glutelin peptide *Coix larchryma-jobi* L.²⁴

The juice of *Coleus atropurpureus* Benth is believed by the people of Nias to cause bloating and flatulence. However, research on *Coleus atropurpureus* Benth regarding this pharmacological effect was not found. The antibacterial effect of *Coleus atropurpureus* Benth is written but does not provide a significant anti-inflammatory analgesic effect.²⁵

The people of Nias believe that a decoction of *Cordyline fruticosa* leaves can cure hemorrhoids, fever and wounds. This is in accordance with research analgesic, anti-inflammatory and anti-pyretic activities of methanolic extract of *Cordyline fruticosa* (L.) A. Chev leaves.²⁶

Costus speciosus decoction is used by the people of Nias to treat flatulence. Evidence of the flatulence effect of *Costus speciosus* has not been explained in detail. *Costus speciosus* has antioxidant, antimicrobial, insecticidal, anticancerous, antidiabetic²⁷, and anticancer effects.²⁸

The people of Nias use *Crinum asiaticum* by roasting it in a fire to treat sprains and swelling. Based on research results, *Crinum asiaticum* has anti-inflammatory effects.²⁹

According to the people of Nias, *Curcuma xanthorrhiza* decoction is able to overcome fever and diarrhea. Some pharmacological tests reported that *Curcuma xanthorrhiza* Roxb has antioxidant, antimicrobial, anti-inflammatory, anticancer and antitumor, antidiabetic, and skincare and hepatoprotective properties.³⁰

Cymbopogon citratus decoction is used by the people of Nias to treat anemia. This is in accordance with research that *Cymbopogon citratus* has erythropoiesis boosting effects so that it has potential use in prevention and treatment of anemia.³¹

Nias people have consumed *Diplazium esculentum* to reduce joint pain. This is in line with research that *Diplazium esculentum* Cyclooxygenase (COX) and 15-Lipoxygenase (15-LOX) inhibitory activity³² and evaluate the in-vitro antiarthritic activity of methanolic leaf extract of *Diplazium esculentum* using inhibition of protein denaturation method.³³

The people of Nias use *Elephantopus scabies* to treat kidney disease. This is in line with Linn's research. The hexane fraction of *Elephantopus scaber* extract was confirmed to have hypolipidemic potential and restoration of kidney function.³⁴

Elettaria cardamomum decoction is used by the people of Nias to treat heart disease and digestive problems. This is in accordance with research that *Elettaria cardamomum* has effects on diabetes, hyperlipidemia, obesity, and high blood pressure.³⁵

A decoction of *Erythrina variegata* leaves is used to treat pain during menstruation based on empirical data from the Nias community. This is in line with previous research which shows that *Erythrina variegata* extract has analgesic anti-inflammatory, and antidepressant effect.³⁶

Nias people use *Etilingera elatior* by burning it to treat inflammation, fever, coughs and wounds. This is in accordance with research that *Etilingera elatior* has anti-inflammatory³⁷ and antibacterial effects.³⁸

Euphorbia hirta decoction is used by the people of Nias to treat digestive and respiratory problems. This is in line with existing research. *Euphorbia hirta* has anti-inflammatory effects, such as allergic rhinitis, asthma, cough, coryza, bronchitis.³⁹

The people of Nias use *Excoecaria cochinchinensis* to treat itchy skin by drinking a decoction of its leaves. Research related to treating itchy skin is related to the ability of this plant as an antibacterial.⁴⁰

The people of Nias use *Gossypium hirsutum* L to treat boils and other skin diseases. This is in line with research reviews that *Gossypium*

hirsutum L is used to treat protozoal, bacterial, fungal, and viral diseases.⁴¹

The people of Nias use *Graptophyllum pictum* L. Griff orally and topically for anti-inflammation due to sprains. This is in line with research on *Graptophyllum pictum* L. Griff which has the potential to anti-hemorrhoid,⁴² anticholinesterase and antidiabetic effects.⁴³

A decoction of *Hibiscus rosa-sinensis* flowers is used by the people of Nias to treat diabetes, heartburn and urinary tract infections. This is in line with research that *Hibiscus rosa-sinensis* L. flower aqueous extract is beneficial in pregnant rats with diabetes.⁴⁴

Nias people believe that a decoction of *Hibiscus tiliaceus* leaves can treat fever. This is in line with research showing *Hibiscus tiliaceus* leaves and stem extracts cytotoxic, analgesic and neuropharmacological activities but there was no activity found in the leaf extract against the test bacterial strains.⁴⁵

Consume *Justicia gendarussa* Burm.f decoction can treat hemorrhoids but no detailed research discussing this matter was found. However, treating hemorrhoids is in line with the anti-inflammatory and antibacterial effects of *Justicia gendarussa* Burm.f extract.⁴⁶

Fever in children on Nias Island is often treated using *Kalanchoe pinnata* placed on the child's forehead. This plant has been studied to have analgesic, antipyretic and anti-inflammatory effects, treating wounds and stomach ulcers.⁴⁷

Nias people believe that consuming *Momordica charantia* can lower cholesterol levels. This is in accordance with research on *Momordica charantia* extract showed hypolipidemic properties, as well as restoring and maintaining the functional and structural integrity of heart and aorta tissue.⁴⁸

Nias people squeeze *Moringa oleifera* leaves to treat fever and stomach aches. This is in accordance with research on *Moringa oleifera* which has the benefits of losing weight, anti-diabetes, preventing heart disease, healthy hair and eyes, rheumatism.⁴⁹ treating herpes or ringworm, treating internal diseases such as stomach wounds, intestinal wounds, stones kidney, and cancer.⁵⁰

Utilization of *Murraya paniculata* leaves as a traditional medicine for heart disease and ischemia. This is in line with research on *Murraya paniculata* as antianxiety, antidepressant, and anti-obesity activity.⁵¹

The people of Nias use *Ocimum basilicum* to treat fever by squeezing the leaves and rubbing the pulp on the body. This antipyretic effect is related to research showing antibacterial effects, especially in obstructive pulmonary diseases such as chronic obstructive pulmonary disease (COPD), asthma, and other respiratory disorders such as bronchitis, tuberculosis, aspergillosis, and lung cancer.⁵²

People believe that *Oroxylum indicum* is a medicinal plant that can cure various diseases. The searched data comprehensively reported the biological activities and therapeutic potential of baicalein originating from the *Oroxylum indicum* plant for anti-cancer, antibacterial, anti-hyperglycemia, neurogenesis, cardioprotective, adipogenesis, anti-inflammatory and wound healing effects.⁵³

The people of Nias believe that consuming a decoction of *Orthosiphon stamineus* leaves can treat kidney stones. This is in line with research showing *Orthosiphon stamineus* leads to inhibition of kidney stones.⁵⁴

The people of Nias use *Peperomia pellucida* to fertility enhancement. This is in accordance with research *Peperomia pellucida* extract has benefits in promoting hair growth, ameliorating male libido, recovering male fertility, and ameliorating renal cells damages.⁵⁵ *Peperomia pellucida* (L.) Kunth also has antioxidant and anti-inflammatory effects so it can improve health.⁵⁶

The people of Nias believe that a decoction of *Phyllanthus niruri* leaves is a medicine for kidney disease. This is in line with research on *Phyllanthus niruri* leaves aqueous extract improves kidney functions, ameliorates kidney oxidative stress, inflammation, fibrosis and apoptosis and enhances kidney cell proliferation in adult male rats with diabetes mellitus.⁵⁷

The people of Nias believe that consuming decoction of *Piper betle* linn leaves can cleanse the blood or have a detoxification effect. The search results stated that *Piper betle* Linn has anti-inflammatory and antioxidant activities so that it can ward off all kinds of diseases.⁵⁸

Pluchea indica is believed by the people of Nias to be antihypertensive. Research related to antihypertension due to *Pluchea indica* has the potential to be developed into a healthy food supplement or drug for the prevention and treatment of hyperglycemic, hyperlipidemic and obese patients⁵⁹, as well as accelerating wound healing.⁶⁰

Polygonum minus Huds is often used by the people of Nias to treat sprains and fracture. Pharmacological studies on *Polygonum minus* Huds have demonstrated antioxidant, LDL oxidation inhibition in vitro, antiulcer activity, analgesic activity, anti-inflammatory activity, antiplatelet aggregation activity in vitro, antimicrobial activity, digestion enhancing properties and cytotoxic activity.⁶¹

Rhinacanthus nasutus L. Kurz is used by the people of Nias to treat skin diseases such as ringworm and tinea versicolor. This is in line with research *Rhinacanthus nasutus* (L.) Kurz (Acanthaceae) has long been used in traditional Thai medicine for the treatment of tinea versicolor, ringworm, pruritic rashes and abscesses.⁶²

Ricinus communis L., is used by the people of Nias to treat flatulence and stomach ache. Based on the literature, *Ricinus communis* is one of the plants from Traditional Persian Medicine which has a flatulence effect.⁶³

Scaevola taccada is known to the people of Nias as a diabetes medicine using a decoction of its leaves. However, research related to this is very limited. Research on *Scaevola taccada* found new furanocoumarins from *Scaevola taccada* fruit which have antifungal activity.⁶⁴

Solanum erianthum is used by the people of Nias to treat stomachache. Research on *Solanum erianthum* and *Solanum torvum* from the Solanaceae family has inhibitory activity against important enzymes (namely cholinesterase, tyrosinase, α -amylase and α -glucosidase), antimicrobial and antifungal potential, antioxidant activity in vitro, and has a high phenolic and alkaloid profile.⁶⁵

The people of Nias use *Syzygium polyanthum* as a laxative. However, there are no research records regarding this matter. *Syzygium polyanthum* is known to have antihyperglycemic effects.⁶⁶

A decoction of dried roots of *Urena lobata* is believed by the people of Nias to be anti-rheumatic. This is in line with research that *Urena lobata* has analgesic, anti-inflammatory⁶⁷ and anti-rheumatic effects.⁶⁸

Nias people believe that consuming *Urtica dioica* decoction can reduce joint pain. This is in accordance with research *Urtica dioica* appears to decrease inflammatory factors, and can improve the symptoms of Rheumatoid Arthritis.⁶⁹

The juice of *Vitex pinnata* leaves is used by the people of Nias to treat 100-day coughs (pertussis). This is in line with the ability of *Vitex pinnata* ethanol extract as an antimicrobial and antifungal. The antimicrobial activity has assessed by disc diffusion assay against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Streptococcus mutans*, although there are no records of specific testing for *Bordetella pertussis*.⁷²

Based on the literature search, it can be concluded that there are 13 plants that need to be explored further because the empirical data

does not match the research that has been carried out. The names of the plants in question are *Adenostemma lavenia* (L.) Kuntze, *Blumea balsamifera*, *Clerodendrum paniculatum*, *Coleus atropurpureus* Benth., *Costus speciosus*, *Graptophyllum pictum* L. Griff., *Hibiscus rosa-sinensis*, *Justicia gendarussa* Burm. F., *Piper betle* Linn, *Ricinus communis*, *Scaevola taccada*, *Syzygium polyanthum*, and *Vitex pinnata*.

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