



## Ethnobotany of Balimo (*Zanthoxylum nitidum*) in the Kanayatn Dayak Community in Tapakng, West Kalimantan

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### Abstract

The Kanayatn Dayak in Tapakng Village has a local culture of using balimo plants for traditional medicine. Balimo is a plant, it has an important meaning in traditional medicine by the Kanayatn Dayak community in Tapakng Village. This study aimed to examine the ethnobotanical knowledge of balimo plants and their advantage among the Kanayatn Dayak community in Tapakng Village. The research method with observation and deep interview and also semi-structured interview. Deep interviews was conducted with four key informants and the semi-structured interview was conducted with 60 respondents. The results showed that, the local people had a traditional treatment system to solve the disease problems. Balimo plants are used as a prevention of alcohol intoxication due to drinking arak and treatment of coughs (dry cough and bloody cough or (hemoptysis). The use of balimo as a prevention of intoxication has an important role because it is related to the Dayak Indigenous rituals. The level of ethnobotanical knowledge of local people showed that, 100% have heard about the balimo, 92% have seen balimo, and 55% have used it. This research provided information to the public about balimo that can be used in medication. Information on the utilization of balimo gives awareness to the people, the population of balimo really needs to be maintained in nature from extinction.

### How to Cite

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## INTRODUCTION

Dayak is one of the tribes in Indonesia settled in the island of Borneo (Sari et al., 2014). Dayak is the the first name for the original or first tribe that inhabit the island of Borneo (Samsodin et al., 2010). Dayaks are scattered in 5 provinces of Kalimantan Island, i.e. West Kalimantan, Central Kalimantan, North Kalimantan, East Kalimantan, and South Kalimantan (Darmadi, 2017). The Dayak people live in Kalimantan Island is included in 405 Dayak sub-tribes (Yusro et al., 2014). Kanayatn Dayak is one of the Dayak tribes who live in West Kalimantan. The existence of Kanayatn Dayak tribes in West Kalimantan can be found in Tapakng Village, Sompak District.

Dayak tribe has a variety of traditions, one of which is the tradition of using plants for traditional medicine. The Kanayatn Dayak people in Tapakng Village have a culture of using plants for traditional medicine. Balimo (*Zanthoxylum nitidum*) is one of the plants used for traditional medicine by the Kanayatn Dayak people in Tapakng Village. At present, there are three members of the genus *Zanthoxylum* that have been used in Indonesia, such as *Z. acanthopodium*, as a spice in North Sumatra (Raja & Hartana, 2017), *Zanthoxylum* sp., as a traditional treatment in West Nusa Tenggara (Hidayat & Cahyaningsih, 2017), and *Z. retsa.*, as a material for sculpture industry in Bali (Purwaning, 2009).

By far, scientific information related to the benefit of balimo is still limited, especially in the Dayak Kanayatn tribe in Tapakng Village. Based on information from the Head of Customary and Head of Village, the population of balimo tends to decrease even though it plays an important role in traditional treatment for local people, therefore it was important to conduct research on the ethnobotanical knowledge of the balimo (*Z. nitidum*) plant among Dayak Kanayatn people. This study aimed to examine the ethnobotanical knowledge of balimo plants and their advantage among the Kanayatn Dayak community in Tapakng Village. The benefits in this study provide information about the benefits of balimo which can be used as medicine, and can be developed into more varied and commercial traditional medicines.

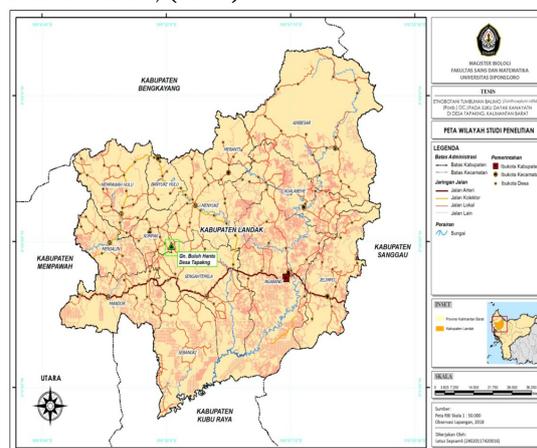
## METHODS

This research was conducted in Tapakng Village, Sompak District, Landak Regency, West Kalimantan Province from April to May 2019 (Figure 1). Tapakng Village is at latitude of 0° 28'

23,7" N, longitude of 109° 31' 44,1" E and altitude 125-200 mpdl.

The objects in this study were balimo (*Z. nitidum*) plants and the Kanayatn Dayak community in Tapakng Village. The instruments used to measure environmental factors were an air thermometer, hygrometer, pH meter, lux meter, and altimeter.

Data collection on knowledge about balimo and its use by the people was done with deep interviews to four key informants and semi-structured interviews to 60 respondents. The key informant in this study was the village shaman in Tapakng Village and the respondents in this study were selected randomly from communities. Respondents knowledge about balimo was categorized into 3 levels of knowledge, i.e. never heard, never seen, and never used which refers to Shanthi et al., (2012).



**Figure 1.** Tapakng Village, Sompak District, Landak Regency, West Kalimantan.

## RESULT AND DISCUSSION

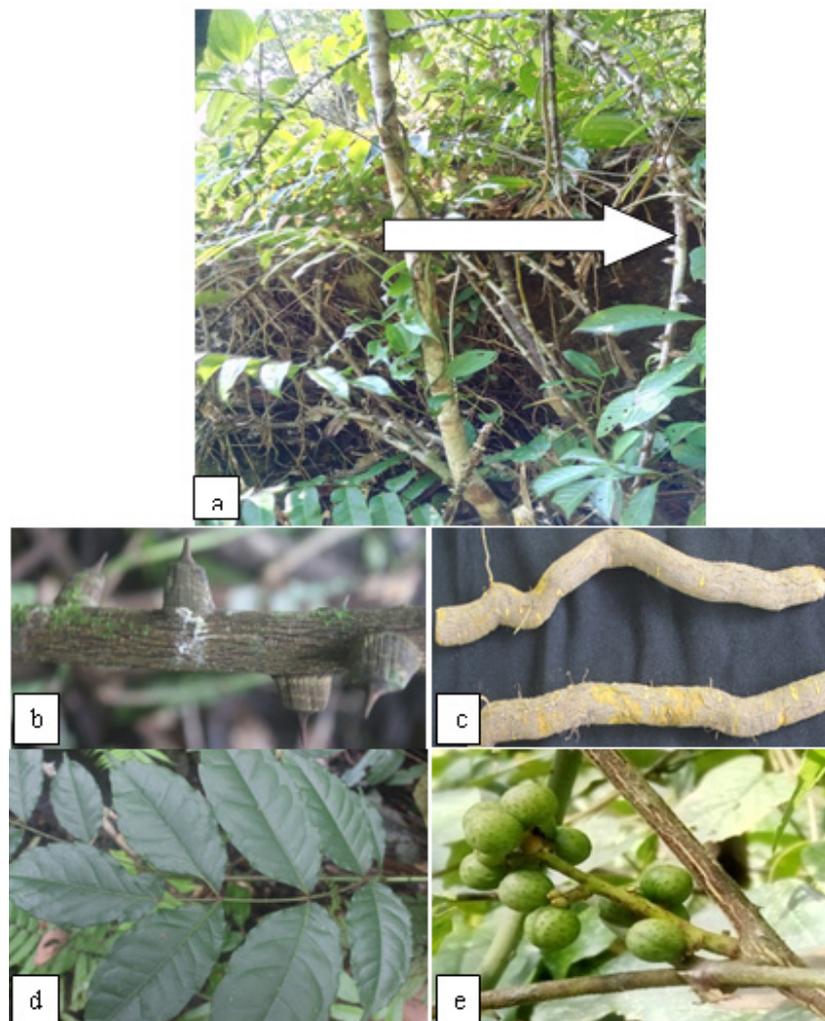
Balimo plants (*Z. nitidum*) is one of the plants in Tapakng Village, which has an important meaning in traditional medicine. The balimo plant in this village has another names, the limo ghost and malimo, but they are more familiar with the name balimo. Balimo are found in Gunung Buluh Hantu, Sompak District, Landak Regency. Balimo's observation results were found them at an altitude of 339 to 518 masl. The balimo habitat population condition is quite good, this is indicated by the density of seedling and sapling levels which are classified as very high at 460 individuals / ha and 80 individuals / ha. Environmental factors of balimo population are temperature of 30°C, 40.73% air humidity, 1146 lux light intensity, and 6.9 soil pH.

The results of the characterization of bali-

mo (*Z. nitidum*) in Gunung Buluh Hantu showed that, habitus balimo has general characteristics of 5-13 m tall, perennials, grows near rocks, grows between bushes, and climbing or creeping woody plants (Figure 2a), this is in accordance with the description done by Baro and Borthakur (2017). Balimo stems have the general characteristics of round stem, rough stem surface, yellow wood color, thorny stem, number of two branches, stem length 4-12 m, woody stem, monopodial branching, sticky thorn stems, thorn length 0.4-0.7 cm, stem diameter 1-4 cm, and spiked branches (Figure 2b). Balimo root has a taproot type and is yellow (Figure 2c). Balimo leaves have general characteristics of compound leaf types, incomplete leaves, oval, tapered leaf tip shape, blunt leaf base, green leaves, orange-smelling leaves, pinnate leaf reinforcement, jagged leaves edges, jagged spine leaves, leaf flesh such as parchment, and leaf surface with rough hair (Figure 2d). Balimos have common characteristics of true fruit types, the color of the fruit when it is not ripe, it has black

spots, the color of the fruit when it is ripe is rather yellow, the shape of the fruit is round, the smell of the fruit is rather spicy, the shape of the seeds is round, the seeds are hard, the number of seeds is one, and black seed color (Figure 2e).

Balimo is one of the plants used by the Kanayatn Dayak tribe in the traditional medicine system. The use of plants is a local culture in solving the problem of disease. Based on information from the village shaman, the causes of the disease are divided into 2 types, diseases caused by wrong actions and diseases caused by mystics. This is similar to the research of Shanti et al., (2014) on the study of ethnobotany traditional medicine, illness is also caused by 2 things, they are personalistic (mystical) and naturalistic (natural). Diseases caused by wrong actions related to daily life activities such as eating irregular and unclean food. Diseases caused by wrong actions are generally cured using a single and a mixture of ingredients. A single herb uses one part of only one plant species (Wahidah & Husain, 2018),



**Figure 2.** Balimo plant a). Habitus; b). Stem; c). Root; e). Leaves; d). Fruit.

while a mixed herb uses more than one part of one plant or a combination of several plant species (Hong et al., 2015). Mystical diseases such as witchcraft and spirits. Was cured with prayers or mantras or water and based on the rules of the village shaman.

Traditional medicine is passed down from generation to generation. The figures who play a role in traditional medicine in this community are traditional shaman or healers. Knowledge about traditional medicine was passed down orally. The inheritance of traditional medical knowledge starts from the village shaman and is transferred to family members, then family members spread the knowledge of traditional medicine to other family members. The process of transferring traditional medicine knowledge done through communication and interaction of ways of utilization, communication, and presentation. Until now, the people of Tapakng Village still using the traditional medicine, because it is able to solve the problem of illness for the people of Tapakng Village and due to the limited medical personnel and the distance of the Community Health Center (Puskesmas) that is 15 km away.

Based on the results of interviews with village shamans, it is known that, balimo is used as a prevention of alcohol intoxication and treatment of cough (dry cough and bloody cough (Hemoptysis) (Table 1).

The use of balimo began as a medical treatment, to prevent alcohol intoxication after drinking arak. Arak is a typical Dayak alcoholic drink, which is consumed during traditional Dayak rituals every year such as Naik Dango. Naik Dango is a thanksgiving ceremony for rice harvest (Andasputra & Julipin, 2011), that generally serves food like lemang and traditional alcoholic drinks like tuak and arak. The function of arak for the local people is to make the body more comfor-

table and facilitate communication with guests. Based on the information from obtained, if the alcoholic drink is consumed in large quantities, it will cause intoxication with several symptoms including dizziness, red eyes, and queasiness. How to deal with the disease, people use balimo root as a prevention of alcohol intoxication. Balimo root is also believed to be used as prevention from alcohol intoxication because its has a spicy taste that can neutralize the alcoholon arak. Balimo root (*Z. nitidum*) can be used as prevention of intoxication because it contains nitidine compounds which have analgesic properties. This is supported research by Chen et al., (2015), *Z. nitidum* contain *nitidine* which has biological activity. The public can also use alternative balimo parts such as stems, because they contain *candicine* compounds that have biological analgesic activity. This is supported by the results of Vashist's research (2016), *Z. armatum* stem containing *candicine* which has analgesic biological activity. For Dayak Kanayatn people in Tapakng Village, the use of balimo root as a prevention of intoxication due to drinking arak has an important meaning, because arak is a typical drink of Dayak and is used in traditional Dayak ritual.

Utilization of balimo, besides used as a prevention of alcohol intoxication, it is also used to treat dry cough and hemoptysis. Dry cough is a disease caused by infection of the respiratory track and not phlegm (Alamgeer et al., 2018). Dry cough is a disease that is experienced by the Kanayatn Dayak in Tapakng Village, but it rarely happens. Dry cough that occurs is generally caused by the lack of cleanliness in the surrounding areas. The people use roots and stems of balimo, turmeric rhizomes, and all parts of the cocoa for dry cough treatment. Balimo root can be used for the treatment of dry cough because it contains norchelerythrin which has antibacterial

**Table 1.** Category for Utilization and Composition of Balimo

Disease / Health Care Category	Material Composition	Part of Uses	How to Com- pose	How to Serve
Alcohol intoxication	Balimo	-Root	Washed, dried, cut with a length of 0.3-0.4 cm	Attached to the sidelines of the teeth or suck
Cough – Dry cough	-Balimo -Kakompal ( <i>Spermacoce latifolia</i> (Aubl.) -Kunyit ( <i>Curcuma longa</i> Linn.)	-Root and stem -Root, stem, and leaf -Rhizome	Washed, dried, sliced, and boiled for 1 minute	Drink
-Hemoptysis	-Balimo -Pinang ( <i>Areca catechu</i> L.) -Kelapa ( <i>Cocos nucifera</i> L.)	-Root -Root -Root	Wash, Dry, Boil for 1 minute	Drink

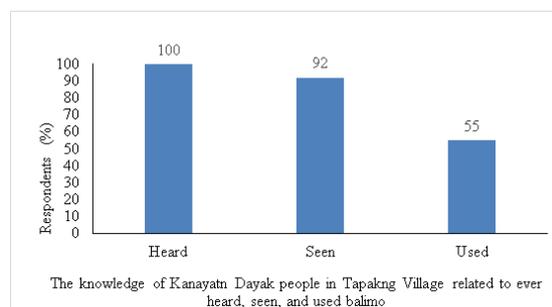
biological activity. This supports the research of Luo et al., (2012), *Z. capense* root contains *norchelerythrin* which has antibacterial biological activity. Balimo stem can be used in the treatment of dry cough because it contains *2-quinolone* which has antibacterial biological activity. This is related on research result by Zohora et al., (2019) & Patino et al., (2012), general *quinolone* was found in genus *Zanthoxylum* and had anti-microba biologic activity. The public can also use the other part of balimo for the treatment of dry cough, such as leaves, because they contain essential oils that have antibacterial biological activity. This is supported by Andila's research (2019), *Z. acanthopodium* leaf contains essential oils which have antibacterial biological activity. Turmeric rhizome can be used for the treatment of dry cough because it contains curcumin which has antibacterial biological activity (Mustofa & Rahmawati, 2015). While, kakompal can be used for the treatment of dry cough because it contains alkaloids and iridoids with antibacterial biological activity (Conserva & Junior, 2012).

The people also uses balimo for the treatment of hemoptysis (bloody cough). Hemoptysis is a disease caused by infection of the respiratory track and produced interference with the respiratory track (Fatiha et al., 2017). Hemoptysis in Tapakng Village is often felt by old people. The people use balimo root, coconut root, and areca nut root for hemoptysis treatment. Balimo root can be used for the treatment of hemoptysis because it contains *norchelerythrin* which has antibacterial biological activity. This is consistent with the results of the study of Luo et al., (2012), the root of *Z. capense* contains *norchelerythrin* which has antibacterial biological activity. The public can also use the other alternative balimo parts for the treatment of hemoptysis, such as leaves, because they contain essential oils that have antimicrobial biological activity. This is supported by Andila's research (2019), *Z. acanthopodium* leaf contains essential oils which have antimicrobial biological activity. Coconut root can be used for the treatment of hemoptysis because it contain saponin, tannins, flavonoids with antibacterial biological activity (Izzuddin & Azrianingsih, 2015). While, areca root can be used for the treatment of hemoptysis because it contains alkaloids, steroids, flavonoids, terpenoids, quinones, phlobatin, tannins, and phenols with antibacterial biological activity (Baby & Rafael, 2014).

There are two ways of serving the balimo concoction for traditional treatment i.e. by sucking and drinking. The advantages of presenting balimo herbs by sucking and drinking are more

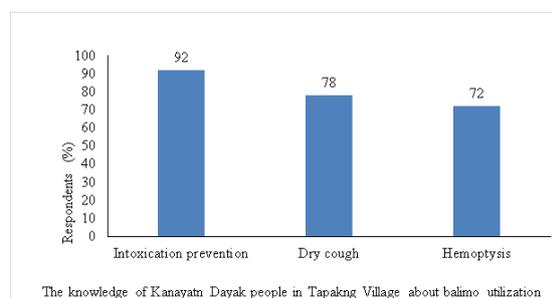
practical and the content of compounds can be absorbed directly into the body.

To get information about balimo and its utilization, researcher used 60 respondents, they were selected randomly who are > 21 years old. The result of people knowledge about balimo showed in Figure 2.



**Figure 2.** Histogram about knowledge of Kanayatn Dayak people in Tapakng Village related to ever heard, seen, and used balimo

Analysis result about people knowledge about balimo showed that, all respondents as much as 60 people with 100% percentage ever heard balimo. This situation showed that knowledge information about balimo is still spread out to all generation. People knowledge are ever heard about balimo come from anywhere. They ever heard from family, parents, and friends. Respondents who ever seen balimo are 55 people with 92% percentage. This situation told that, people are still have knowledge and experience about their perception of balimo. Respondents who ever used balimo as much as 33 people with 55% percentage. This showed that almost all respondents have not used balimo. It because of people knowledge is lack in using balimo as a traditional medicine. People knowledge about the use of balimo so far as health care (as a prevention of alcohol intoxication) and treatment of coughs (dry cough and hemoptysis) (Figure 3).



**Figure 3.** Histogram about knowledge of Kanayatn Dayak people in Tapakng Village related to balimo utilization

The results of the analysis ethnobotanical knowledge of the Dayak Kanayatn in Tapakng Village on the utilization of balimo showed that, balimo utilization knowledge as a alcohol intoxication was obtained from 55 people with a percentage of 92%. People knowledge about balimo utilization as a dry cough curing was obtained from 47 people with a percentage of 78% . People knowledge about balimo utilization as hemoptysis medication was obtained from 43 people with a percentage of 72%. Respondent knowledge result from balimo utilization showed that, people are still get the information utilization of balimo. Knowledge are owned respondents about balimo support local wisdom in balimo utilization as traditional medication. The results of this research have a positive contribution to the Indonesian people and the development of science, especially in the utilization, potential management, and conservation efforts of balimo.

## CONCLUSION

The Kanayatn Dayak in Tapakng Village has local wisdom to use balimo plants in the traditional treatment for health care, as a prevention of alcohol intoxication and cough diseases (hemoptysis and dry cough). Knowledge of the Dayak Kanayatn in Tapakng Village about balimo i.e. showed that, 100% people have heard about the balimo, 92% people have seen the balimo, and 55% people have used the balimo. The people knowledge regarding the use of balimo as a prevention of alcohol intoxication with a percentage of 92%, knowledge of dry cough treatment with a percentage of 78%, and knowledge of treatment of hemoptysis with a percentage of 72%.

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