Available online at BIOMA: Jurnal Ilmiah Biologi
Websites:http://journal.upgris.ac.id/index.php/bioma/index
BIOMA: Jurnal Ilmiah Biologi, 11(2), October 2022, 165-178
Doi: https://doi.org/10.26877/bioma.v11i2.11491

FAMILY MEDICINAL PLANTS (TOGA) IN TANAP VILLAGE SANGGAU REGENCY AND THEIR UTILIZATION BY THE DAYAK MUARA ETHNIC FOR THE TREATMENT OF DIGESTIVE SYSTEM DISORDERS

Fathul Yusro*, Evy Wardenaar, Yeni Mariani
Forestry Department, Forestry Faculty, Tanjungpura University
Jl. Daya Nasional, Pontianak, West Kalimantan, Indonesia, 78124
**Corresponding author: fathulyusro@gmail.com*

ARTICLE INFO

Article history
Submission
April 26th, 2022
Revision
June 18th, 2022
Accepted
August 11th, 2022

Keywords:
Dayak Muara
Digestive system disorders
Medicinal plants

ABSTRACT

Medicinal plants are used for various kinds of health care, one of which is to treat problems in the digestive system. This research aimed to analyze the utilization of family medicinal plants (TOGA) by the ethnic of Dayak Muara in Tanap village in handling digestive system disorders. This study was conducted by survey method with a purposive sampling technique. This research was initiated by conducting interviews with the people of Tanap village who came from the Dayak Muara, then continued with identifying the medicinal plants mentioned. The data obtained were then analyzed with an ethnobotanical index in the form of Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL). The Dayak Muara ethnic in Tanap Village uses 22 species of TOGA to handle digestive system disorders. The highest families used were Zingiberaceae and Amaryllidaceae. The dominant plant parts used, processing method, administration method, and remedies form for the handling of digestive system disorders are leaves (36%), boiled processing (43%), drinking (44%), and single herb form (67%). Plants with high use value (UV=1) are jambu biji (Psidium guajava) and kunyit (Curcuma longa). The digestive system disorder categories with the highest ICF included sprue (1), nausea and vomiting (0.98), intestinal worms, diarrhea, abdominal pain, and constipation (0.97). Plant that had the highest FL value (100%) included cocor bebek (Bryophyllum pinnatum), patah tulang (Euphorbia tirucalli), and putri malu (Mimosa pudica) for the treatment of toothache. Entawak (Artocarpus anisophyllus) for stomachache, pinang (Areca catechu) for constipation, lidah buaya (Aloe vera) for hemorrhoids, and sawo (Manilkara zapota) for stomachache.

INTRODUCTION

Sanggau Regency is part of the province of West Kalimantan with very diverse societal characteristics. One form of community pluralism that can be seen is the variety

of ethnics or sub-ethnics that exist, such as the Dayak ethnic with its sub-ethnics such as the Iban Dayak, Kanayant, Bukat, Daro' (Yusro *et al.*, 2014), Paus (Pradita *et al.*, 2021), and Muara (Yusro *et al.*, 2021). Each Dayak sub-ethnic has its language, culture, and local wisdom. One of the local wisdom they have is using medicinal plants.

Medicinal plants for the Dayak people are an essential part of their lives. It can be seen from several reports that show that the Dayak sub-ethnics, who are still living close to nature, have been using plants to maintain the health of their people for generations, such as the Dayak ethnics of Bukat and Daro' (Yusro *et al.*, 2014), Desa' (Yusro *et al.*, 2020), Iban (Yusro *et al.*, 2019), Paus (Pradita *et al.*, 2021), Kanayant (Sari *et al.*, 2021), Kantuk (Liliyanti *et al.*, 2021), Muara (Yusro *et al.*, 2021), and Mahap (Maharani *et al.*, 2021). Some of the plants used by the community come from nature that grows wild or have been cultivated, such as family medicinal plants (TOGA).

People use medicinal plants for various kinds of treatment or health care such as treatment for fever (Yusro *et al.*, 2014), anti-inflammatory (Ardiana *et al.*, 2019), feminine problems (Rania *et al.*, 2019), tonic (Riconadi *et al.*, 2020), prenatal care of mothers and children, and postpartum (Pradita *et al.*, 2021; Mariani *et al.*, 2021), hair care (Liliyanti *et al.*, 2021), stomach disorders (Yusro *et al.*, 2021), and digestive system disorder (Yusro *et al.*, 2019; Ningsih *et al.*, 2020).

Several problems with the digestive system are disorders that occur from the mouth to the anus. These disorders are mouth sores, gastritis, excessive gas discharge, toothache, constipation, stomach pain, hemorrhoids, pain in the mouth, and diarrhea (Tangjitman *et al.*, 2015). In 2019, diarrhea was the highest prevalence (6.8%) (Balitbangkes RI, 2019).

Many people in West Kalimantan have handled digestive system disorders using medicinal plants, such as 21 plant species used by the Dayak Iban in Kapuas Hulu (Yusro *et al.*, 2019) and 25 plant species used by the community in Bunut Village Sanggau (Ningsih *et al.*, 2020). In Sanggau Regency, many areas have not been studied regarding the plant's utilization to treat digestive system disorders, one of which is in Tanap Village.

Previous research has shown that the Tanap villagers, predominantly from the Dayak Muara ethnic, are aware of medicinal plants (32 species), especially for the care of babies and postpartum mothers (Mariani *et al.*, 2021). Nevertheless, their knowledge of using family medicinal plants or TOGA to treat digestive system disorders has not been

carried out. Family medicinal plants or TOGA are several species of selected medicinal plants that can planted in the house or home's yard and used as first aid when family members are sick. Some TOGA plants are also deliberately cultivated, and some grow naturally in the yard and are known to have medicinal properties (Sari *et al.*, 2019). Our current research aimed to analyze the family medicinal plants (TOGA) in Tanap village and their uses by the Dayak Muara in handling digestive system disorders.

MATERIALS AND METHODS

Time and Research Site

The research was conducted in April 2021. The research site was Tanap village Sanggau regency (**Figure 1**).

Equipments and Materials

The equipment used questionnaires, voice recorders, and cameras. The materials were all TOGA's plants used by the Tanap village community especially Dayak Muara for the treatment of digestive system disorders.

Research Subject

The subject of this research is Dayak Muara ethnic community in Tanap village Sanggau regency.

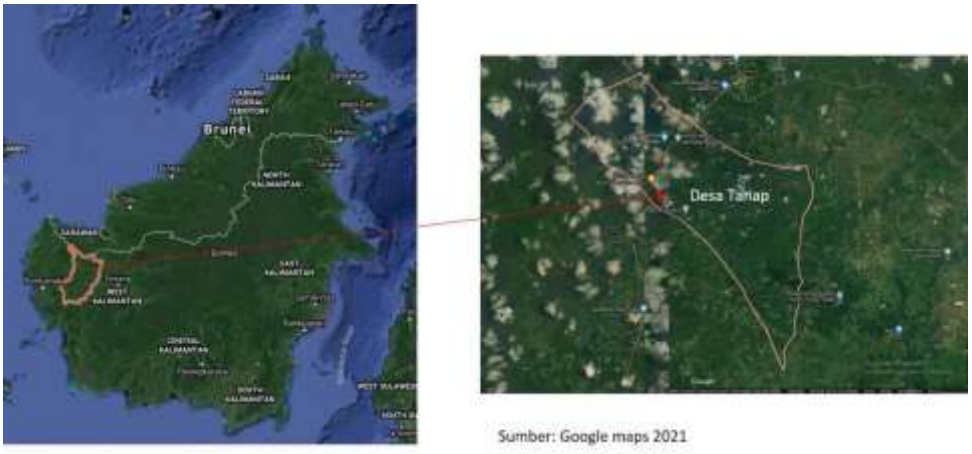

Figure 1. The Tanap village of Sanggau Regency

Procedure

Survey and observation were conducted with purposive sampling technique. This research was initiated by conducting interviews with the Tanap village community from the Dayak Muara. Selected respondents must meet criteria such as a resident of Tanap village, having lived at least five years in Tanap village, being over 17 years old, and is registered as a family member of Tanap village resident. The total of informants who were interviewed was 10% of the households number or 96 informants, then continued with identifying the medicinal plants (TOGA).

Data analysis and interpretation

The data obtained then analyzed with an ethnobotanical index (Tangjitman *et al.*, 2015) in the form of use-values (UV), informant consensus factor (ICF), and fidelity level (FL).

$$\text{Use value (UV)} = \sum \frac{U}{n}$$

U = number of user of the particular plant
n = number of total respondent

$$\text{Informant consensus factor (ICF)} = {(Nur - Nt)}\Big/{(Nur - 1)}$$

Nur = number of user of certain disease category
Nt = number of plant to treat certain disease category

$$\text{Fidelity level (FL)} = (\frac{Np}{N}) * 100$$

Np = number of user of specific plant for certain disease category
N = number of user of specific plant for all disease category

RESULTS AND DISCUSSION

The plant's species of family medicinal plants (TOGA) and their use value (UV)

People in Tanap village still use TOGA to treat digestive system disorders. Twenty-two species of plants are used to treat various diseases such as diarrhea, sprue, constipation, stomachache, intestinal worms, hemorrhoids, gastritis, nausea and vomiting, toothache, and flatulence (**Table 1**). This result is slightly higher when

compared to that used by the Dayak Iban, which utilizes 21 plant species (Yusro *et al.*, 2019), but lower than in other areas in Sanggau Regency, such as in Bunut village, which uses 25 plant species (Ningsih *et al.*, 2020).

Several plants with high use value include jambu biji (*Psidium guajava*), kunyit (*Curcuma longa*), alang-alang (*Imperata cylindrica*), and jahe (*Zingiber officinale*). Jambu biji (*P. guajava*) is traditionally used by the community to remedy diarrhea, stomach pain, ulcers, constipation, and toothache. *P. guajava* contains several secondary metabolites like steroid compounds, alkaloids, phenolic tannins, saponins (Simbolon *et al.*, 2021), crategolic acid, guajavolat acid, guajaverin, hyperin, and isoquercetin. It has antiimplantation properties in white rats (Ariani *et al.*, 2010).

The community of Tanap village uses kunyit (*C. longa*) as medicine for gastritis, stomachaches, and flatulence. This plant contains curcumin and curcuminoid compounds and has several biological activities such as antibacterial, antioxidant, anti-inflammatory, antiviral, and antifungal (Yuan Shan & Iskandar, 2018). Alang-alang (*I. cylindrica*) to treat sprue and intestinal worms. This plant contains polyphenolic compounds and acts as an antioxidant to lower blood pressure (Dhianawaty & Ruslin, 2014). Jahe (*Z. officinale*) is used to remedy nausea, vomiting, and constipation. This plant contains gingerol and shogaol compounds (Srikandi *et al.*, 2020) and functions in treating heart disease, cancer, pain during menstruation, and digestive system disorders (Aryanta, 2019).

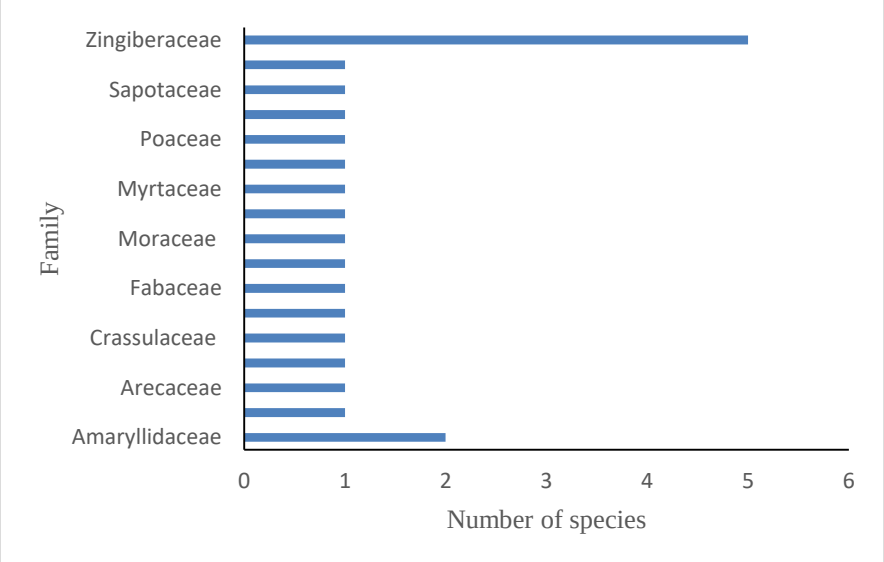

Figure 2. The plant families

Table 1. The Dayak Muara's TOGA plants used to cure digestive system disorders

No	Local name	Botanical name	Family	Life form	Indications
1	Alang-alang	*Imperata cylindrica*	Poaceae	Herb	Sprue, intestinal worm
2	Bangle, banglai	*Zingiber casumounar*	Zingiberaceae	Herb	Gastritis, stomachache
3	Bawang merah	*Allium cepa*	Amaryllidaceae	Herb	Diarrhea and gastritis
4	Bawang putih	*Allium sativum*	Amaryllidaceae	Herb	Gastritis, toothache
5	Cucor bebek, tumbuh daun, kecolap	*Bryophyllum pinnatum*	Crassulaceae	Herb	Toothache
6	Entawak, mentawak	*Artocarpus anisophyllus*	Moraceae	Tree	Stomachache
7	Entomue, temulawak	*Curcuma zanthorrhiza*	Zingiberaceae	Herb	Gastritis, flatulence, nausea and vomiting, intestinal worm
8	Jahe	*Zingiber officinale*	Zingiberaceae	Herb	Nausea and vomiting, constipation
9	Jamu biji, jambu biji	*Psidium guajava*	Myrtaceae	Shrub	Diarrhea, stomachache, gastritis, constipation, toothache
10	Koncur, kencur	*Kaempferia galanga*	Zingiberaceae	Herb	Gastritis, intestinal worm stomachache, nausea and vomiting
11	Kunyit	*Curcuma longa*	Zingiberaceae	Herb	Gastritis, stomachache, flatulence
12	Lidah buaya	*Aloe vera*	Xanthorrhoeaceae	Herb	Hemorrhoids
13	Mada daun, patah tulang	*Euphorbia tirucalli*	Euphorbiaceae	Shrub	Toothache
14	Mengkudu	*Morinda citriolia*	Rubiaceae	Shrub	Stomachache, gastritis and hemorrhoids
15	Nangka belanda, sirsak	*Annona muricata*	Annonaceae	Shrub	Diarrhea, stomachache and flatulence
16	Pegagan	*Centella asiatica*	Mackinlayaneae	Herb	Toothache and gastritis
17	Pepaya	*Carica papaya*	Caricaceae	Shrub	Constipation and gastritis
18	Pinang	*Areca catechu*	Arecaceae	Tree	Constipation
19	Pisang	*Musa acuminata*	Musaceae	Herb	Constipation and gastritis
20	Putri malu	*Mimosa pudica*	Fabaceae	Bush	Toothache
21	Sawo	*Manilkara zapota*	Sapotaceae	Shrub	Stomachache
22	Sereh, sirih	*Piper betle*	Piperaceae	Climber	Gastritis and toothache

Table 1. continued

No	Local name	Plant part	Processing mode	Administration mode	Utilization form	∑U	UV
1	Alang-alang	Leaves	Boiled	Drunk, gargled	Single	74	0,77
2	Bangle, banglai	Rhizome	Boiled	Patched, drunk	Mixed	27	0,28
3	Bawang merah	Tuber	Mashed	Patched, drunk	Single	20	0,21
4	Bawang putih	Tuber	Mashed	Patched, rubbed	Single	45	0,47
5	Cucor bebek, tumbuh daun, kecolap	Leaves	Mashed	Patched	Single	18	0,19
6	Entawak, mentawak	Fruit	Unprocessed	Ate	Single	22	0,23
7	Entomue, temulawak	Rhizome	Boiled	Drunk	Single	13	0,14
8	Jahe	Rhizome	Boiled	Drunk	Single	74	0,77
9	Jamu biji, jambu biji	Leaves, fruit, stem	Unprocessed, mashed, boiled	Patched, ate, drunk	Mixed	96	1
10	Koncur, kencur	Leaves, rhizome	Unprocessed, mashed, boiled	Patched, drunk	Mixed	45	0,47
11	Kunyit	Rhizome	Mashed, boiled, grated	Patched, drunk	Single, mixed	96	1
12	Lidah buaya	Leaves	Boiled	Drunk	Single	13	0,14
13	Mada daun, patah tulang	Twigs	Unprocessed	Patched	Mixed	6	0,06
14	Mengkudu	Leaves	Boiled	Drunk	Single	48	0,50
15	Nangka belanda, sirsak	Leaves	Boiled	Drunk	Single	10	0,10
16	Pegagan	Leaves	Boiled	Drunk, gargled	Single	31	0,32
17	Pepaya	Fruit	Unprocessed	Ate	Single	66	0,69
18	Pinang	Fruit	Boiled	Drunk	Single	5	0,05
19	Pisang	Fruit	Unprocessed	Ate	Single	56	0,58
20	Putri malu	Roots	Boiled	Gargled	Mixed	30	0,31
21	Sawo	Fruit	Unprocessed	Ate	Single, mixed	34	0,35
22	Sereh, sirih	Leaves	Boiled	Drunk, gargled	Mixed	5	0,05

The Dayak Muara in Tanap village use a very diverse of plant in handling digestive system disorders. Some TOGA plants used by Dayak Muara people are deliberately cultivated, and some grow naturally in the yard and are known to have medicinal properties. It is recorded that 17 families have been used, with the dominant families being Zingiberaceae and Amaryllidaceae (**Figure 2**). The knowledge of the Dayak Muara has similarities with the communities in Kapuas Hulu especially Dayak Iban (Yusro *et al.*, 2019) and Sanggau especially Bunut village (Ningsih *et al.*, 2020), where the Zingiberaceae and Amaryllidaceae families are the dominant families for the handling of digestive system disorders. The Zingiberaceae contains extractive compounds such as tannins, saponins, flavonoids, alkaloids, essential oils, and phenols (Irayanti & Putra, 2020). Plants from this family have many properties such as anti-bacterial (Irayanti & Putra, 2020), anti-virus, antioxidant, analgesic, and anti-cancer (Danciu *et al.*, 2015).

The Dayak Muara community in Tanap village dominantly uses leaves (36%) to treat digestive system disorders (**Figure 3A**). Mainly they process the plant with boiled (43%) (**Figure 3B**) and administer it with drunk method (44%) (**Figure 3C**). Most herbs are in a single form (67%) (**Figure 3D**). These results are in line with those used by the communities in Kapuas Hulu especially Dayak Iban (Yusro *et al.*, 2019) and Sanggau especially Bunut village (Ningsih *et al.*, 2020).

Leaves are abundant; therefore, it is easier for people to use them. In addition, the leaves are known to contain components of bioactive compounds that have many biological effects in medicine (Mariani *et al.*, 2016). Traditionally, people extract the bioactive components of plants for treatment by boiling them with water as a solvent. This method is considered the simplest and easiest way to do it. Patients can directly use the results of the extraction process by drinking. Drinking the potion is considered an effective way to treat diseases, especially those related to internal organs (Hidayat & Rachmadiyanto, 2017). The ingredients made by the Dayak Muara are generally still in the form of a single herb. It is an easy way in potion application because they no need to use other ingredients or plants as a mixture.

Informant consensus factor (ICF) and fidelity level (FL)

We found that the informants' agreement regarding medicinal plants for treating digestive system disorders ranged from 0.94 - 1. The highest value from the ICF indicated

an agreement between the informants regarding using certain types of medicinal plants to treat specific disease categories (Tangjitman *et al.*, 2015). Several disease categories with the highest ICF included mouth sores (1), nausea and vomiting (0,98), intestinal worms, diarrhea, abdominal pain, and constipation (0,97) (**Table 2**).

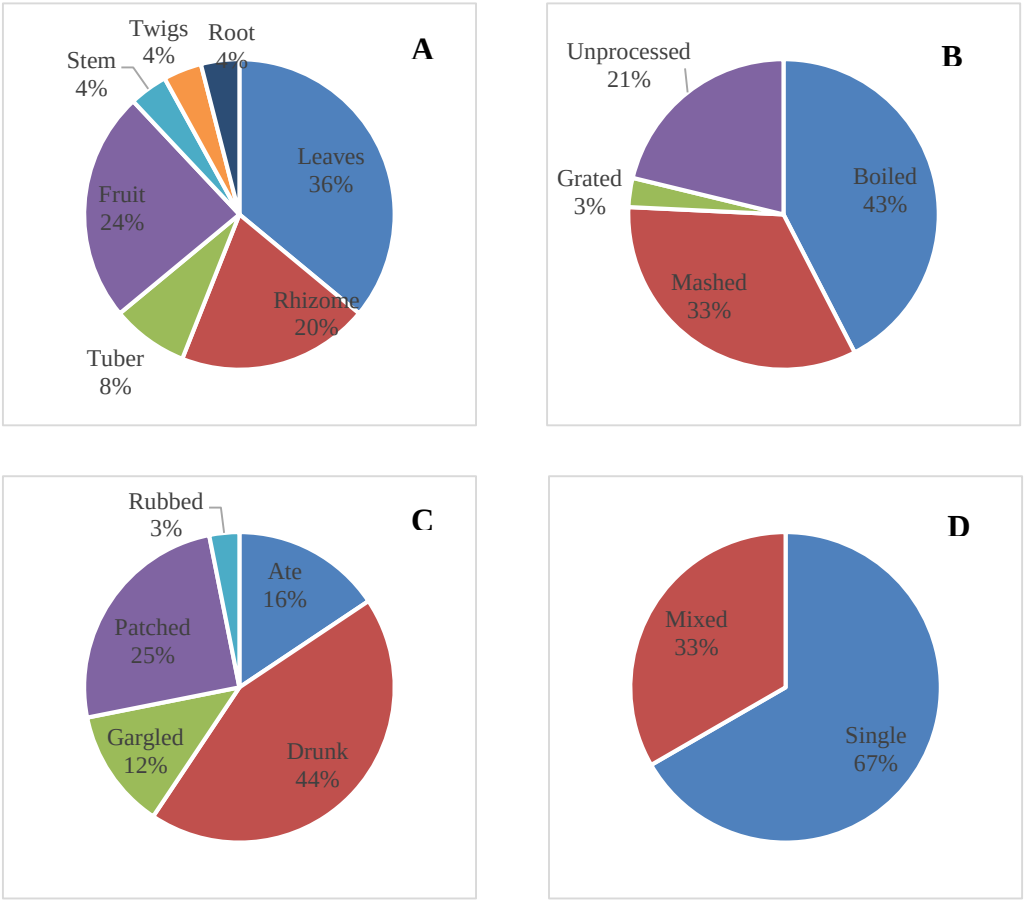

Figure 3. The Dayak Muara community utilization patterns of TOGA to treat digestive system disorders **(**A= plant part used; B= processing method; C= application method; D= remedies form)

The FL value indicates the most chosen plant to treat a specific disease category (Tangjitman *et al.*, 2015). Several plants that have the highest FL value (100) include cocor bebek (*Bryophyllum pinnatum*), patah tulang (*Euphorbia tirucalli*), and putri malu (*Mimosa pudica*) for the treatment of tooth decay. Entawak (*Artocarpus anisophyllus*) for abdominal pain, pinang (*Areca catechu*) for constipation, lidah buaya (*Aloe vera*) for hemorrhoids and sawo (*Manilkara zapota*) for stomachache.

Table 2. The Informant consensus factor (ICF) and fidelity level (FL) of TOGA's plants used to cure the digestive system disorders

No.	Disease Categories	ICF	*Fidelity level* (FL, %)
1	Intestinal worm	0,97	Kencur (30,42), temulawak (20), alang-alang (62,18)
2	Diarrhea	0,97	Jambu biji (30,61), nangka belanda (34,48), bawang merah (41,17)
3	Gastritis	0,96	Kunyit (65,89), pepaya (11,94), jambu biji (6,12), mengkudu (47,43), pisang (14,75), temulawak (32), banglai (50), serai (37,5), kencur (31,69), bawang merah (58,82), bawang putih (33,82), pegagan (52,54)
4	Nausea and vomiting	0,98	Jahe (56,36), kencur (27,46), temulawak (28)
5	Flatulence	0,94	Kunyit (17,05), temulawak (20), nangka belanda (31,03)
6	Toothache	0,96	Serai (62,5), bawang putih (66,17), cocor bebek (100), pegagan (47,45), jambu biji (5,44), patah tulang (100), putri malu (100)
7	Stomachache	0,97	Kunyit (17,05), kencur (30,42), jambu biji (51,7), nangka belanda (34,48), banglai (50), mengkudu (38,46), sawo (100), entawak (100)
8	Sprue	1	Alang-alang (37,83)
9	Constipation	0,97	Jahe (43,63), jambu biji (6,12), pinang (100), pepaya (88,05), pisang (85,24)
10	Hemorrhoids	0,96	Mengkudu (14,1), lidah buaya (100)

Cocor bebek (*B. pinnatum*) is traditionally used to treat toothache. Sylvia *et al.* (2020) stated that *B. pinnatum* contains flavonoid compounds, phenols, tannins, steroids, and antioxidants. The community uses the patah tulang plant (*E. tirucali*) as a toothache medicine. This plant has bioactive components such as phenols and tannins and acts as an antioxidant (Manongko *et al.*, 2020).

The Dayak Muara community in Tanap village uses putri malu (*M. pudica*) to treat toothache. This plant contains bioactive compounds in flavonoids, alkaloids, terpenoids, saponins, coumarins and is efficacious as an antioxidant (Wulan *et al.*, 2019). Entawak (*A. anisophyllus*) is used by the community to treat abdominal pain. This plant contains alkaloids, flavonoids, polyphenols, terpenoids, steroids and has antibacterial and antioxidant activity (Manongko *et al.*, 2020).

The community traditionally uses pinang (*A. catechu*) as a constipation remedy. This plant has bioactive components such as flavonoids, alkaloids, monoterpenes, tannins, quinones, phenols, and sesquiterpenes. This plant is reported to have anti-inflammatory properties (Ardiansyah *et al.*, 2014). Dayak Muara uses lidah buaya (*A.*

vera) to cure hemorrhoids. This plant contains flavonoid compounds and acts as an antioxidant (Riyanto & Wariyah, 2012).

M. zapota or sawo reported possessed biological properties such as antidiabetic, antimicrobial, antioxidant, antihyperglycemic (Islam *et al.*, 2021). The plants used to treat digestive system disorders with high of ICF and FL values need to be explored further, especially related to bioactive components that play an essential role in treating digestive system disorders (Tangjitman *et al.*, 2015).

CONCLUSION

The Dayak Muara community in Tanap village uses 22 species of TOGA to handling digestive system disorders. Zingiberaceae and Amaryllidaceae are the most widely used plant families. Several plants with high use value include guava (*P. guajava*), turmeric (*C. longa*), reeds (*I. cylindrica*), and ginger (*Z. officinale*). Species that had the highest FL value (100%) included cocor bebek (*B. pinnatum*), patah tulang (*E. tirucalli*), and putri malu (*M. pudica*) for the treatment of tooth decay, and entawak (*A. anisophyluss*) for abdominal pain. Pinang (*A. cathecu*) for constipation, aloe vera (*A. vera*) for hemorrhoids, and sawo (*M. zapota*) for stomachache. The use of TOGA by the Muara Dayak tribe can add to the knowledge base of medicinal plants in West Kalimantan and become a starting point for developing and socializing it to the wider community.

ACKNOWLEDGMENT

We acknowledge the Faculty of Forestry of Tanjungpura University which has funded this research, and to all parties such as the Village Head and his staff and all the people who have helped carry out this research activity.

REFERENCES

Ardiana, N., Mariani, Y., & Tavita, G. E. (2019). Studi pemanfaatan tumbuhan obat berpotensi sebagai anti-inflamasi di Desa Teluk Batang Utara Kecamatan Teluk Batang Kabupaten Kayong Utara. *Jurnal Hutan Lestari*, *7*(3), 1111–1129. https://doi.org/10.26418/jhl.v7i3.37266

Ardiansyah, S. A., Hidayat, S. D., & Simbolon, N. S. (2014). Aktivitas anti radang ekstrak etanol biji pinang (*Areca catechu* L.) pada tikus putih jantan. *Indonesian Journal of Pharmaceutical Science and Technology*, *III*(1), 16–22. https://ejournal.stfi.ac.id/index.php/jstfi/article/view/32

Ariani, S. R. D., Susilowati, E., Susanti VH, E., & Setiyani, S. (2010). Activity test of guava (*Psidium guajava* L.) leaf methanol extract as contraception antifertility to white mice (*Rattus norvegicus*). *Indonesian Journal of Chemistry*, *8*(2), 264–270. https://doi.org/10.22146/ijc.21632

Aryanta, I. W. R. (2019). Manfaat jahe untuk kesehatan. *Widya Kesehatan*, *1*(2), 39–43. https://doi.org/10.32795/widyakesehatan.v1i2.463

Danciu, C., Vlaia, L., Fetea, F., Hancianu, M., Coricovac, D. E., Ciurlea, S. A., Şoica, C. M., Marincu, I., Vlaia, V., Dehelean, C. A., & Trandafirescu, C. (2015). Evaluation of phenolic profile, antioxidant and anticancer potential of two main representants of Zingiberaceae family against B164A5 murine melanoma cells. *Biological Research*, *48*, 1–9. https://doi.org/10.1186/0717-6287-48-1

Dhianawaty, D., & Ruslin. (2014). Kandungan total polifenol dan aktivitas antioksidan dari ekstrak metanol akar *Imperata cylindrica* (L) Beauv. *Majalah Kedokteran Baandung*, *47*(1), 60–64. https://doi.org/10.15395/mkb.v47n1.398

Hidayat, S. and Rachmadiyanto, A. N. (2017). Utilization of alang-alang (I*mperata cylindrica* (L.) Raeusch.) as traditional medicine in Indonesian Archipelago. *The 1st SATREPS Conference*, *1*, 82–89. Retrieve from https://publikasikr.lipi.go.id/index.php/satreps/article/view/197.

Islam, S., Alam, M. B., Ann, H. J., Park, J. H., Lee, S. H., & Kim, S. (2021). Metabolite profiling of *Manilkara zapota* leaves by high-resolution mass spectrometry coupled with ESi and APCl and in vitro antioxidant activity, α-glucosidase, and elastase inhibition assays. *International Journal of Molecular Sciences*, *22*, 132. https://doi.org/ 10.3390/ijms22010132

Irayanti, A., & Putra, A. . G. R. Y. (2020). A narrative review of Zingiberaceae family as antibacterial agent for traditional medication based on Balinese local wisdom. *Journal of Pharmaceutical Science and Application*, *2*(2), 66. https://doi.org/10.24843/jpsa.2020.v02.i02.p04

Liliyanti, M., Mariani, Y., & Yusro, F. (2021). Pemanfaatan tumbuhan obat untuk perawatan rambut oleh Suku Dayak Kantuk di Desa Seluan Kabupaten Kapuas Hulu Kalimantan Barat. *Bioma : Jurnal Ilmiah Biologi*, *10*(2), 228–247. https://doi.org/10.26877/bioma.v10i2.9019

Maharani, S. A., Tavita, G. E., Mariani, Y., & Yusro, F. (2021). Keanekaragaman jenis tumbuhan obat yang dimanfaatkan oleh pengobat tradisional (Battra) Suku Dayak Mahap dan Suku Melayu di Desa Tembesuk Kabupaten Sekadau. *Serambi Engineering*, *VI*(4), 2256–2269. https://doi.org/10.32672/jse.v6i4.3469

Manongko, P. S., Sangi, M. S., & Momuat, L. I. (2020). Uji senyawa fitokimia dan aktivitas antioksidan tanaman patah tulang (*Euphorbia tirucalli* L.). *Jurnal MIPA*,

9(2), 64. https://doi.org/10.35799/jmuo.9.2.2020.28725

Mariani, Y, Yusro, F., Konishi, Y., Taguchi, T., & Tominaga, A. (2016). Regulatory effects of five medicinal plants used by Dayak Uud Danum in West Kalimantan Indonesia on the delayed-type hypersesensitivity and the inflammation of human colon epithelial cells. *Kuroshio Science*, *10–1*(December), 59–71. http://www.kochi-u.ac.jp/kuroshio/f01a-kuroshio-science-e.html

Mariani, Y., Wardenaar, E., & Yusro, F. (2021). Tumbuhan berkhasiat obat di Desa Tanap Kabupaten Sanggau dan pemanfaatannya untuk perawatan bayi dan perempuan pasca persalinan. *Biosains*, *7*(2), 92–102. https://doi.org/10.24114/jbio.v5i2.13984%0AISSN

Ningsih, K., Mariani, Y., Arbiastutie, Y., & Yusro, F. (2020). Studi pemanfaatan tumbuhan obat berpotensi mengobati pada penyakit sistem pencernaan di Kelurahan Bunut Kecamatan Kapuas Kabupaten Sanggau. *Jurnal Hutan Lestari*, *8*(2), 217–228.

Pradita, S., Mariani, Y., Wardenaar, E., & Yusro, F. (2021). Pemanfaatan tumbuhan obat oleh Suku Dayak Paus dan Melayu untuk perawatan ibu dan anak pasca persalinan di Desa Pengadang Kabupaten Sanggau Kalimantan Barat. *Biodidaktika: Jurnal Biologi Dan Pembelajarannya*, *16*(1), 93–110. http://dx.doi.org/10.30870/biodidaktika.v16i1.10805

Rania, Yusro, F., Wardenaar, E., & Mariani, Y. (2019). Studi pemanfaatan tumbuhan obat oleh pengobat tradisional untuk mengatasi masalah kewanitaan di Desa Masbangun Kecamatan Teluk Batang Kabupaten Kayong Utara. *Jurnal Borneo Akcaya*, *5*(2), 84–94.

Riconadi, R., Arbiastutie, Y., Mariani, Y., Sisillia, L., & Yusro, F. (2020). Studi pemanfaatan tumbuhan obat sebagai tonik oleh pengobat tradisional di Desa Karya Bakti Kecamatan Sungai Betung Kabupaten Bengkayang. *Jurnal Hutan Lestari*, *8*(3), 640–652. https://doi.org/10.26418/jhl.v8i3.42734

Riyanto, & Wariyah, C. (2012). Stabilitas sifat antioksidatif lidah buaya (*Aloe vera* var. Chinensis) selama pengolahan minuman lidah buaya. *Agritech: Jurnal Fakultas Teknologi Pertanian UGM*, *32*(1), 73–78. https://doi.org/10.22146/agritech.9659

Sari, R. P., Yusro, F., & Mariani, Y. (2021). Medicinal plants used by Dayak Kanayatn traditional healers in Tonang Village Sengah Temila District Landak Regency. *Jurnal Biologi Tropis*, *21*(2), 324. https://doi.org/10.29303/jbt.v21i2.2557

Simbolon, R. A., Halimatussakdiah, & Amna, U. (2021). Uji kandungan senyawa metabolit sekunder pada ekstrak daun jambu biji. *Quimica: Jurnal Kimia Sains Dan Terapan*, *3*(1), 12–18. https://doi.org/10.33059/jq.v3i1.3493

Srikandi, S., Humaeroh, M., & Sutamihardja, R. (2020). Kandungan gingerol dan shogaol dari ekstrak jahe merah (*Zingiber officinale* Roscoe) dengan metode maserasi bertingkat. *Al-Kimiya*, *7*(2), 75–81. https://doi.org/10.15575/ak.v7i2.6545

Sylvia, D., Fatimah, & Pratiwi, D. (2020). Perbandingan aktivitas antioksidan beberapa

ekstrak daun cocor bebek (*Kalanchoe pinnata*) dengan menggunakan metode DPPH. *Jurnal Ilmiah Farmako Bahari*, *11*(1), 21–31. https://doi.org/10.52434/jfb.v11i1.718

Tangjitman, K., Wongsawad, C., Kamwong, K., Sukkho, T., & Trisonthi, C. (2015). Ethnomedicinal plants used for digestive system disorders by the Karen of Northern Thailand. *Journal of Ethnobiology and Ethnomedicine*, *11*(27), 1–13. https://doi.org/10.1186/s13002-015-0011-9

Wulan, Yudistira, A., & Rotinsulu, H. (2019). Uji aktivitas antioksidan dari ekstrak etanol daun *Mimosa pudica* Linn. menggunakan metode DPPH. *Pharmacon*, *8*(1), 106–113. https://doi.org/10.35799/pha.8.2019.29243

Yuan Shan, C., & Iskandar, Y. (2018). Studi kandungan kimia dan aktivitas farmakologi tanaman kunyit (*Curcuma longa* L.). *Farmaka*, *16*(2), 547–555. https://doi.org/10.24198/jf.v16i2.17610.g8793

Yusro, F., Mariani, Y., Diba, F., & Ohtani, K. (2014). Inventory of medicinal plants for fever used by four Dayak Sub Ethnic in West Kalimantan, Indonesia. *Kuroshio Science*, *8*(1), 33–38. https://pdfs.semanticscholar.org/85de/a1079c6fb510e349c126eed288aeb485162b.pdf?_ga=2.237937280.1828213471.1561974200-652424871.1561974200

Yusro, F., Mariani, Y., & Wardenaar, E. (2019). Pemanfaatan tumbuhan obat untuk mengatasi gangguan sistem pencernaan oleh Suku Dayak Iban: Studi kasus di Kabupaten Kapuas Hulu Kalimantan Barat. *Jurnal Borneo Akcaya*, *5*(1), 58–72.

Yusro, F., Mariani, Y., & Wardenaar, E. (2021). The utilization of medicinal plants to overcome gastric disorders by The Dayak Muara Tribe in Kuala Dua Village, Sanggau Regency. *Jurnal Biologi Tropis*, *21*(2), 416. https://doi.org/10.29303/jbt.v21i2.2638

Yusro, F., Pranaka, R., Budiastutik, I., & Mariani, Y. (2020). Diversity of medicinal plants used by traditional healers of Dayak Desa Tribe in the Villages of Kebong and Merpak, Sintang Regency. *Jurnal Biologi Tropis*, *20*(3), 329 – 339. https://doi.org/10.29303/jbt.v20i3.2010