

# Potential of Medicinal Plants Against Cancer and Tumors: Ethnobotanical Study of the Dayak Tamambaloh Tribe, Indonesia

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## Abstract

The defense of plants to treat cancer (digestive cancer, lung cancer) and tumors have been traditionally carried out for a long time by the Dayak Tamambaloh people in Labian Ira'ang Village. However, the practice of traditional medicine is still delivered orally, and has not been documented in writing in scientific literature. The purpose of this study is to record plants, plant parts, and how to use plants used by the Dayak Tamambaloh tribe for traditional cancer and tumor treatment. This research use descriptive qualitative approach. Research data are collected in three ways namely literature studies, semi -structured interviews, and field observation. Literature study related to supporting data on medicinal plants. Semi-structured interviews were aimed at traditional healers, traditional leaders, temenggung, elders, people who know plants, and people who grow and care for plants. Field observations were made after conducting interviews with respondents and assisted by traditional healers. Determination of respondents with purposive sampling technique. Research data were analyzed by descriptive qualitative. The results of this study obtained 5 types of plants in 5 families which are used to treat cancer and tumors. The plant families used are: Acanthaceae, Annonaceae, Balsaminaceae, Fabaceae, Selaginellaceae. While the types of plants are *Clinacanthus nutans* Lindau for cancer and tumor drugs, *Annona muricata* L as anti-cancer, *Impatiens balsamina* L for digestive cancer drugs, *Spatholobus littoralis* Hassk for tumor drugs, and *Selaginella doederleinii* Hieron for lung cancer drugs. The results of this study have the opportunity to discover new types of medicinal plants that can be further investigated on a laboratory scale by pharmacists.

**Keywords:** plants, medicine, traditional, cancer, tumor, tamambaloh.

## INTRODUCTION

Indonesia has high biodiversity and ethnic diversity with a variety of distinctive cultures [1], one of which is the Dayak Tamambaloh ethnicity located in Labian Ira'ang Village, Batang Lupar District, Kapuas Hulu Regency, West Kalimantan Province. Each ethnic group has a particular culture based on its ongoing interaction with the environment [2], including the Tamambaloh Dayak people who also have a distinctive culture of interacting with the environment. The form of interaction between the Tamambaloh Dayak people and the environment is reflected in the activity of using plants as ingredients for traditional medicinal processes. This activity is a local wisdom found in the Tamambaloh Dayak people.

Traditional medicine is part of a pluralistic culture that can generate a variety of local knowledge and wisdom in a group of people so that local cultural wealth and values that contain policies and views on life are maintained [3,4]. However, there are several factors that can threaten the existence of local knowledge and wisdom of traditional medicine using plants in the Dayak Tamambaloh community.

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These factors are: (a) the inability of the older generation to transfer traditional knowledge to young people [5-7], (b) transmitted orally [8-11], (c) has not been documented and published in writing through research [12-16], (d) influenced by modern technology [17-21], (e) there is an attitude of ignoring local traditions [22], and (f) lifestyle changes [23].

Based on these problems, it becomes increasingly important to conduct research on the ethnobotany of the use of medicinal plants in the Dayak Tamambaloh community because it can be used as a tool to document knowledge of traditional societies. Ethnobotany is a direct relationship between humans and plants in terms of utilization and management, especially in traditional societies [24,25]. Ethnobotanical studies can help explain how local people use, and manage plants [26-31]. Ethnobotany has the potential to reveal the traditional knowledge system of a community or ethnic group regarding the diversity of biological resources, conservation and culture [32]. There is now an urgent need to carry out ethnobotanical investigations and documentation of the knowledge of local people in certain areas in order to generate a wealth of useful experience for scientific discovery/innovation [33-37].

The specific objective of this research is to collect data on plant species, parts of plants used, and how the Dayak Tamambaloh people use plants to treat cancer and tumors in the traditional way. The urgency of this research is: (a) there is an urgent need to record, document, and publish local community knowledge as a form of academic responsibility for the preservation of local culture, (b) the results of this research form the basis for supporting sustainable development, and (c) form the basis to introduce the local wisdom of the Dayak Tamambaloh people through publication in scientific literature (digital journals).

## MATERIALS AND METHODS

### General Condition of the Research Sites

Labian Ira'ang Village, Batang Lupar District, Kapuas Hulu Regency, West Kalimantan Province, Indonesia (Figure 1) was formed in 2011. Labian Ira'ang Village is located at the coordinates N:01°07' 38.9" E:112°15' 26.0". The boundaries of Labian Ira'ang Village are bordered to the north by Mensiau Village, to the south by Abau Village, to the east by Setulang Village, to the west by Labian Village. The area of Labian Ira'ang Village is 2.370,85 Ha. Upland hill forest area 99,36 Ha, lowland forest area 0,18 Ha, peat swamp forest area 543,26 Ha, lowland secondary forest area 9,72 Ha, peat swamp secondary forest area 5,73 Ha, forest area secondary riverbank 68,67 Ha. The population is 463 people consisting of 250 men and 213 women. Labian Ira'ang Village has a traditional institution consisting of customary stakeholders and customary management.

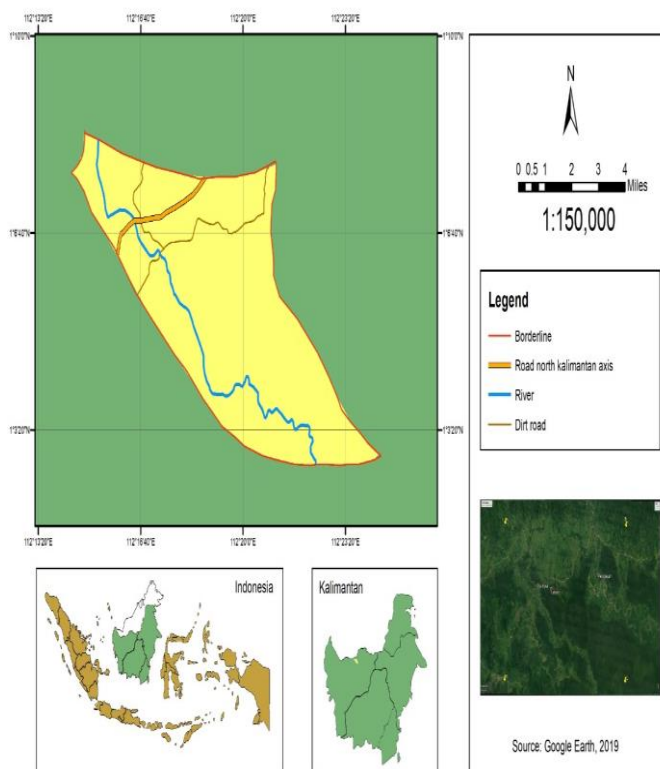


Figure 1. Research location

### Research methods

The approach used in this study is a qualitative descriptive approach. A qualitative descriptive approach is used because data is obtained in the form of descriptive words related to knowledge of medicinal plants in the Dayak Tamambaloh community in Labian Ira'ang Village.

### Data collection

The stages of data collection consisted of: (a) literature study to obtain supporting data and information related to research variables, (b) semi-structured interviews were used to obtain oral information through conversations with respondents about research topics, (c) field observations aimed at documenting plant species medicine used by the Tamambaloh Dayak people in traditional medicine. Field observations are assisted by traditional healers. The research data were obtained from several sources (respondents) consisting of: (a) traditional healer (Mr. Yosef Kalabet) native to the Dayak Tamambaloh tribe in Labian Ira'ang Village, (b) traditional leader (Mr. Stepanus Kokong), temenggung (Mr. Antonius Leo Pameang), elders (Mrs. Maria Magdalene Boan), (d) people who know medicinal plants (Mr. Yosef Uset), (e) people who grow and maintain medicinal plants (Ms. Margareta Note). Determination of respondents using purposive sampling technique.

### Data analysis

The data analysis technique used in this research is descriptive qualitative analysis. Analysis of qualitative descriptive data with the stages of: (a) determining the scientific name of medicinal plants by matching the data in

the field with data at <http://www.plantamor.com> and relevant reference books, (b) consulting with plant experts at Malang State University, (c) perform tabulation and description of data into tables with the following format:

Family	Scientific name	Vernacular names	Utilized part	How to use	Disease name

## RESULTS AND DISCUSSION

The results of interviews conducted with all respondents obtained the types of plants used by the Dayak Tamambaloh tribe in Labian Ira'ang Village to treat cancer and tumors. Plant data is presented in Table 1.

Table 1. List of medicinal plants for cancer and tumors in the Dayak Tamambaloh tribe

Family	Scientific name	Vernacular names	Utilized part	How to use	Disease name
<u>Acanthaceae</u>	<i>Clinacanthus nutans</i> Lindau.	Tambak paku	Leaf	Boiled, and drink	Cancer and tumors
<u>Annonaceae</u>	<i>Annona muricata</i> L.	Durian balanda	Leaf, fruit	The leaf are boiled and drunk Ripe fruit, squeeze the water to drink	Anti cancer
<u>Balsaminaceae</u>	<i>Impatiens balsamina</i> L.	Terangga	Seeds, flowers	15-60 grams of seeds are boiled and drunk Flowers 3-6 grams of boiled and drunk	Digestive cancer
Fabaceae	<i>Spatholobus littoralis</i> Hassk.	Bararan kalait	Root	Boiled, and drink	Tumors
<u>Selaginellaceae</u>	<i>Selaginella doederleinii</i> Hieron.	Cakar ayam	All parts of the plant	Boiled, and drink	Lung cancer

In more detail related to the types of plants used by the Dayak Tamambaloh people to treat cancer (digestive cancer,

lung cancer) and tumors are presented in Figure 2a-e.



Figure 2a-e: (a). *Clinacanthus nutans* Lindau; (b). *Annona muricata* L; (c). *Impatiens balsamina* L; (d). *Selaginella doederleinii* Hieron; (e) *Spatholobus littoralis* Hassk.

The Dayak Tamambaloh people use plants from the families Acanthaceae, Annonaceae, Balsaminaceae, Fabaceae, Selaginellaceae for traditional medicine. Acanthaceae to treat cancer and tumors. Annonaceae is used as an anti-cancer. Balsaminaceae to treat digestive cancer. Fabaceae for tumor medicine. Selaginellaceae as a lung cancer drug.

The reasons why people use plants from this family are: (a) they are still widely available in the forest or around the house, (b) medicinal knowledge using plants is passed down from generation to generation, and (c) they are easy to cultivate. The results of previous research reported that the Acanthaceae family is used by medical practitioners in Asia

and Europe because it has anti-inflammatory, anti-allergic, anti-diabetic activity [38,39]. Acanthaceae contains alkaloids, phenols, terpenoids, tannins, quinones, cardiac glycosides, saponins, carbohydrates, flavonoids, and proteins [40]. The people of Rajshahi, Bangladesh use the Acanthaceae family traditionally to treat cancer, asthma, abscesses, anthelmintic, astringents, bronchitis, wounds, coughs, diuretics, diarrhea, dysentery, eczema, earaches, headaches, inflammation, jaundice, kidney disease, leprosy, paralysis, scabies, ringworm, boils, and toothache [41]. The Acanthaceae family has a major contribution in the treatment of certain diseases (ethnobotany), conservation and sustainability of natural resources [42].

The Annonaceae family is used traditionally for treatment [43]. Annonaceae have antimalarial activity [44], anti-free radicals, and antifungal [45]. Annonaceae are known as acetogenins which are localized in leaves, stems, seeds, and fruit so that they have anticancer, antitumor, antidiabetic, antimalarial, antiviral, antiparasitic, immunosuppressive, and cytotoxic activities [46]. Decoction of roots from Annonaceae is used as a drink to relieve stomach ache by people in Malaysia [47]. This is probably effective because plants from the Annonaceae family contain isoquinoline alkaloids which are able to inhibit gastric fluid secretion and contraction of smooth muscle in the stomach [47]. Communities in the Cameroon region utilize 7 species from the Annonaceae to treat malaria, and 14 species to treat disease symptoms that may be associated with malaria [48]. People in the mountains of Cameroon use 41 species of plants from the Annonaceae family for traditional medicine [49].

The Balsaminaceae family has biological benefits because it contains secondary metabolites [50]. Secondary metabolites are key to pharmacological effects [51]. The results of previous research reported that the Balsaminaceae family is used by the Jambur Labu community in East Aceh, Indonesia to treat snake bites [52]. Research conducted on the Ada'a people, Ethiopia shows that plants from the Balsaminaceae family are used to treat diseases in humans [53]. Communities on the island of Papua, Indonesia also use plants from the Balsaminaceae family to cure malaria traditionally [54]. The Azad people of Jammu and Kashmir use it for the treatment of burns [55]. The Fabaceae family is used in the treatment of various human health care systems in Ethiopia [56], and for medicine by indigenous peoples in Argentine-Chilean Patagonia [57]. The people of Rajshahi, Bangladesh use plants from the Fabaceae family to treat abscesses, asthma, coughs, colds, dysentery, various skin diseases, boils, and leprosy [58]. Fabaceae are used in traditional medicine for infectious diseases [59]. The Selaginellaceae family contains alkaloids, phenolics, and terpenoids which are traditionally used to heal postpartum wounds and menstrual disorders [60]. Phytochemically, Selaginellaceae contains biflavonoids [61]. Medically used biflavonoids for antioxidant, anti-inflammatory, anticancer [60], cancer, hepatitis, and inflammation [62].

The Dayak Tamambaloh people use *Clinacanthus nutans* Lindau to cure cancer and tumors. *Annona muricata* L as anti-cancer. *Impatiens balsamina* L for digestive cancer drugs. *Spatholobus littoralis* Hassk to treat tumors. *Selaginella doederleinii* Hieron to treat lung cancer. The reason people use these plant species is because they have been passed down from generation to generation by the community and the efficacy of the treatment has been proven. The results of this research are supported by previous research which reported that *C. nutans* is used by people in Malaysia, Thailand, and China to treat skin rashes, insect and snake bites, wounds caused by the herpes simplex virus, diabetes, and gout [63]. The results of phytochemical tests on *C. nutans* obtained bioactive compounds such as flavonoids, glycosides, glycolipids, cerebrosides, and monoacylmonogalatosylglycerol [63]. *C. nutans* extract has antitumor and antioxidant activity thus indicating an effective approach for the prevention and treatment of cancer [64]. *A. muricata* is traditionally used to treat diarrhea, dysentery, fever, pain, respiratory and skin diseases, internal and external parasites, bacterial infections, hypertension, inflammation, diabetes, and cancer [65]. *A. muricata* extract has antimicrobial, anti-inflammatory, antiprotozoal, antioxidant, insecticidal, larvicidal, and cytotoxic activity against tumor cells [65].

*I. balsamina* extract contains polyphenols, flavonoids, saponins, tannins, quinones, steroids, and terpenoids so that they have the potential to heal external wounds [66]. The results of previous research reported that *I. balsamina* contains terpenoids, flavonoids, polyphenols, and anthraquinone compounds that can inhibit *Staphylococcus*, *Escherichia coli*, and *Candida albicans* [67]. *S. littoralis* has potential as an antioxidant and anticancer [68]. *S. littoralis* is used by people in Central Kalimantan as a drug that has antioxidant activity [69]. *S. littoralis* contains alkaloids, flavonoids, and steroids [69]. *S. littoralis* effectively reduces oxidative stress, reduces fat mass, and body weight [70]. *S. doederleinii* contains phytochemicals such as flavonoids which function to cure fever, jaundice, liver disorders, heart disease, cirrhosis, diarrhea, cholelithiasis, sore throat, lung cough, improve blood circulation, and stop external bleeding [71]. *S. doederleinii* is a traditional herb that is widely used in China to treat several diseases, especially cancer [72].

The Dayak Tamambaloh tribe in Labian Ira'ang Village uses all parts of the plant (roots, stems, leaves, flowers, fruits, seeds) for traditional medicine. The results of research conducted on the people of Yunnan, China reported that the roots, rhizomes, stems, bark, leaves, flowers, fruit were used as traditional medicine [73]. People in Malaysia use the leaves, flowers, roots, bark, fruit and seeds as traditional medicines as well as cosmetic preparations [74]. Thai people living in Ban Hua Kua Village, Kae Dam District, Maha Sarakham Province reported that the parts of the plants used were roots, leaves, fruit, bark, young stems, flowers, and rhizomes as traditional medicine [75]. Local

residents in Barangay, Maliao, Albay, Philippines use the plants for herbal medicines used in traditional therapies, the parts of the plants used are leaves, stems, flowers, fruit, seeds, bark, and sap [76]. How to use plants for treatment in the Dayak Tamambaloh community by boiling and drinking. The reason for using it by boiling and drinking it is because the process is not complicated and has been passed down from generation to generation. The results of research on the Buyi community in eastern Yunnan, China reported that the processing of plants for traditional medicine was through boiling [77]. The results of this research have weaknesses, namely: (a) the community believes in the efficacy of traditional medicinal plants, but has not been scientifically proven (laboratory scale), (b) the use of plants as traditional medicine by the community has not paid attention to standard doses.

## CONCLUSIONS

The Dayak Tamambaloh people have local knowledge in using plants to treat cancer and tumors, which they have inherited from their older generations. Traditional knowledge of using plants to treat cancer and tumors in the Dayak Tamambaloh tribe is a good first step for future research work in the pharmaceutical field. Therefore, it is very important that the results of this research be published in a scientific journal so that it can make a positive contribution to the development of science in the health sector. The results of this research are based on local knowledge of the Dayak Tamambaloh people in Labian Ira'ang Village who have used plants for treatment. But it has no clinical validation and has not shown scientific validation.

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