

## **Etnobotani to Explore the Potential of Medicine Plants in Sumatera Utara**

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**Abstract:** Ethnobotany is a one of science that can be used to study the relationship between human, plants and the environment. it involves many branches of science, such as botany, biochemistry, pharmacology, toxicology, medicine, nutrition, ecology, evolution, law, resource economics, sociology, anthropology and others. Moreover, its aim is to explore community knowledge in the use of plants in various aspects of life in terms of economic, cultural and religious. Furthermore, its results are also of double benefits not only for humans, but also for the environment. Besides that, it is also beneficial in the protection of knowledge by using the types of plants. One of the results of ethnobotany research that serves to improve the human life is common knowledge about the use of plants as medicines. In Sumatera Utara there have also been many studies on medicinal plant ethnobotany in several ethnics, such as Batak Toba, Karo and Simalungun. Ethnobotany research use the determination of key informants and samples by purposive sampling, explores ethnobotany data by doing interviews, direct observation as well as plant documentation by inventory and transect methods. Data analysis done qualitatively and quantitatively. Plants in society can be classified based on their use values, including as food, animal feed, main material, secondary material, medicines, symbols, ornamental plants and economic potential.

**Keywords:** Etnobotani, Medicine Plants, Sumatera

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### **I. Introduction**

North Sumatera is one of the provinces that has a high ethnic diversities, including Malay, Toba-Samosir, Mandailing-Angkola, Karo, Simalungun, Dairi, Pakpak Bharat, and Nias. The eight tribes have mixed and added tribes of migrants such as Javanese, Minang, Banjar, Aceh, Chinese and Indians. The wealth of these tribes is also balanced with extraordinary natural wealth, both animals and plants. Various ethnic groups have different cultures, especially in the use of plants. To explore various knowledge in the use of these plants can be done with ethnobotany approach.

Ethnobotany is a branch of biology that studies human relations with plants and the environment. It involves many fields of sciences such as botany, biochemistry, pharmacology, toxicology, medicine, nutrition science, ecology, evolution, law, resource economics, sociology, anthropology and others. It explores and reveals community knowledge about the use of surrounding plant resources both directly and indirectly and can be used as a tool to document the knowledge of traditional communities. Certain ethnic communities have used various types of plants to support their lives. All groups of communities have a dependency on plants according to their regional character, culture and, beliefs.

Moreover, it is a common knowledge for the use of plants in various aspects of life both in terms of economic, cultural and religious. Many researches on ethnobotany have been carried out on various ethnic groups in Indonesia and even in the world. Various information about the use of plants has been obtained. It is also able to describe the interaction between humans and plants in their environment by involving the cultural system. The interaction can be in the form of community perspective in grouping, characterizing and utilizing plants. In general, people will group plants based on their benefits, such as food, offerings in religious or religious rituals, craft materials, construction materials, animal feed, coloring agents and medicines.

Furthermore, it relies on the use of plants around it with a function to increase the life force of humans. One of the ethnobotany research results used is community knowledge about the use of plants as medicine. Various types of plants have been developed as medicines such as cancer drugs, high blood pressure, diabetes and so on. Researches on medicinal plants have been carried out including: Utilization of medicinal plants by the people in Zay, that reported by Giday *et al.*, (2003); Utilization of medicinal plants in the Indian Tamil Nadu

community reported by Muthu, *et al.*, (2006); Utilization of medicinal plants in the Zegie Peninsula community reported by Teklehaymanot dan Giday (2007); utilization of medicinal plants in Kerala community reported by Rajith and Ramachandran, (2010); Utilization of medicinal plants in Bangladesh communities reported by Hossan *et al.*, (2010); Traditional medicinal plants in the community in Gemad Ethiopia report by Mesfin *et al.*, (2013).

In Indonesia the use of medicinal plants is also growing rapidly. The awareness of back to nature and the desire to leave chemical medicines, encourage the use of plants as medicines. Several studies that have been done include the diversity of medicinal plants of the Talang Mamak community around the Bukit Tigapuluh Riau National Park reported by Setyowati and Wardah (2007); a study of medicinal plants by the people of Bonebolango Regency, Gorontalo Province, which was reported by Kandowangko *et al.*, (2011).

In North Sumatera, several ethnobotany studies have also been carried out, including typical medicinal plants of North Sumatra, reported by Lestari (2016); Ethnobotany study of Batak Toba sub-ethnic community in Peadungdung Village reported by Anggreini *et al.*, (2016); Ethnobotany community in Bukit Mas Langkat Village reported by Nasution *et al.*, (2016); the potential of medicinal plants in the Pansur Natolu community reported by Sihombing *et al.*, (2016); ethnobotany of the Toba Batak community in Martoba village reported by Ibo and Arimuki (2019).

According to the description above, it is necessary to know about not only the various uses of plants of ethnicities abut also several types of medicinal plants in North Sumatra, along with the various methods and analysis that can be used in ethnobotany research.

## II. Methods and Analysis In Etnobotani Study

The Information gathering in ethnobotany involves several fields of sciences. Its researches can be done by using two approaches, namely anthropology and ecology. Various information can be collected in ethnobotany research, including socio-cultural data, socio-economic data, and plant data. Some of the activities carried out in ethnobotany research include the determination of Kuci and sample informants by purposive sampling; explore plant data by doing informal interviews, unstructured interviews, semi-structured interviews, structured interviews; socioeconomic data by doing interview and secondary data; plant documentation with inventory and transect methods.

### Analysis in Ethnobotany Research

Analysis in ethnobotany research can be done by two methods, namely qualitative and quantitative analysis. Qualitative analysis in this research emphasizes composition, life forms, phenology, sociability, and viability. This is closely related to the degree of health, fertility and the ability to grow alive in nature as well as the environment or house. Quantitative analysis includes the indices commonly used in this research. The index provides a description of the level of utilization of plants in society. Table 1 explains some of the indices that have been used in several ethnobotany studies.

**Table 1.** Index of Plant Utilization

Use Value (Prance <i>et al.</i> , 1987)	$UV_s = \sum_i^n Value_{use\ category}(i)$	Use value of a species is the sum of scores given by researchers for various uses of a species. The use of the major is given a minor use score of 0.5. Usability claims in the utilization category (for example for building material, food) rather than specific uses
Index of Cultural Significance (Turner, 1988)	$ICS = \sum_{i=1}^n (q * i * e)$	The score for each use is obtained from the multiplication of 3 ordinal scales: q = quality of use, (very important / critical (5) to less attention / not important (0)) i = high usability intensity (5), low (0) e = usability exclusivity: there are species substitutionsn (2)-(1)-(0,5)
Ethnic Index of Cultural Significance (Lajones & Lemas 2001, Stoffle 1990)	$EICCS = \sum_{i=1}^n \left(\frac{p}{u} * i * e * c\right)$	Modified from Turner (1988) to reduce subjectivity. Is the total number of uses and/or parts of plants used for special purposes (p/u) multiplied by: i = intensity of use (Turner 1988) e = exclusivity of use (liked at least by 1 informant (2) not preferred (1))
Cultural Significance Index (Silva <i>et al.</i> , 2006)	$CSI = \sum_{i=1}^n (i * e * c) * CF$	Designed to combine the preceding index component with the consensus method and binary grouping to reduce subjectivity. i = species management (not managed / regulated 1; or managed / regulated 2)

Informant Consensus Factor  
(Trotter dan Longan, 1986)

$$ICF = \frac{[Nur - Ns]}{[Nur - 1]}$$

e = Preference for use is not preferred (1) preferred (2)  
 c = Frequency of use rarely (1) often (2)  
 CF = Correction factor (number of citations for a species divided by the highest number of citations for a species)  
 Used to find out the homogeneity of local knowledge.  
 Nur = the number of usability reports for each category  
 Ns = the number of species used for a particular category by all informants. ICF values vary from 0-1

Source: taken from several research sources

### III. Result and Discussion

#### USE VALUE OF PLANT

##### Grouping of Plants Based on Use Value

Plants have different roles and meanings, according to the culture and habits inherent in certain ethnicities. Some plants have a single use value and some have a dual use value. Rice is one of the plants which has a double use value, in addition to being food, it is also used as medicine, religious rituals, cosmetics and animal feed. In detail, Table 2 explains some of the plant groupings based on their use value.

**Table 2.** Plants Grouping Based on Use Value

No	Description of use	Source
1	additional food	Staple foods, additional food ingredients, seasonings
2	livestock	As food for livestock such as goats, buffalo, cows, chickens, ducks
3	Main Material	Building wood, firewood, equipment
4	Secondary material	Dyes, cosmetics, cleansers
5	Medicines	Analgesics, anti-poisons, veterinary medicines
6	Symbol	Birth, religion, myth
7	Decorative plants	Fences and yards
8	Economic Potential	Processed plants and products sold for income sources

##### Potential Plants as Medicines

Ethnobotany researches in Sumatera Utara continue to progress. Various studies have reported on the use of plants in various ethnic groups in Sumatera Utara, including the use of plants as medicines. In the Forest Park Area of Tongkoh, 38 types of medicinal plants were commonly used by the people in their surroundings (Sembiring et al., 2013). Simanjuntak (2017) also found 92 types of medicinal plants in the Simalungun ethnic community. The same thing was stated by Anggraeni (2016), that the Batak Toba Sub-ethnic community in Peadungdung Village used 162 species of plants and 92 species as medicines.

Types of plants used as medicines are derived from several tribes, including Zingiberaceae, Asteraceae, liliaceae and so on. These plants come from wild plants and cultivated plants. Table 3 below contains several types of plants that are potentially developed as medicines in Sumatera Utara.

**Table 3.** Types of plants that are potentially developed as medicines in Sumatera Utara

scientific name	Types Local name	Use	The part that is utilized	Sources
<i>Ageratum conyzoides</i>	Babandotan/Sibau-bau	Cancer	Leaves and flowers	Anggreini et al., (2016); Astuti (2015)
<i>Bidens pilosa</i>	Halosi	Lesion	Leaves	Ibo dan Arimukti (2019)
<i>Centella asiatica</i>	Ampapaga	Overcoming senility	All parts of the plant	Anggreini et al., (2016); Ibo dan Arimukti (2019)
<i>Dysophlla auriculata</i>	Simarihur-rihur ni	Child's fever and itching	All parts of the plant	Ibo dan Arimukti (2019)
<i>Emilia sonchifolia</i>	Asu Alum-alum	Rheumatism	Leaves	Anggreini et al., (2016); Ibo dan

<i>Eurycoma longifolia</i>	Tongkat ali	Male fertilizers	Leaves	Arimukti (2019)
<i>Hibiscus indicus</i>	Purbajolma	As a fertility medicine	Roots	Nasution <i>et al.</i> , (2016) Anggraini <i>et al.</i> , (2016); Ibo dan Arimukti (2019)
<i>Impatiens platypetala</i>	Bunga Raya	Deep heat	Leaves	Anggreini <i>et al.</i> , (2016); Ibo dan Arimukti (2019)
<i>Loranthus ferrugineus</i>	Benalu Kopi	Cancer and Tumors	Leaves	Bulan dan Fahmi (2016)
<i>Melastoma malabathricum</i>	Senduduk	Decreased cholesterol levels	Leaves	Arief <i>et al.</i> , (2012)
<i>Mimosa pudica</i>	Sihirput merah	Liver disorders	Root	Ibo dan Arimukti (2019)
<i>Moringa oleifera</i>	Kelor	Hot, hot inside, convulsions, anti aging	Leaves and seeds	Bahriyah <i>et al.</i> , (2015)
<i>Muntingia calabura</i>	Daun Kersen	Antibiotics	Leaves	Arum (2012)
<i>Phyllanthus niruri</i>	Gala-gala porhis	Diarrhea, boils	All parts of the plant	Ibo dan Arimukti (2019)
<i>Physalis unguolata</i>	Pultak-pultak	Diabetes	All parts of the plant	Anggreini <i>et al.</i> , (2016)
<i>Rhodomyrtus tomentosa</i>	Harimonting	Diabetes and injury	Fruits	Anggraini <i>et al.</i> , (2016)
<i>Saurauia vulcani</i>	Pirdot	Diabetes	Leaves and fruits	Sitorus (2015); Hutahaean <i>et al.</i> , (2018); Anggreini <i>et al.</i> , (2016); Ibo dan Arimukti (2019)
<i>Sida rhombifolia</i>	Sibagure	Antibiotics	Roots	Anggreini <i>et al.</i> , (2016); Ibo dan Arimukti (2019)
<i>Virtex trifolia</i>	Sialagundi/lagundi	Asthma, Eye medicine	Leaves	Ibo dan Arimukti (2019); Lestari (2016)
<i>Zanthoxylum acanthopodium</i>	Andaliman	Antioxidants and antimicrobials	Fruits	Wijaya <i>et al.</i> , (2002); Suryanto <i>et al.</i> , (2004); Suryanto <i>et al.</i> , (2005)

#### IV. Conclusion

Various types of plants are used as medicines by ethnic groups in North Sumatra. Types of medicinal plants obtained from ethnobotany research can be used as preliminary information to explore the potential of medicines. Many studies on the content of medicinal substances in a plant based on information from ethnobotany research, such as the study of pirdot plants, which currently has a lot of research on the active compounds contained in these plants, coffee parasites that have been developed as cancer medicine, gotu kola which has been developed as a drug to improve memory and so on. Plants which are used as medicine also come from various sources, cultivated plants and also wild plants. Plant parts that are used also vary such as leaves, stems, fruit, flowers, roots, sap and all parts of plants.

#### References

##### Journal Papers:

- [1]. Anggraeni, R., Silalahi M dan Nisyawati (2016). Studi etnobotani masyarakat subetnis Batak Toba di Desa Peadungdung, Sumatera Utara, Indonesia. *Pro-Life*, 3(2), 129-142.
- [2]. Astuti, H. (2015). Uji Aktivitas Antibakteri Ekstrak Etanol Dan Ekstrak Air Daun Bandotan (*Ageratum conyzoides*, L.) Terhadap *Staphylococcus aureus* Dan *Escherichia coli*. *Majalah Farmaseutik*, 11(1), 290-293.
- [3]. Arief, M. I., Novriansyah, R., Budianto, I. T., & Harmaji, M. B. (2012). Potensi bunga karamunting (*Melastoma malabathricum* L.) terhadap kadar kolesterol total dan trigliserida pada tikus putih jantan hiperlipidemia yang diinduksi propiltiourasil. *Prestasi*, 1(2), 60-97.
- [4]. Arum, Y. P. (2012). Isolasi dan uji daya antimikroba ekstrak daun kersen (*Muntingia calabura*). *Jurnal MIPA*, 35(2).
- [5]. Bahriyah, I., Hayati, A., & Zayadi, H. (2015). Studi Etnobotani Tanaman Kelor (*Moringa oleifera*) di Desa Sumber Kecamatan Tambelangan Kabupaten Sampang Madura. *BIOSAIN TROPIS (BIOSCIENCE-TROPIC)*, 1(1).
- [6]. Giday, M., Asfaw, Z., Elmqvist, T., & Woldu, Z. (2003). An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. *Journal of ethnopharmacology*, 85(1), 43-52.
- [7]. Hutahaean, S., Tanjung, M., Sari, D. P., & Ningsih, V. E. (2018, March). Antihyperglycemic and antihyperlipidemic effects of pirdot (*saurauia vulcani* korth.) leaves extract in mice. In *IOP Conference Series: Earth and Environmental Science* (Vol. 130, No. 1, p. 012042). IOP Publishing.
- [8]. Ibo, L. K., & Arimukti, S. D. (2019, March). Ethnobotanical study of Batak Toba sub-ethnic community in Martoba Village, Samosir District, North Sumatra. In *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia* (Vol. 5, No. 2, pp. 234-241).
- [9]. Koleva, V., Dragoeva, A., Nanova, Z., Koynova, T., & Dashev, G. (2015). An ethnobotanical study on current status of some medicinal plants used in Bulgaria. *Int. J. Curr. Microbiol. App. Sci*, 4(4), 297-305.
- [10]. Lestari P. 2016. Studi tanaman khas Sumatera Utara yang berkhasiat obat. *Jurnal Farmanesia*, 3(1), 11-21.
- [11]. Liu, Y., Ahmed, S., Liu, B., Guo, Z., Huang, W., Wu, X., & Long, C. (2014). Ethnobotany of dye plants in Dong communities of China. *Journal of ethnobiology and ethnomedicine*, 10(1), 23. 10-23
- [12]. Liyanti, P. R., Budhi, S., & Yusro, F. (2015). Studi Etnobotani Tumbuhan Yang Dimanfaatkan Di Desa Pesaguan Kanan Kecamatan Matan Hilir Selatan Kabupaten Ketapang. *Jurnal Hutan Lestari*, 3(3).
- [13]. Mesfin, K., Tekle, G., & Tesfay, T. (2013). Ethnobotanical study of traditional medicinal plants used by indigenous people of Gemad District, Northern Ethiopia. *Journal of Medicinal Plants*, 1(4), 32-37
- [14]. Muthu, C., Ayyanar, M., Raja, N., & Ignacimuthu, S. (2006). Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu, India. *Journal of Ethnobiology and ethnomedicine*, 2(1), 43.
- [15]. Nurlaha, N., Setiana, A., & Asminaya, N. S. (2014). Identifikasi Jenis Hijauan Makanan Ternak Di Lahan Persawahan Desa Babakan Kecamatan Dramaga Kabupaten Bogor. *Jurnal Ilmu dan Teknologi Peternakan Tropis*, 1(1), 54-62.

- [16]. Nasution, J., Masitah, P. D., & Riyanto, R. (2016). Kajian Etnobotani Tumbuhan Obat Oleh Etnis Masyarakat Di Dusun Aras Napal Kiri Dan Dusun Aras Napal Kanan Desa Bukit Mas Kecamatan Besitang Kabupaten Langkat. *Jurnal Biosains*, 2(2), 91-96.
- [17]. Rajith, N. P., & Ramachandran, V. S. (2010). Ethnomedicines of Kurichyas, Kannur district, Western Ghats, Kerala. *Indian Journal of Natural Products and Resources* Vol. 1(2), June 2010, pp. 249-253
- [18]. Setyowati, W., & Wardah, D. (2007). Keanekaragaman Tumbuhan Obat Masyarakat Talang Mamak di Sekitar Taman Nasional Bukit Tigapuluh, Riau. *Biodiversitas*, 8(3), 228.
- [19]. Sembiring, R., Utomo, B., & Batubara, R. (2013). Keanekaragaman Vegetasi Tanaman Obat di Hutan Pendidikan Universitas Sumatera Utara Kawasan Taman Hutan Raya Tongkoh Kabupaten Karo Sumatera Utara. *Peronema Forestry Science Journal*, 2(2), 19-22.
- [20]. Sihombing, M., Azhar, I., & Afifuddin, Y. (2016). Potensi Tumbuhan Obat Di Cagar Alam Dolok Saut, Desa Pansur Natolu, Kecamatan Pangaribuan, Kabupaten Tapanuli Utara. *Peronema Forestry Science Journal*, 5(3), 207-213.
- [21]. Silalahi, M., Nisyawati, N., & Anggraeni, R. (2018). Studi Etnobotani Tumbuhan Pangan yang Tidak Dibudidayakan oleh Masyarakat Lokal Sub-etnis Batak Toba, di Desa Peadungdung Sumatera Utara, Indonesia. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan (Journal of Natural Resources and Environmental Management)*, 8(2), 241-250.
- [22]. Simanjuntak, H. A. (2017). Etnobotani Tumbuhan Obat di Masyarakat Etnis Simalungun Kabupaten Simalungun Provinsi Sumatera Utara. *BIOLINK (Jurnal Biologi Lingkungan, Industri, Kesehatan)*, 3(1), 75-80.
- [23]. Sitorus, P. (2015). Characterization Simplisia and Ethanolic Extract of Pirdot (Saurauia Vulcani, Korth) Leaves and Study of Antidiabetic Effect in Alloxan Induced Diabetic Mice. *International Journal of ChemTech Research* Vol 8 No 6 pp 789-794
- [24]. Suryadarma IGP, 2008. Etnobotani. Diktat Kuliah Jurusan Pendidikan Biologi Universitas Negeri Yogyakarta.
- [25]. Suryanto, E., Raharjo, S., Sastrohamidjojo, H., & Tranggono, T. (2005). Aktivitas Antioksidan dan Stabilitas Ekstrak Andaliman (*Zanthoxylum acanthopodium* DC) Terhadap Panas, Cahaya Fluoresen dan Ultraviolet. *agriTECH*, 25(2), 63-69.
- [26]. Suryanto, E., Sastrohamidjojo, H., & Raharjo, S. (2004). Antiradical Activity of Andaliman (*Zanthoxylumacanthopodium* DC) Fruit Extract. *Indonesian Food and Nutrition Progress*, 11(1), 15-19.
- [27]. Teklehaymanot, T., & Giday, M. (2007). Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, Northwestern Ethiopia. *Journal of ethnobiology and Ethnomedicine*, 3(1), 12.
- [28]. Wijaya, C. H., Hadiprodjo, I. T., & Apriyantono, A. (2002). Identification of Volatile Compounds and Key Aroma Compounds of Andaliman Fruit (*Zanthoxylum Acanthopodium* DC.). *Food Sci. Biotechnol*, 2(6), 680-683.

#### **Books:**

- [29]. Bulan, R., & Fahmi, A. (2016). Uji Aktivitas Antioksidan Dari Flavonoid Total Daun Benalu (*Dendrophthoe Pentandra* (L) Miq) Dari Pohon Glodokan (*Polyalthia Longifolia*). Prosiding Seminar Nasional Kimia dan Pendidikan Kimia.
- [30]. Hakim, L. (2014). Etnobotani dan manajemen kebun-pekarangan rumah: ketahanan pangan, kesehatan dan agrowisata. *Selaras. Malang*.
- [31]. Hossan, S., Agarwala, B., Sarwar, S., Karim, M., Jahan, R., & Rahmatullah, M. (2010). Traditional use of medicinal plants in Bangladesh to treat urinary tract infections and sexually transmitted diseases. *Ethnobotany Research and Applications*, 8, 061-074.
- [32]. Kadowangko N. Y, Margaretha S dan Jusna A. 2011. *Kajian Tanaman Obat oleh Masyarakat Kabupaten Bonebolango Provinsi Gorontalo*. Laporan Penelitian Jurusan Biologi FMIPA Universitas Negeri Gorontalo.

#### **Theses:**

- [33]. Jumari, S. D, Purwanto, Y. 2012. *Etnobiologi Masyarakat Samin. Disertasi. Program Pascasarjana Institut Pertanian Bogor. Bogor*.

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