

Medicinal plants used for menstrual regulators and pain relievers in Tumiang Village, West Kalimantan, Indonesia

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Abstract. Panjaitan RGP, Khairunnisa, Titin, Akbarini D. 2024. Medicinal plants used for menstrual regulators and pain relievers in Tumiang Village, West Kalimantan, Indonesia. *Biodiversitas* 25: 4796-4805. The use of medicinal plants for traditional treatment is a common practice in various rural areas in Indonesia. Therefore, this study aims to create an inventory of medicinal plants used as menstrual regulators and pain relievers by the community in Tumiang Village, Samalantan Sub-district, Bengkayang District, West Kalimantan, Indonesia. This study employs a qualitative method with triangulation techniques, and data collection was conducted with interviews, observations, and documentation by involving 11 informants. The results showed that a total of 15 plants were used as menstrual regulators and pain relievers by the community of Tumiang Village. These included *korongan* (*Ricinus communis*), *marampayo* (*Croton hirtus*), *kakompo* (*Limnophila rugosa*), *sarat saribu* (*Lygodium microphyllum*), *antidur* (*Phyllanthus urinaria*), *ganda rusa* (*Phaleria macrocarpa*), *ahiak* (*Zingiber officinale*), *cakur* (*Kaempferia galanga*), *unyit* (*Curcuma longa*), *tamulawak* (*Curcuma zanthorrhiza*), *matsoe* (*Perilla frutescens*), *karaokoe* (*Piper betle*), *kumis kucing* (*Orthosiphon aristatus*), *asam jawa* (*Tamarindus indica*), and *rosella* (*Hibiscus sabdariffa*). In addition, 2 plants, namely *pinang* (*Areca catechu*) and *saring kuyang* (*Zingiber purpureum*), were specifically used only as menstrual pain relievers. The results of the study highlight the unique role of the Zingiberaceae family is the most commonly utilized, with leaves being the most frequently used plant part, and the most prevalent processing method being boiling. This research underscores the significance of these plants in the health of the local community and their potential for further scientific exploration.

Keywords: Herbs, inventory, traditional medicine, triangulation method, Zingiberaceae

INTRODUCTION

Menstruation is a natural phenomenon that involves the discharge of blood from the uterus through the vagina, occurring at roughly regular monthly intervals during a woman's reproductive years (Rafique and Al-Sheikh 2018). Menstrual disorders are prevalent conditions, affecting over 50% of women in several countries around the world (Wijayanti 2022). These disorders comprise several conditions, including oligomenorrhea, polymenorrhea, hypermenorrhea, hypomenorrhea, amenorrhea, and dysmenorrhea (Indriyanti et al. 2019). Oligomenorrhea is characterized by irregular menstrual cycles, such as prolonged cycles lasting more than 35 days (Gimunová et al. 2022). Meanwhile, polymenorrhea comprises short menstrual cycles of less than 21 days or more than once a month (Rafique and Al-Sheikh 2018). Several studies have shown that hypermenorrhea typically occurs when the duration of menstruation exceeds 7 days, with a blood loss of more than 80 mL. At the same time, hypomenorrhea is characterized by a shorter duration with minimal blood loss (Rafique and Al-Sheikh 2018). Amenorrhea is defined as the absence of menstruation during the reproductive years (Newbery et al. 2019), while dysmenorrhea is considered to be cyclic uterine pain occurring before or during menstruation (Bernardi et al. 2017). In addition, Safitri and

Gustina (2023) and Ayamolowo et al. (2024) have shown that pain in dysmenorrhea is typically caused by hormonal imbalance, particularly in progesterone, leading to lower abdominal cramps spreading to the lower back.

According to previous studies, amenorrhea and dysmenorrhea are the most prevalent menstrual disorders experienced by women (Ayamolowo et al. 2024). These conditions can be managed through different approaches, including medical interventions or the consumption of medicinal plants. Izzaty et al. (2017) also stated that conventional hormonal treatment or minor surgery can be used to manage amenorrhea when the blood membrane is closed. Meanwhile, analgesic drugs such as aspirin, mefenamic acid, paracetamol, caffeine, and feminax have been proven to be effective in alleviating dysmenorrheal symptoms (Rustam 2015). Medicinal plants, including turmeric and tamarind, are also effective for dysmenorrhea, primarily due to their active agent content with anti-inflammatory, analgesic, and antioxidant properties (Safitri and Gustina 2023). Several reports have shown the potency of turmeric and tamarind in treating amenorrhea (Indrayangingsih et al. 2015).

In Indonesia, the use of plants as medicines is a longstanding tradition that has been passed down through generations (Panjaitan et al. 2020; 2021). In addition, various tribes in the country possess diverse traditional medicines made from natural ingredients. For example, the

Buton Tribe uses pounded turmeric rhizomes (*Curcuma domestica* Valetton) and tamarind juice (*Tamarindus indica* L.) (Indrayangingsih et al. 2015), while the Lampung Tribe around the Way Kambas National Park uses *dadap* leaves (*Erythrina variegata* L.) (Yudiyanto et al. 2022). The Sasak Tribe in Kediri, Sekotong Middle, Tampak Siring, Santong, and Labuhan Haji Villages are known for the use of rhizome *temu ireng* (*Curcuma aeruginosa* Roxb.) (Damayanti et al. 2021), while the Baduy Tribe in Kanekes Village uses aren roots (*Arenca pinnata* (Wurmb) Merr.) (Kameswari 2023) as menstrual regulators. Several studies have also reported the use of papaya fruit (*Carica papaya* L.) and *sereh* stem (*Cymbopogon citratus* (DC.) Stapf) by the Lampung Tribe around the Way Kambas National Park (Yudiyanto et al. 2022), turmeric (*C. domestica*) by the Malay tribe in Batu Berdaun Village (Qasrin et al. 2020), and cinnamon skin (*Cinnamomum burmanni* (Nees & T.Nees) Blume) by the Mandailing tribe in Aek Guo Village (Rambey et al. 2024) for alleviating menstrual pain.

The community in Tumiang Village, Samalantan Sub-district, Bengkayang District, continues to rely on their tradition of using local plants as medicinal remedies. In addition to being a cultural practice, the limited healthcare facilities in the village serve as a primary factor driving the use of traditional medicine. Furthermore, Tumiang Village is surrounded by vast forests and expansive natural landscapes. Despite the widespread use of medicinal plants by the rural community, information regarding their usage has yet to be well-documented (Wahyuningsih et al. 2022). The lack of written documentation, cultural changes, modernization (Yudiyanto et al. 2022), limited interest among the younger generation, deforestation, and environmental degradation may contribute to a decline in knowledge regarding these medicinal plants (Panjaitan et al. 2024). This shows that there is a need to conduct an inventory process to understand the diversity of traditional medicinal plants and their use. This study hypothesizes that the community in Tumiang Village continues to utilize traditional medicinal plants due to their easy availability and the simplicity of their processing methods. Therefore, this study aims to identify the species, parts, and processing methods of medicinal plants used as menstrual regulators and pain relievers in Tumiang Village,

Samalantan Sub-district, Bengkayang District, West Kalimantan, Indonesia.

MATERIALS AND METHODS

Study area

Tumiang Village is situated in the Samalantan Sub-district of Bengkayang District, West Kalimantan, Indonesia (Figure 1). Based on data from the Badan Pusat Statistik Kabupaten Bengkayang (2024), it is known that the area of Tumiang Village is 27,90 square kilometers. The distance from Tumiang Village to the sub-district capital of Samalantan is 13 kilometers. Pasti Jaya Village borders the village to the north, Ansolok Village to the east, Caong Village to the south, and Babane Village to the west. Tumiang Village is composed of two hamlets: Pasrah and Sasak. The population of Tumiang Village in 2023 was 2,589 individuals, consisting of 1,383 males and 1,206 females. The population residing in Tumiang Village includes individuals of Dayak, Malay, Javanese, Chinese, Bugis, and Batak ethnicities. The Dayak ethnic group is the primary focus in the exploration of information regarding the utilization of medicinal plants in Tumiang Village.

Procedures

This study employs a qualitative research method utilizing triangulation, which combines techniques of interviews, observations, and documentation. Informant selection was carried out using purposive sampling, based on certain considerations, specifically the residents of Tumiang Village who possess knowledge and practices related to the use of traditional medicinal plants; a total of 11 informants were selected, including 1 midwife and 10 traditional healers. All informants are from the Dayak ethnic group and reside in Tumiang Village. The age range of the informants varies from 31 to 59 years, with a diverse mix of both male and female participants. This study adhered to ethical guidelines, and all informants provided informed consent to participate after being fully briefed on the study's objectives, methods, benefits, potential risks, and their right to withdraw at any time without penalty or consequence.

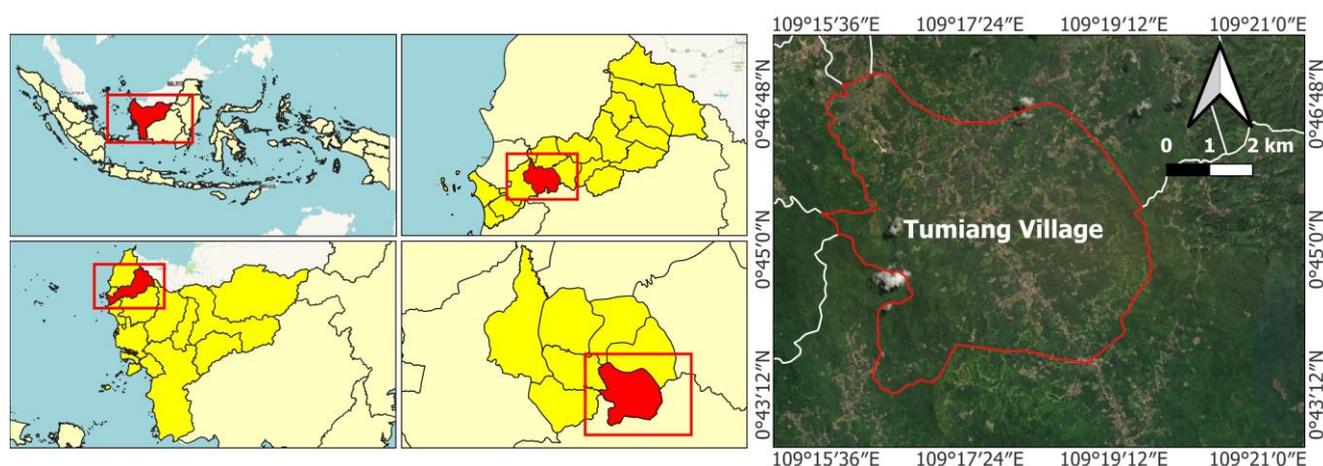


Figure 1. Location study in Tumiang Village, Samalantan Sub-district, Bengkayang District, West Kalimantan, Indonesia

This study focuses solely on the inventory of medicinal plants used for menstrual pain relief and alleviation and does not explore other potential uses of these plant species. Field surveys were conducted over a specified period, with a total research duration of two months, during which surveys were conducted twice per month. During the surveys, interviews with informants were held at previously agreed-upon locations, while observations were carried out at sites relevant to the use of the medicinal plants. The interview phase involved posing questions related to the types of plants, the parts used, and the processing methods for medicinal plants intended to alleviate menstrual pain and facilitate menstruation. The observation phase included a direct examination of medicinal plants used for menstrual pain relief and facilitation, as well as the collection of plant samples for herbarium preparation. The documentation phase served to complement the interview and observation methods by capturing photographs throughout the research process, from interviews to herbarium preparation.

Plant sampling was conducted in the yards, gardens, and forests surrounding Tumiang Village. The process of preparing dry herbarium specimens followed the guidelines outlined by Ristoja (2015) wherein plant specimens were placed on newspaper with the arrangement reflecting the entire plant in its natural condition. The specimens were then stacked with cardboard between each layer (a maximum of 10 stacks), clamped and tied with a press, and dried in the sun. Once dried, the specimens were transferred to herbarium paper and affixed using acid-free plastic tape. Fragile parts such as flowers and seeds were stored in acid-free paper envelopes and attached to the top-right corner of the herbarium paper. A label was affixed to the bottom-left corner using acid-free glue. The completed herbarium specimens were subsequently identified at the Biology Laboratory, Faculty of Mathematics and Natural Sciences, Universitas Tanjungpura, Indonesia, under registration numbers 043/A/LB/FMIPA/UNTAN/2022, 045/A/LB/FMIPA/UNTAN/2022, and 058/A/LB/FMIPA/UNTAN/2023. The plant names were scientifically verified through Plants of the World Online to ensure accuracy with accepted scientific nomenclature.

Data analysis

The data analysis technique employed in this study is qualitative descriptive analysis. The data obtained from informants were verified through a cross-checking process with other informants to ensure the consistency and accuracy of the information. After verification, the data were summarized and synthesized to produce an in-depth descriptive analysis. Information obtained from the informants regarding plant types, the parts used, and the processing methods for medicinal plants is presented in narrative form, accompanied by images and tables that display the results of the interviews. Species identification was conducted at the Biology Laboratory, Faculty of Mathematics and Natural Sciences, Universitas Tanjungpura, Indonesia.

RESULTS AND DISCUSSION

Medicinal plants used for alleviating menstrual pain and facilitating menstruation

This study aimed to document the knowledge of the community in Tumiang Village, Samalantan Sub-district, regarding the use of medicinal plants as menstrual regulators and pain relievers. Based on interview data, a total of 17 plant species were obtained, consisting of 15 plants that were often used as menstrual regulators and pain relievers, namely *karaoke* (*Piper betle* L.), *korongan* (*Ricinus communis* L.), *sarat saribu* (*Lygodium microphyllum* (Cav) R.Br.), *marampayo* (*Croton hirtus* L'Hér.), *kakompo* (*Linnophila rugosa* (Lour.) Merr.), *antidur* (*Phyllanthus urinaria* L.), *asam jawa* (*T. indica*), *kumis kucing* (*Orthosiphon aristatus* (Blume) Miq.), *matsoe* (*Perilla frutescens* L. Britton), *ganda rusa* (*Phaleria macrocarpa* (Sceff) Boerl.), *rosella* (*Hibiscus sabdariffa* L.), *ahiak* (*Zingiber officinale* Roscoe), *cakur* (*Kaempferia galanga* L.), *tamulawak* (*Curcuma zanthorrhiza* Roxb.) and *unyit* (*Curcuma longa* L.). In comparison, 2 plants were specifically used as pain relievers, namely *pinang* (*Areca catechu* L.) and *saring kuyang* (*Zingiber purpureum* Roscoe) (Table 1, Figure 2). These plants belonged to various families with 6 species categorized as monocots (i.e., family Aracaceae and Zingiberaceae), 10 species as dicots (i.e., family Euphorbiaceae, Fabaceae, Lamiaceae, Malvaceae, Phyllanthaceae, Piperaceae, and Thymelaceae), and 1 species as a fern (i.e., family Schizaeaceae). The most commonly used species belonged to the Zingiberaceae family (Figure 4). In addition, the rhizomes of plants in the Zingiberaceae family contained alkaloids, flavonoids, and terpenoids (Syamsuri and Alang 2021). The family also exhibited antioxidant, anti-inflammatory, antimicrobial, anticancer, and antiemetic activities (Ballester et al. 2023).

Based on the results, plant parts used by the community of Tumiang Village included seeds, roots, leaves, stems, rhizomes, fruits, and flowers, with leaves being the most commonly used (Figure 4). This result was consistent with Panjaitan et al. (2024), where leaves were also considered the most frequently used part due to the presence of various beneficial compounds, including phenols, tannins, saponins, alkaloids, and flavonoids, which are beneficial as medicinal components. The results showed that the most common processing method was boiling, followed by the consumption of boiled water (Figure 3). Similar results were also obtained by Wahyuningsih et al. (2022) that boiling was a widely used processing method due to its simplicity (Santoso et al. 2019).

During the field sample collection, it was observed that the habitat of the plants *ahiak* (*Z. officinale*), *cakur* (*K. galanga*), *unyit* (*C. longa*), *tamulawak* (*C. zanthorrhiza*), *saring kuyang* (*Z. purpureum*), *karaoke* (*P. betle*), *kumis kucing* (*O. aristatus*), *korongan* (*R. communis*), and *rosella* (*H. sabdariffa*) were the yards of local residents; plants *ganda rusa* (*P. macrocarpa*) and *marampayo* (*C. hirtus*) were found in the forest; the plants *sarat saribu* (*L. microphyllum*) and *antidur* (*P. urinaria*) could be found in community fields; the plants *kakompo* (*L. rugosa*) and *matsoe* (*P. frutescens*) were found in both community

plantations and along the roads of Tumiang Village. All of these plants have a wide distribution due to the vast natural land space of Tumiang Village, making them easily accessible.

Table 1. Medicinal plant species as menstrual regulators and pain relievers in Tumiang Village, Samalantan Sub-district, Bengkayang District, West Kalimantan, Indonesia

Plant name	Family	Part used	Processing Method	Benefit
<i>Pinang</i> (<i>Areca catechu</i> L.)	Aracaceae	Seeds	Half a <i>pinang</i> seed is pounded or crushed with a pestle, and the crushed seed is wrapped in 1 clean	Menstrual pain relievers (dismenore)
<i>Karaoke</i> (<i>Piper betle</i> L.)	Piperaceae	Leaves	karaoke leaf. The <i>pinang</i> seed wrapped in the karaoke leaf is ready to be chewed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Korongan</i> (<i>Ricinus communis</i> L.)	Euphorbiaceae	Leaves and roots	Five <i>korongan</i> and <i>sarat saribu</i> leaves and 2 roots are cleaned and cut into small pieces. Furthermore, these leaves and roots are dried in the sun. The	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Sarat saribu</i> (<i>Lygodium microphyllum</i> (Cav) R.Br.)	Schizaeaceae		dried ingredients are boiled until the water turns slightly yellowish, then strained and poured into a glass. The concoction water is ready to be consumed.	
<i>Marampayo</i> (<i>Croton hirtus</i> L'Hér.)	Euphorbiaceae	Leaves, stems, and roots	Ten <i>marampayo</i> , <i>kakompo</i> , and <i>antidur</i> leaves, one stem, and two roots are cleaned and finely chopped.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Kakompo</i> (<i>Limnophila rugosa</i> (Lour.) Merr.)	Lamiaceae		Then, all the ingredients are dried in the sun. The dried ingredients are boiled until the water turns dark green, then strained and poured into a glass. The concoction water is ready to be consumed.	
<i>Antidur</i> (<i>Phyllanthus urinaria</i> L.)	Phyllanthaceae			
<i>Asam Jawa</i> (<i>Tamarindus indica</i> L.)	Fabaceae	Fruits	Two <i>asam jawa</i> fruits and 4 <i>unyit</i> rhizomes are cleaned and thinly sliced. These ingredients are then boiled until the water turns orange-yellow, then strained and poured into a glass. The concoction water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Unyit</i> (<i>Curcuma longa</i> L.)	Zingiberaceae	Rhizomes		
<i>Kumis kucing</i> (<i>Orthosiphon aristatus</i> (Blume) Miq.)	Lamiaceae	Leaves and flowers	Ten <i>kumis kucing</i> leaves and 2 flowers are cleaned. These ingredients are boiled until the water turns yellow-brown, then strained and poured into a glass. The concoction water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Matsoe</i> (<i>Perilla frutescens</i> L. Britton)	Lamiaceae	Leaves and Roots	Fifteen <i>matsoe</i> leaves, 3 <i>matsoe</i> roots, and 2 <i>ganda rusa</i> roots are cleaned and finely chopped.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Ganda rusa</i> (<i>Phaleria macrocarpa</i> (Sceff) Boerl.)	Thymelaceae	Roots	Furthermore, these leaves and roots are dried in the sun. The dried ingredients are boiled until the water turns slightly brown, then strained and poured into a glass. The concoction water is ready to be consumed.	
<i>Rosella</i> (<i>Hibiscus sabdariffa</i> L.)	Malvaceae	Fruits	Seven <i>rosella</i> flowers are cleaned. The ingredients are boiled until the water turns reddish, then strained and poured into a glass. The boiled water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Ahiak</i> (<i>Zingiber officinale</i> Roscoe)	Zingiberaceae	Rhizomes	Six <i>ahiak</i> rhizomes are cleaned and crushed. The ingredients are boiled until the water becomes slightly cloudy, then strained and poured into a glass. The boiled water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Cakur</i> (<i>Kaempferia galanga</i> L.)	Zingiberaceae	Rhizomes	Seven <i>cakur rhizomes</i> are cleaned and thinly sliced. The ingredients are boiled until the water becomes slightly cloudy, then strained and poured into a glass. The boiled water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)
<i>Saring kuyang</i> (<i>Zingiber purpureum</i> Roscoe)	Zingiberaceae	Rhizomes	Five <i>saring kuyang</i> rhizomes are cleaned and thinly sliced. These ingredients are boiled until the water turns slightly yellowish, then strained and poured into a glass. The boiled water is ready to be consumed.	Menstrual pain relievers (dismenore)
<i>Tamulawak</i> (<i>Curcuma zanthorrhiza</i> Roxb.)	Zingiberaceae	Rhizomes	Four <i>tamulawak</i> rhizomes are cleaned and thinly sliced. These ingredients are boiled until the water becomes slightly cloudy, then strained and poured into a glass. The boiled water is ready to be consumed.	Menstrual regulators and pain relievers (amenore and dismenore)

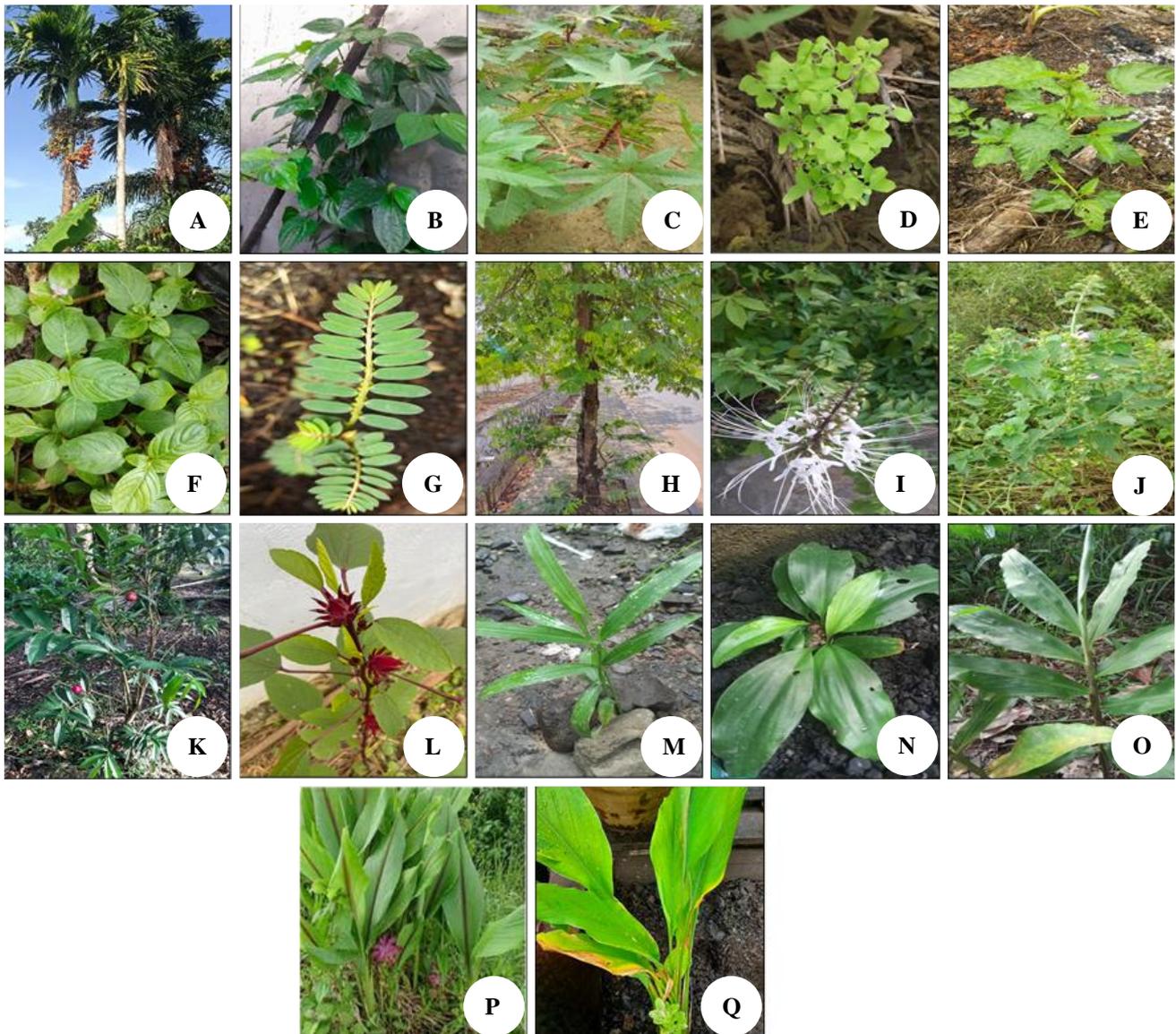
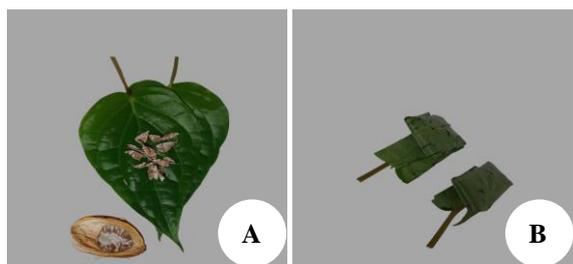


Figure 2. Plants used as menstrual regulators and pain relievers in Tumiang Village, Bengkayang District, West Kalimantan, Indonesia, such as A. *Pinang* (*Areca catechu*); B. *Karaoke* (*Piper betle*); C. *Korongon* (*Ricinus communis*); D. *Sarat Saribu* (*Lygodium microphyllum*); E. *Marampayo* (*Croton hirtus*); F. *Kakompo* (*Linnophila rugosa*); G. *Antidur* (*Phyllanthus urinaria*); H. *Asam Jawa* (*Tamarindus indica*); I. *Kumis Kucing* (*Orthosiphon aristatus*); J. *Matsoe* (*Perilla frutescens*); K. *Ganda Rusa* (*Phaleria macrocarpa*); L. *Rosella* (*Hibiscus sabdariffa*); M. *Ahiak* (*Zingiber officinale*); N. *Cakur* (*Kaempferia galanga*); O. *Saring Kuyang* (*Zingiber purpureum*); P. *Tamulawak* (*Curcuma zanthorrhiza*); Q. *Unyit* (*Curcuma longa*)

Phytochemical content in plants

Supiandi et al. (2021) revealed that the community in Sanggau District used pinang (*A. catechu*) to treat vaginal discharge. In addition, Pradita et al. (2021) reported that its fruit was used by the community in Pengadang Village, Sekayam Sub-district, to heal baby's umbilical wounds and provide comfort to mothers and children after childbirth as a head patch. This plant species has been reported to contain several beneficial compounds, including polyphenols, flavonoids, alkaloids, and tannins (Ansari et al. 2021). Furthermore, it exhibits a fascinating array of pharmacological activities, serving as an antioxidant, antihypertensive, antidepressant, antifungal, antibacterial, antimalarial, anti-HIV, antiallergic, and anti-inflammatory agent (Ansari et al. 2021).

Supiandi et al. (2021) reported the traditional use of *karaoke* (*P. betle*) by the community in Sanggau District to treat blurred eyes. This practice, also observed in Nobal Village, Sintang District, where it was used to treat stomach pain, leukorrhea, and clean female genitalia due to vaginal discharge (Julung et al. 2023), is a testament to the community's traditional knowledge. This plant species is rich in tannins, flavonoids, eugenol, hydroxychavicol, chavibetol (Azahar et al. 2020), polyphenols, saponins, and triterpenoid essential oils (Sakinah et al. 2020). Consequently, it exhibited several pharmacological activities, including antibacterial, antimicrobial, analgesic, anti-inflammatory, antioxidant, antiproliferative, and antidiabetic (Sakinah et al. 2020).



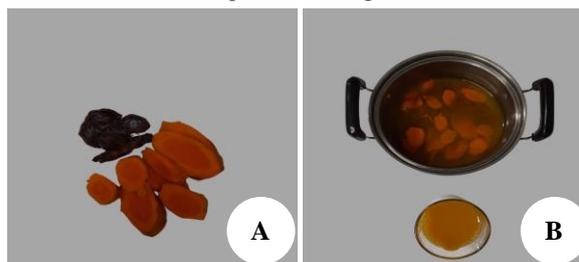
Use of *pinang* and *karaoke* as menstrual regulators and pain relievers. A. Half a *pinang* seed crushed; B. *Pinang* seed wrapped in *karaoke* leaf ready for consumption



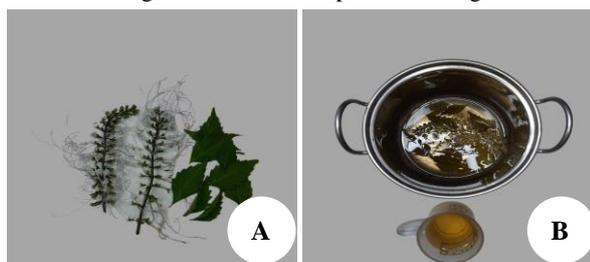
Use of *korongan* and *sarat saribu* as menstrual regulators and pain relievers. A. Five *korongan* and *sarat saribu* leaves cut into small pieces and dried; B. Ingredients boiled until boiling, then strained and poured into a glass



Use of *marampayo*, *kakompo*, and *antidur* as menstrual regulators and pain relievers. A. Ten *marampayo*, *kakompo*, and *antidur* leaves, one stem, and two roots dried; B. Ingredients boiled until boiling, then strained and poured into a glass



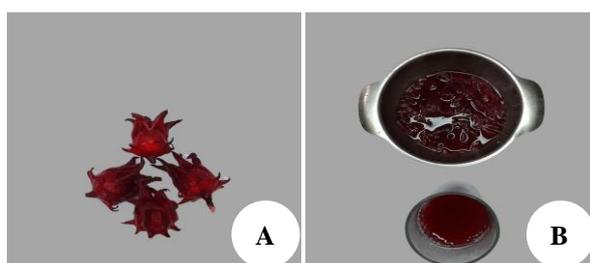
Use of *asam jawa* and *unyit* as menstrual regulators and pain relievers. A. Two *asam jawa* fruits and four *unyit* rhizomes thinly sliced; B. Ingredients boiled until boiling, then strained and poured into a glass



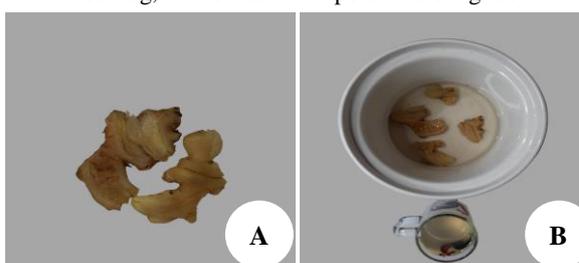
Use of *kumis kucing* as menstrual regulators and pain relievers. A. Ten *kumis kucing* leaves and two flowers taken; B. Ingredients boiled until boiling, then strained and poured into a glass



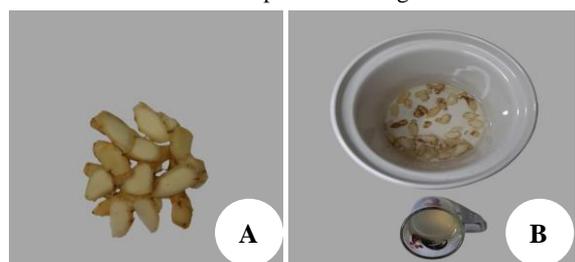
Use of *matsoe* and *ganda rusa* as menstrual regulators and pain relievers. A. Fifteen *matsoe* leaves, three *matsoe* roots, and two *ganda rusa* roots chopped and dried; B. Ingredients boiled until boiling, then strained and poured into a glass



Use of *rosella* as menstrual regulators and pain relievers. A. Seven *rosella* flowers taken; B. Ingredients boiled until boiling, then strained and poured into a glass



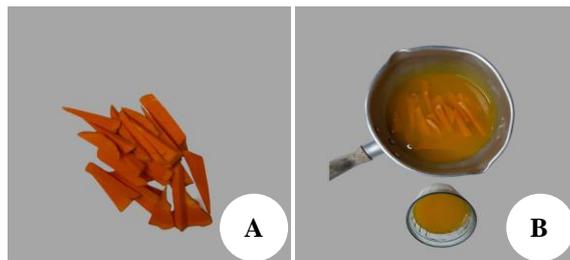
Pain relievers. A. Six *ahiaik* rhizomes crushed; B. Ingredients boiled until boiling, then strained and poured into a glass



Use of *cakur* as menstrual regulators and pain relievers. A. Seven *cakur* rhizomes thinly sliced; B. Ingredients boiled until boiling, then strained and poured into a glass



Use of *saring kuyang* as pain relievers. A. Five *saring kuyang* rhizomes thinly sliced; B. Ingredients boiled until boiling, then strained and poured into a glass



Use of *tamulawak* as a menstrual regulator and pain reliever. A. Four *tamulawak* rhizomes thinly sliced; B. Ingredients boiled until boiling, then strained and poured into a glass

Figure 3. Traditional treatment for regulating and relieving menstrual pain comprised various processing methods.

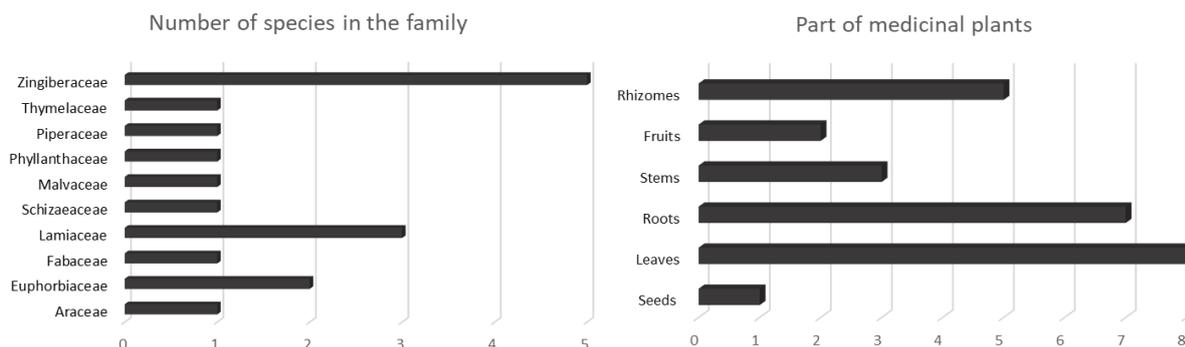


Figure 4. The number of types of each family and plant parts used. Some of the plants used are multipurpose medicinal plants

Panjaitan et al. (2024) reported the use of *korongan* (*R. communis*) by the community in Babane Village, Bengkayang District, as a medicine for hypertension. This plant species also contains compounds such as saponins, flavonoids, steroids, and glucoside (Chouhan et al. 2021) and exhibits a diverse range of pharmacological activities as an antioxidant, anticancer, antidiabetic, hepatoprotective, insecticidal, lipotropic, anti-asthma, antimicrobial, anti-inflammatory, and antiulcer agent (Chouhan et al. 2021).

According to Pradita et al. (2021), *sarat saribu* (*L. microphyllum*) was used by the community in Pengadang Village, Sekayam Sub-district, to improve blood circulation in postpartum mothers. *L. microphyllum* has also been reported to contain various compounds such as flavonoids, phenolics, terpenoids, and steroids (Teoh et al. 2023). In addition, it exhibited various pharmacological activities, including antihelminthic, antidiarrheal, antipyretic agent (Alam et al. 2021), antioxidant, antimicrobial, anti-inflammatory, and hepatoprotective (Teoh et al. 2023).

Alkawi et al. (2021) showed that *marampayo* (*C. hirtus*) was used by the community in Amesiu Village, Konawe District, Southeast Sulawesi to treat colon cancer. This plant species has also been reported to contain several compounds, such as alkaloids, steroids, glycosides, terpenoids (Bhavana et al. 2020), flavonoids, and phenolics (Dall'Acqua et al. 2021). In addition, it exhibited pharmacological activity as an antioxidant (Dall'Acqua et al. 2021).

Gorai et al. (2013) stated that *kakompo* (*L. rugosa*) is a versatile plant in the treatment of various ailments, such as fever, diarrhea, dysentery, indigestion, and elephantiasis.

This plant species has also been reported to contain compounds such as coumarin, triterpenoids, tannins, alkaloids, flavonoids (Phong et al. 2022), terpenoids, phenol, and ketone (Hota et al. 2023). Furthermore, it showed various pharmacological activities, including antioxidant, antimicrobial, antibacterial, antifungal, antitumor, analgesic, anti-inflammatory, antimalarial, antiviral, anti-HIV, antihelminthic, antiulcer, and antidiabetic (Hota et al. 2023).

Supiandi et al. (2023) showed that *antidur* (*P. urinaria*) was used by the community in Temau Village, Embaloh Hulu Sub-district, to treat dysentery and itching. In addition, it has been reported to contain various beneficial compounds, such as lignans, flavonoids, phenolics, tannins, and terpenoids (Geethangili and Ding 2018). This plant species also exhibits pharmacological activities as a hepatoprotective, antidiabetic, antimicrobial, anticancer, and cardioprotective agent (Geethangili and Ding 2018).

Yudiyanto et al. (2022) demonstrated the versatile uses of *asam jawa* (*T. indica*) by the community around the Way Kambas National Park. This plant was used to treat dysentery, cough, fever, rheumatism, and even for stamina enhancement. The plant's composition of compounds such as flavonoids and phenolics (Mbunde et al. 2018) supports these diverse uses. Furthermore, this plant species also had pharmacological activities as an anticancer, antiviral (Tamam et al. 2023), and antioxidant agent (Mbunde et al. 2018).

According to Yudiyanto et al. (2022), *kumis kucing* (*O. aristatus*) was used by the community around the Way Kambas National Park to treat kidney stones and relieve cough. The scientific validation of this plant's medicinal properties, including its composition of beneficial compounds,

such as flavonoids, terpenoids, and phenolic acids (Abdullah et al. 2020), and its pharmacological activities as an antioxidant, anti-inflammatory and antihyperglycemic agent (Abdullah et al. 2020) provide reassurance of its efficacy.

Panjaitan et al. (2023) stated that *matsoe* (*P. frutescens*) was used by the community in Pemangkat Sub-district to treat allergies and cholesterol, prevent heart disorders and cancer, and alleviate internal heat. In addition, it was reported to contain compounds such as alkaloids, terpenoids, quinine, phenylpropanoids, phenolics, flavonoids, essential oil, triterpenes, carotenoids, phytosterol, fatty acids, tocopherols policosanol (Ahmed 2018), polyphenolics compounds, coumarins and anthocyanins (Hou et al. 2022). This plant species also had pharmacological activities, including anti-inflammatory, antidepressant, antispasmodic, anticancer, antioxidant, antimicrobial, insecticidal, neuroprotective, and hepatoprotective (Hou et al. 2022).

Haruna et al. (2022) showed that *ganda rusa* (*P. macrocarpa*) was used by the community in Lipulalongo Village, Labobo Sub-district, to lower high blood pressure. Rambey et al. (2024) also showed that it was used by the community in Aek Guo Village, Mandailing Natal District, to treat respiratory disease, cardioprotective, and malaria. This plant species has also been reported to contain flavonoids, benzophenones, phenolic acids, and terpenoids (Ahmad et al. 2023). In addition, it had pharmacological activities as an antioxidant, antimicrobial, antidiabetic, antihypercholesterolemia, anti-inflammatory, antihypertensive, anticancer, and analgesic agent (Ahmad et al. 2023).

Panjaitan et al. (2024) showed that *rosella* (*H. sabdariffa*) was used by the community in Babane Village, Bengkayang District, as a medicine for hypertension. In addition, it was shown to contain compounds such as phenolic acids, flavonoids, anthocyanins, and organic acids (Izquierdo-Vega et al. 2020). The plant also had pharmacological activities, including antitussive, antihypertensive, antimicrobial, antidiuretic, choleric, analgesic, immunomodulator, hepatoprotective, antioxidant, and anticancer (Izquierdo-Vega et al. 2020).

According to Rambey et al. (2024), *ahiak* (*Z. officinale*) was used by the community in Aek Guo Village, Mandailing Natal District, to treat a bowel disorder, hyperglycemia, and menstrual cramps. In addition, it was shown to contain compounds such as alkaloids, flavonoids, phenols, tannins, terpenoids, saponins, and phytosterols (Karpagapandi and Sultana 2021). The plant also exhibited pharmacological activities as an antioxidant, antimicrobial, anticancer, antiobesity, antidiabetic, anti-nausea, antiemetic, and anti-inflammatory agent (Mao et al. 2019).

Supiandi et al. (2023) showed that *cakur* (*K. galanga*) was used by the community in Temau Village, Embaloh Hulu Sub-district to eliminate body odor and catch a cold accompanied by chills. The plant has also been reported to contain compounds such as terpenoids, phenolics, cyclic dipeptides, flavonoids, diarylheptanoids, fatty acids, and esters (Wang et al. 2021). In addition, it has pharmacological activities as an anti-inflammatory, antioxidant, antitumor, and antituberculosis (Wang et al. 2021).

According to Julung et al. (2023), *saring kuyang* (*Z. purpureum*) was used by the community in Nobal Village,

Sintang District to accelerate postpartum recovery, anti-pain, and pain in the body. This plant has also been reported to contain compounds such as terpenoids, flavonoids, alkaloids, steroids, and benzenoids (Singh et al. 2015). In addition, it exhibits pharmacological activities, including analgesic, antimicrobial, anti-inflammatory, anticancer, radical scavenging, and antimalarial (Singh et al. 2015). Yudiyanto et al. (2022) stated that *tamulawak* (*C. zanthorrhiza*) was used by the community around the Way Kambas National Park to stimulate appetite, internal disease, indigestion medicine, and maintain liver health. This species has been reported to contain compounds such as curcumin, essential oils, saponins, flavonoids, alkaloids, and tannins (Kustina et al. 2020). In addition, it exhibited pharmacological activities as an antibacterial, antimicrobial, anticancer, antifungal, and antioxidant agent (Kustina et al. 2020).

Pradita et al. (2021) show that *unyit* (*C. longa*) was used by the community in Soatobaru Village, West Galela sub-district to reduce the postpartum belly in mothers after childbirth. This plant species has also been reported to contain tannins, alkaloids, flavonoids, phenols, and saponins (Azizah and Aji 2023). In addition, it exhibited pharmacological activities, such as antioxidant, antitumor, antidiabetic, and anti-inflammatory (Fahryl and Carolia 2019).

Menstrual disorders such as amenorrhea and dysmenorrhea can be pharmacologically treated through hormone therapy to regulate menstruation and analgesic medications to alleviate menstrual pains. According to Yusnaini (2020), amenorrhea and dysmenorrhea may occur due to decreased estrogen levels in the body. Foods containing phytoestrogens play a significant role in stabilizing estrogen levels in the body (Yusnaini 2020). Phytoestrogens are natural compounds from plants that exhibit estrogen-like activity (Arum et al. 2017; Izzaty et al. 2017; Yusnaini 2020). One group of phytoestrogens, isoflavones, are widely distributed across various plant parts, including roots, stems, leaves, and fruits (Arum et al. 2017). Isoflavones are part of the flavonoid subclass (Mierza et al. 2023) and are secondary metabolites with diverse derivatives and phytochemicals broadly distributed in plants (Primiani et al. 2018). The chemical structure of isoflavones is similar to 17 β -estradiol, enabling them to bind to estrogen receptors and thus exert estrogenic activity in the body (Primiani et al. 2018).

Based on this research, consequently, it is concluded that the following plants—*korongan* (*R. communis*), *marampayo* (*C. hirtus*), *kakompo* (*L. rugosa*), *sarat saribu* (*L. microphyllum*), *antidur* (*P. urinaria*), *ganda rusa* (*P. macrocarpa*), *ahiak* (*Z. officinale*), *cakur* (*K. galanga*), *unyit* (*C. longa*), *tamulawak* (*C. zanthorrhiza*), *matsoe* (*P. frutescens*), *karaoke* (*P. betle*), *kumis kucing* (*O. aristatus*), *asam jawa* (*T. indica*), and *rosella* (*H. sabdariffa*) may be used as menstrual regulators and pain relievers. At the same time, *pinang* (*A. catechu*) and *saring kuyang* (*Z. purpureum*) may alleviate menstrual pain due to their flavonoid content. The most commonly used plant family, part, and processing methods were Zingiberaceae, leaves, and boiling, respectively.

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REFERENCES

- Abdullah FI, Chua LS, Bohari SPM, Sari E. 2020. Rationale of *Orthosiphon aristatus* for healing diabetic foot ulcer. *Nat Prod Commun* 15 (9): 1-13. DOI: 10.1177/1934578X20953308.
- Ahmad R, Mazlan MKN, Aziz AFA, Gazzali AM, Rawa MSA, Wahab HA. 2023. *Phaleria macrocarpa* (Scheff.) Boerl.: An updated review of pharmacological effects, toxicity studies, and separation techniques. *Saudi Pharm J* 31 (6): 874-888. DOI: 10.1016/j.jsps.2023.04.006.
- Ahmed HM. 2018. Ethnomedicinal, phytochemical and pharmacological investigations of *Perilla frutescens* (L.) Britt. *Molecules* 24 (1): 102. DOI: 10.3390/molecules24010102.
- Alam MM, Emon NU, Alam S, Rudra S, Akhter N, Mamun MMR, Ganguly A. 2021. Assessment of pharmacological activities of *Lygodium microphyllum* Cav. leaves in the management of pain, inflammation, pyrexia, diarrhea, and helminths: In vivo, in vitro, and in silico approaches. *Biomed Pharmacother* 139: 111644. DOI: 10.1016/j.biopha.2021.111644.
- Alkawi A, Rondonuwu SB, Kandou FEF. 2021. Inventory of medicinal plants and their traditional use by the community in Amesiu Village, Konawe Regency, Southeast Sulawesi. *Pharmacoin* 10 (2): 790-797. DOI: 10.35799/pha.10.2021.34026. [Indonesian]
- Ansari A, Mahmood T, Bagga P, Ahsan F, Shamim A, Ahmad S, Shariq M, Parveen S. 2021. *Areca catechu*: A phytopharmacological legwork. *Food Front* 2 (2): 163-183. DOI: 10.1002/fft.2.70.
- Arum I, Sumiati, Abdullah L. 2017. Utilization of isoflavone in top leave meal of *Indigofera zollingeriana* as source of phytoestrogens to increase the production and reproductive of quail. *Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan* 5 (2): 56-60. DOI: 10.29244/jipthp.5.2.56-60. [Indonesian]
- Ayamolowo LB, Ayamolowo SJ, Olayinka EO, Olowokere AE. 2024. Prevalence of menstrual disorders and self-care practices among female undergraduates in a southwestern tertiary institution, Nigeria. *Intl J Reprod Contracept Obstet Gynecol* 13 (4): 817-825. DOI: 10.18203/2320-1770.ijrcog20240771.
- Azahar NI, Mokhtar NM, Arifin MA. 2020. *Piper betle*: A review on its bioactive compounds, pharmacological properties, and extraction process. *IOP Conf Ser: Mater Sci Eng* 991: 012044. DOI: 10.1088/1757-899X/991/1/012044.
- Azizah N, Aji OR. 2023. Antibacterial efficacy of turmeric (*Curcuma domestica*) rhizome infusion against *Aeromonas hydrophila* and its toxicity. *Al-Hayat: J Biol Appl Biol* 6 (2): 126-136. DOI: 10.21580/ah.V6i2.16934.
- Badan Pusat Statistik Kabupaten Bengkayang. 2024. Samalantan District in Figures 2024. Badan Pusat Statistik Kabupaten Bengkayang, Indonesia. [Indonesian]
- Ballester P, Cerdá B, Arcusa R, García-Muñoz AM, Marhuenda J, Zafrilla P. 2023. Antioxidant activity in extracts from *Zingiberaceae* family: Cardamom, turmeric, and ginger. *Molecules* 28 (10): 4024. DOI: 10.3390/molecules28104024.
- Bernardi M, Lazzeri L, Perelli F, Reis FM, Petraglia F. 2017. Dysmenorrhea and related disorders. *F1000Res* 6: 1645. DOI: 10.12688/f1000research.11682.1.
- Bhavana R, Rajan R, Thomas B. 2020. Comparative studies on morphology, anatomy and phytochemistry of selected species of *Croton* L. (Euphorbiaceae). *Plant Arch* 20 (1): 639-656.
- Chouhan HS, Swarnakar G, Jogpal B. 2021. Medicinal properties of *Ricinus communis*: A review. *Intl J Pharm Sci Res* 12 (7): 3632-3642. DOI: 10.13040/IJPSR.0975-8232.12(7).3632-42.
- Dall'Acqua S, Sinan KI, Sut S, Ferrarese I, Etienne OK, Mahomoodally MF, Lobine D, Zengin G. 2021. Evaluation of antioxidant and enzyme inhibition properties of *Croton hirtus* L'Hér. extracts obtained with different solvents. *Molecules* 26 (7): 1902. DOI: 10.3390/molecules26071902.
- Damayanti R, Umami SS, Suhirman. 2021. The ethnobotany study of medicinal plants in Lombok Island. *Biota: Biologi dan Pendidikan Biologi* 14 (2): 1-18. DOI: 10.20414/jb.v14i2.386.
- Fahryl N, Carolia N. 2019. Turmeric (*Curcuma domestica* Val.) as therapy of gout arthritis. *Majority* 8 (1): 251-255. [Indonesian]
- Geethangili M, Ding S-T. 2018. A review of the phytochemistry and pharmacology of *Phyllanthus urinaria* L. *Front Pharmacol* 9: 1109. DOI: 10.3389/fphar.2018.01109.
- Gimunová M, Paulinyová A, Bernaciková M, Paludo AC. 2022. The prevalence of menstrual cycle disorders in female athletes from different sports disciplines: A rapid review. *Intl J Environ Res Public Health* 19 (21): 14243. DOI: 10.3390/ijerph192114243.
- Gorai D, Jash SK, Singh RK, Sarkar A, Majhi S. 2013. Review article: Chemical and pharmacological aspects of *Linnophila rugosa*: An update. *Intl J Nat Prod Res* 3 (4): 120-124.
- Haruna MF, Kenta AM, Herawati. 2022. Medicinal plants used by the community of Lipulalongo Village, Banggai Laut District, Central Sulawesi, Indonesia. *Asian J Ethnobiol* 5 (1): 62-68. DOI: 10.13057/asianjethnobiol/y050107.
- Hota R, Nanda BK, Behera B, Dalai MK. 2023. Ethno-botanical and phytopharmacological study of *Linnophila rugosa* Roth. Merr. (Scrophulariaceae): Mini review. *Curr Tradit Med* 9 (5): 137-149. DOI: 10.2174/2215083808666220610123934.
- Hou T, Netala VR, Zhang H, Xing Y, Li H, Zhang Z. 2022. *Perilla frutescens*: A rich source of pharmacological active compounds. *Molecules* 27 (11): 3578. DOI: 10.3390/molecules27113578.
- Indrayangingsih WOI, Ibrahim N, Anam S. 2015. Ethno pharmacy study of herbal plant in Buronewe, Binongko Sub-district, Wakatobi Regency of South East Sulawesi. *Jurnal Farmasi Galenika* 1 (2): 79-84. DOI: 10.22487/j24428744.2015.v1.i2.6236. [Indonesian]
- Indriyanti I, Martiana T, Rahman FS. 2019. Correlation individual characteristics and work stress with menstrual disorders in tobacco farmers. *Indones J Occup Saf Health* 8 (3): 249-258. DOI: 10.20473/ijosh.v8i3.2019.249-257.
- Izquierdo-Vega JA, Arteaga-Badillo DA, Sánchez-Gutiérrez M, Morales-González JA, Vargas-Mendoza N, Gómez-Aldapa CA, Castro-Rosas J, Delgado-Olivares L, Madrigal-Bujaidar E, Madrigal-Santillán E. 2020. Organic acids from roselle (*Hibiscus sabdariffa* L.) A brief review of its pharmacological effects. *Biomedicines* 8 (5): 100. DOI: 10.3390/biomedicines8050100.
- Izzaty NR, Imandiri A, Suciati S. 2017. Secondary amenorrhea therapy with acupuncture and turmeric-fenugreek herbal. *J Vocat Health Stud* 1 (1): 27-31. DOI: 10.20473/jvhs.v1.i1.2017.27-31.
- Julung H, Supiandi MI, Ege B, Zubaidah S, Mahanal S. 2023. Ethnobotany of medicinal plants in the Dayak Linoh tribe in Sintang District, Indonesia. *Biodiversitas* 24 (2): 767-775. DOI: 10.13057/biodiv/d240212.
- Kameswari D. 2023. Pemanfaatan tanaman herbal dalam praktik pengobatan tradisional Suku Baduy, Kabupaten Lebak, Banten. *Briliant* 8 (1): 160-169. DOI: 10.28926/briliant.v8i1.1109. [Indonesian]
- Karpagapandi L, Sultana BF. 2021. Phytochemical profiling and antioxidant activity of *Zingiber officinale* rhizome. *Pharm Innov J* 10 (7): 40-46.
- Kustina E, Zulharmita, Misfadhila S. 2020. Traditional uses, phytochemistry and pharmacology of *Curcuma xanthorrhiza* Roxb.: A review. *Intl J Sci Healthc Res* 5 (3): 494-500.
- Mao Q-Q, Xu X-Y, Cao S-Y, Gan R-Y, Corke H, Beta T, Li H-B. 2019. Bioactive compounds and bioactivities of ginger (*Zingiber officinale* Roscoe). *Foods* 8 (6): 185. DOI: 10.3390/foods8060185.
- Mbunde M, Mdegela RH, Laswai HS, Mabiki FP. 2018. Quantification of phenolics, flavonoids, and antioxidant activity of *Tamarindus indica* from selected areas in Tanzania. *Asian J Nat Prod Biochem* 16 (1): 22-28. DOI: 10.13057/biofar/f160103.
- Mierza V, Aida F, Hartati H, Verliani H, Zahra NA, Valensia R. 2023. Analysis of various isoflavone identification methods: Literature review. *J Pharm Sci* 6 (1): 109-117. DOI: 10.36490/journal-jps.com.v6i1.28.

- Newbery G, Neelakantan M, Cabral MD, Omar H. 2019. Amenorrhea in adolescents: A narrative review. *Pediatr Med* 2: 30-39. DOI: 10.21037/pm.2019.06.06.
- Panjaitan RGP, Kristi Y, Irawan B, Salleh LM. 2024. Short Communication: Medicinal plants traditionally used to treat hypertension in Babane Village, Bengkayang, West Kalimantan, Indonesia. *Biodiversitas* 25 (7): 3121-3129. DOI: 10.13057/biodiv/d250734.
- Panjaitan RGP, Mitalia, Partasasmita R. 2020. Indigenous knowledge of the people in Karya Usaha Hamlet (Kubu Raya, West Kalimantan, Indonesia) on the processing and diversity of plants that enhance toddler's appetite. *Biodiversitas* 21 (9): 4284-4290. DOI: 10.13057/biodiv/d210946.
- Panjaitan RGP, Titin, Yuliana YGS. 2021. Ethno-medical plants used for medication of jaundice by the Chinese, Dayak, and Malays ethnic in West Kalimantan, Indonesia. *Pharmacogn J* 13 (4): 916-923. DOI: 10.5530/pj.2021.13.118.
- Panjaitan RSU, Rusmiyanto PWE, Mukarlina. 2023. Ethnobotany of traditional medicine plant ethnic in Pemangkat Sub-district, Sambas District. *J Biol Tropis* 23 (4): 572-581. DOI: 10.29303/jbt.v23i4.5658.
- Phong HX, Viet NT, Quyen NTN, Thinh PV, Trung NM, Ngan TTK. 2022. Phytochemical screening, total phenolic, flavonoid contents, and antioxidant activities of four spice commonly used in Vietnamese traditional medicine. *Mater Today: Proc* 56 (Part 3): A1-A5. DOI: 10.1016/j.matpr.2021.12.142.
- Pradita S, Mariani Y, Wardenaar E, Yusro F. 2021. The utilization of medicinal plants by Dayak Paus and Malay tribes for postpartum care on mother and child in Pengadang Village, Sanggau Regency West Kalimantan. *Biodidaktika* 16 (1): 93-110. DOI: 10.30870/biodidaktika.v16i1.10805. [Indonesian]
- Primiani CN, Widiyanto J, Rahmawati W, Chandrakirana G. 2018. Isoflavones profile as phytoestrogens in varoius local Leguminosae. *Proc Biol Educ Conf* 15 (1): 704-708. [Indonesian]
- Qasrin U, Setiawan A, Yulianty Y, Bintoro A. 2020. Ethnobotanical study of medicinal plants for used by Malay People in Lingga District the Kepulauan Riau Province. *Jurnal Belantara* 3 (2): 139-152. DOI: 10.29303/jbl.v3i2.507. [Indonesian]
- Rafique N, Al-Sheikh MH. 2018. Prevalence of menstrual problems and their association with psychological stress in young female students studying health sciences. *Saudi Med J* 39 (1): 67-73. DOI: 10.15537/smj.2018.1.21438.
- Rambey R, Nelasufa F, Athoriez APM, Solihin, Rahmawaty, Susilowati A, Afifuddin Y. 2024. Ethnobotanical study of medicinal plants by indigenous community of Aek Guo Village, Mandailing Natal District, Indonesia. *Biodiversitas* 25 (3): 1046-1056. DOI: 10.13057/biodiv/d250318.
- Ristoja. 2015. Eksplorasi Pengetahuan Lokal Etnomedisin dan Tumbuhan Obat Berbasis Komunitas di Indonesia: Pedoman Koleksi Sampel Tumbuhan, Dokumentasi, Pembuatan Herbarium, dan Deskripsi Morfologi. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, Tawangmangu. [Indonesian]
- Rustam E. 2015. Gambaran pengetahuan remaja putri terhadap nyeri haid (dismenore) dan cara penanggulangannya. *Jurnal Kesehatan Andalas* 3 (1): 286-290. DOI: 10.25077/jka.v4i1.236. [Indonesian]
- Safitri, Gustina. 2023. Effect of routine consumption of turmeric-tamarind herb on dysmenorrhea among adolescent girls. *Embrio: Jurnal Kebidanan* 15 (1): 41-48. DOI: 10.36456/embrio.v15i1.6120.
- Sakinah D, Rusdi, Misfadhila S. 2020. Review of traditional use, phytochemical and pharmacological activity of *Piper betle* L. *Galore Intl J Health Sci Res* 5 (3): 59-66.
- Santoso EA, Jumari J, Utami S. 2019. Inventory of medicinal plants for pregnant and postpartum women in Dayak Tomun of the Lopus Village Lamandau Regency of Central Kalimantan. *Biosaintifika* 11 (1): 25-31. DOI: 10.15294/biosaintifika.v11i1.17917.
- Singh CB, Manglembi N, Swapana N, Chanu SB. 2015. Ethnobotany, phytochemistry and pharmacology of *Zingiber cassumunar* Roxb. (Zingiberaceae). *J Pharmacogn Phytochem* 4 (1): 1-6.
- Supiandi MI, Ege B, Julung H, Zubaidah S, Mahanal S. 2021. Ethnobotany of traditional medicine in Dayak Jangkang Tribe, Sanggau District, West Kalimantan, Indonesia. *Biodiversitas* 22 (12): 5417-5424. DOI: 10.13057/biodiv/d221224.
- Supiandi MI, Julung H, Susanti Y, Zubaidah S, Mahanal S. 2023. Potential of traditional medicinal plants in the Dayak Tamambaloh tribe, West Kalimantan, Indonesia. *Biodiversitas* 24 (6): 3384-3393. DOI: 10.13057/biodiv/d240634.
- Syamsuri, Alang H. 2021. Inventory of the zingiberaceae family with economic value (ethnomedicine, ethnocosmetics and ethnofood) in Kabupaten Kolaka Utara, Sulawesi Tenggara, Indonesia. *Agro Bali: Agric J* 4 (2): 219-229. DOI: 10.37637/ab.v4i2.715. [Indonesian]
- Tamam MB, Aini NS, Murtadlo AAA, Turista DDR, Naw SW, Ullah ME. 2023. Antiviral and anticancer activity from *Curcuma longa* L. and *Tamarindus indica* bioactive compounds through in silico analysis. *Intl J Appl Sci Adv Technol Inform* 2 (1): 12-17. DOI: 10.24036/sainstek/vol2-iss01/21.
- Teoh WY, Yong YS, Razali FN, Stephenie S, Shah MD, Tan JK, Gnanaraj C, Esa NM. 2023. LC/MS/MS and GC-MS analysis for the identification of bioactive metabolites responsible for the antioxidant and antibacterial activities of *Lygodium microphyllum* (Cav.) R.Br. *Separations* 10 (3): 215. DOI: 10.3390/separations10030215.
- Wahyuningsih D, Juhaini J, Novita H, Nurafiatullah N, Rosninda R, Awalyah Y, Suryani S, Oktaviana M, Ningsih TA, Azmin N, Nasir M. 2022. Inventarisasi tumbuhan obat tradisional di wilayah Bendungan Mila Kabupaten Dompu. *Juster: Jurnal Sains dan Terapan* 1 (2): 27-36. DOI: 10.55784/juster.v1i2.100. [Indonesian]
- Wang S-Y, Zhao H, Xu H-T, Han X-D, Wu Y-S, Xu F-F, Yang X-B, Göransson U, Liu B. 2021. *Kaempferia galanga* L.: Progresses in phytochemistry, pharmacology, toxicology and ethnomedicinal uses. *Front Pharmacol* 12: 675350. DOI: 10.3389/fphar.2021.675350.
- Wijayanti R. 2022. Aktivitas fisik dan kecemasan dengan gangguan menstruasi pada mahasiswa. *Jurnal JKFT* 7 (2): 82-87. DOI: 10.31000/jkft.v7i2.7330. [Indonesian]
- Yudiyanto, Hakim N, Wakhidah AZ. 2022. Ethnobotany of medicinal plants from Lampung Tribe around Way Kambas National Park, Indonesia. *Nusantara Biosci* 14 (1): 84-94. DOI: 10.13057/nusbiosci/n140111.
- Yusnaini Y. 2020. Effect of soybean milk consumption of changes in adolescent secondary amenorrhea period late adolescence in the dayah Insan Qur'ani, Aceh Besar. *AcTion: Aceh Nutr J* 5 (2): 98-104. DOI: 10.30867/action.v5i2.125. [Indonesian]