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Ethnobotanical Review and Species Diversity Potential of *Zingiberaceae* as Postpartum Medicinal Resources in Remote Communities of Kalimantan

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Abstract

The local communities in remote regions of Kalimantan possess indigenous knowledge in utilizing plants from the *Zingiberaceae* family as traditional medicine, particularly for postpartum care. Many species of *Zingiberaceae* continue to be used in postpartum treatments due to their effectiveness in alleviating and healing ailments. The present study reviewed the potential diversity of *Zingiberaceae* species used in traditional postpartum medicine and identified their chemical constituents. The method employed was a literature review analyzing scientific publications from the past 10 years that discuss the use of *Zingiberaceae* by remote communities in Kalimantan for postpartum treatment. The results indicate that ten species from four genera, namely *Alpinia*, *Kaempferia*, *Curcuma*, and *Zingiber,* are commonly used. Typically, the rhizome is the part utilized, processed through methods such as boiling, pounding, or powdering, either for oral consumption or topical application. Chemical compounds found in *Zingiberaceae* include curcumin (immunomodulatory), ethyl-p-methoxycinnamate (analgesic), flavonoids (anti-inflammatory), and gingerol and shogaol (anti-inflammatory and antipyretic), all of which contribute to postpartum therapeutic effects. This study confirms that *Zingiberaceae* plays a significant role in traditional postpartum medicine and highlights the need for further research to support the preservation of indigenous knowledge, conservation efforts, and sustainable utilization.

Keywords: local wisdom, postpartum, treatment, *Zingiberaceae*

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Introduction

Local communities in remote regions of Kalimantan have long utilized plants for medicinal purposes. Knowledge of plant-based healing is passed down through generations by those living nearby, primarily due to its proven effectiveness. The *Zingiberaceae* family is a group of medicinal plants widely used in traditional medicine. In Indonesia, including Kalimantan, local communities commonly cultivate and utilize traditional herbal remedies derived from *Zingiberaceae* (Mukarromah & Hayati, 2023). It is frequently found throughout Kalimantan, as indicated by previous exploratory studies: Erwinsyah et al. (2022) identified 11 species from the *Zingiberaceae* family, Gianto et al. (2023) recorded 8 species, and Sepsamli and Syamswisna (2025) documented 9 species.

The *Zingiberaceae* family has demonstrated potential in traditional postpartum treatments, as corroborated by several existing studies. Mariani et al. (2023) reported that *Zingiberaceae* is the most commonly used source of postpartum remedies, with four species identified. This aligns with findings from Pradita et al. (2021), who documented eight species used for the same purpose. Based on these reviews, *Zingiberaceae* shows promising potential in postpartum medicinal applications.

To further understand the postpartum healing potential of *Zingiberaceae*, it is important to examine its active compounds. One well-documented species, *Zingiber officinale*, contains anti-inflammatory and antioxidant compounds such as gingerol, beta-carotene, capsaicin, caffeic acid, curcumin, and salicylate (Aryanta, 2019). The presence of these active compounds supports the medicinal potential of *Zingiberaceae* in traditional postpartum care.

Given the broad diversity of *Zingiberaceae* species used by local communities in Kalimantan, it is essential to explore their medicinal uses and chemical contents in greater depth. Many of these species are cultivated in household gardens but lack comprehensive data regarding their traditional medicinal applications and bioactive compounds, especially for postpartum treatment. Hence, this literature review serves as a foundation for further research, practical use, and conservation efforts related to the *Zingiberaceae* family. The objective is to explore the potential and diversity of *Zingiberaceae* species used in postpartum healing practices in remote regions of Kalimantan.

Research Method

This study employed a literature review method using Google Scholar and PubMed. The keywords used in the literature search included "ethnobotany of *Zingiberaceae*," "utilization of *Zingiberaceae*," "traditional medicine of *Zingiberaceae*," "ecology of *Zingiberaceae*," "postpartum use of *Zingiberaceae*," "*Zingiberaceae* in Kalimantan," and "active compounds of *Zingiberaceae*." The literature review data analysis referred to studies from the last

ten years, consisting of English and Indonesian-language journals. A total of 23 research articles related to the ethnobotany of *Zingiberaceae* were identified within the past decade.

Research Results and Discussion

Zingiberaceae

Zingiberaceae is a family of flowering plants commonly referred to by various Indonesian communities as *jahe-jahean* or "ginger-like plants" (Andini et al., 2020). The species in this family are predominantly found in tropical and subtropical regions (Hartati et al., 2014). As a tropical country, Indonesia harbors a diverse variety of *Zingiberaceae* species that grow across different land elevations. Tjitrosoepomo (1993) and Pandey (2003) explain that species within the *Zingiberaceae* family naturally thrive from lowland areas to highland regions. However, only a few *Zingiberaceae* species are documented in valley habitats, although most are found in such areas (Holttum, 1950).

The *Zingiberaceae* in Kalimantan exhibit high species variation, as demonstrated by the results of previous research and taxonomy efforts. Lamb et al. (2013) reported that Kalimantan hosts a wide diversity of *Zingiberaceae* species, comprising 19 genera and nearly 250 named species, with many more yet to be characterized and formally named.

Tjitrosoepomo (1994) states that *Zingiberaceae* plants have an herbaceous growth form (*herbaceous perennials*) with long lifespans. These species have distinct characteristics, including aromatic scents from their rhizomes, enlarged rhizomes such as tubers, thickened roots, and specialized cavities in the rhizome roots that store essential oils. Their leaves grow in a rosette pattern, typically alternating in arrangement. The leaves are lanceolate or elliptical in shape, with pinnate or parallel venation. The leaves have short petioles and resemble sheath-like divisions. Additionally, the leaves possess ligules, and the leaf sheaths tightly wrap around one another, creating the appearance of a pseudostem.

Based on the literature reviewed over the past 10 years, 23 ethnobotanical studies on *Zingiberaceae* were identified, focusing on their use as postpartum medicinal treatments among the indigenous communities of Kalimantan. A total of 10 *Zingiberaceae* species were recorded for this purpose (see **Table 1**).

Table 1. *Zingiberaceae* Species Used in Postpartum Treatments

Species/Common Name	Citation
Alpinia galanga (L.) Willd. / Galangal	Fardana et al. (2024), Hikmah (2018)
Kaempferia galanga L. / Aromatic ginger	Efremila et al. (2015), Fardana et al. (2024), Haziki et al. (2021), Julung et al. (2024), Karimah et al. (2021), Mariani et al. (2023), Pirmansyah et al. (2021), Pradita et al. (2021), Suciyati & Retnaningati (2024), Wulan (2025)
Curcuma mangga Valeton & Zijp / Mango ginger	Julung et al. (2024)

Curcuma longa L. / Turmeric	Andari et al. (2020), Ege et al. (2022), Fardana et al. (2024), Julung et al. (2024), Julung & Ege (2020), Karimah et al. (2021), Kholifah et al. (2020), Mariani et al. (2023), Sambudra et al. (2022), Supiandi et al. (2024), Supiandi et al. (2021), Takoy et al. (2015)
Curcuma xanthorrhiza Roxb. / Java ginger	Fardana et al. (2024), Julung et al. (2024), Karimah et al. (2021), Wulan (2025)
Curcuma zedoaria (Christm.) Roscoe / White turmeric	Julung et al. (2024), Pradita et al. (2021)
Zingiber officinale Roscoe / Ginger	Ege et al. (2022), Fardana et al. (2024), Hikmah (2018), Julung et al. (2024), Julung & Ege (2020), Mariani et al. (2023), Pirmansyah et al. (2021), Supiandi et al. (2021), Supiandi et al. (2024), Takoy et al. (2015), Wulan (2025)
Zingiber officinale Linn. var. *Rubrum* / Red ginger	Fardana et al. (2024), Julung et al. (2024)
Zingiber officinale var. *Amarum* / Small white ginger	Julung et al. (2024), Wahyuni et al. (2023)
Zingiber purpureum Roscoe / Cassumunar ginger	Julung et al. (2024)

Ethnobotany of *Zingiberaceae* as a postpartum medicinal source

Several women from the remote communities of Kalimantan use *Zingiberaceae* species for postpartum treatment. Particular species are utilized for their effectiveness in alleviating and treating postpartum ailments. This is based on data from the past ten years referencing the ethnobotanical use of *Zingiberaceae* in traditional postpartum medicine, along with their potential as indicated by phytochemical tests.

Based on the ethnobotanical findings regarding *Zingiberaceae* for postpartum treatment, 23 articles published between 2015 and 2025 have explored this topic. Ten *Zingiberaceae* species were recorded as being used for postpartum care. Each species has a different preparation method, though they serve similar purposes; this variation often depends on ancestral knowledge passed down through generations.

According to data analysis across the articles, the inland regions of West Kalimantan Province frequently report the use of *Zingiberaceae* species for postpartum treatment. The plant parts used are primarily the rhizomes. The ethnobotanical study by Pradita et al. (2021), conducted in Pengadang Village, Sanggau Regency, West Kalimantan Province, reported two *Zingiberaceae* species used for postpartum care: 1) Aromatic ginger, locally known as *cekur*, is used to expel lochia (impure blood) in postpartum women. It can be processed in two ways: the rhizome is crushed and applied topically, or it can also be grated and consumed orally. The duration of use was not specifically stated, and 2) White turmeric, locally known as *temu putih*, is also used to cleanse lochia. The rhizome is either crushed and applied or grated and consumed.

Other *Zingiberaceae* species were documented in the study by Ege et al. (2022), exploring the traditional medicinal use of *Zingiberaceae* among the Jangkang Dayak ethnic group in Sanggau

Regency, West Kalimantan Province. Two species were identified: 1) Turmeric, locally known as *bongah*, is used to accelerate physical recovery after childbirth. The rhizome is crushed and boiled, and the resulting water is consumed. The duration of use was not detailed, and 2) Ginger, locally known as *loyak joronang*, is used for body recovery after childbirth. The rhizome is crushed, mixed with water, and consumed. The duration of use was also not specified.

Further ethnobotanical research on *Zingiberaceae* was conducted by Mariani et al. (2023) in Belaban Ella Village, Menukung District, Melawi Regency, West Kalimantan Province. Three *Zingiberaceae* species were identified for treating postpartum ailments: 1) Ginger is used to enhance breast milk production. The rhizome is cooked and consumed, typically three times a day until recovery; 2) Aromatic ginger is used to help the uterus dry up more quickly. The rhizome is grated, and the juice is consumed. The treatment lasts 3–4 days or until recovery (3 times/day); and 3) Turmeric is also used to help the uterus dry up. The rhizome is crushed, and the juice is consumed. The treatment lasts 3–4 days or until recovery (2 times/day).

A more in-depth ethnobotanical study on the use of *Zingiberaceae* in other areas of Melawi Regency was conducted in Belonsat Village among the Dayak Linoh ethnic group (Wahyuni et al., 2023). One species of *Zingiberaceae* was recorded as being used for postpartum treatment, namely small white ginger/*emprit* ginger, locally known as *Liak Padi* or *Jahe Padi*. The rhizome is used to aid physical recovery after childbirth. It is crushed into a fine paste, then mixed with hot water (the mixture may be filtered), and the resulting liquid is consumed twice a day. Another species documented, identical to the findings of Mariani et al. (2023), was turmeric. This plant is used for treating internal uterine wounds following childbirth. This finding was reported by Sambudra et al. (2022) in a study on the use of traditional medicinal plants among the Dayak Linoh people in Laja Ribau Village, Melawi Regency. However, the specific plant part and preparation method were not discussed.

The study by Andari et al. (2020) was conducted among the Dayak Kendawangan community in Rangkung Village, Ketapang Regency, West Kalimantan Province. The research identified one *Zingiberaceae* species used for postpartum treatment: Turmeric. The rhizome is used to treat wounds and for postpartum wound care. It is prepared by grating the rhizome and then either drinking the juice or applying it topically. However, the duration of use was not detailed.

Another study by Kholifah et al. (2020) examined the ethnobotany of the Dayak Kayaan and Dayak Bukat communities in Datah Dian Village, Kapuas Hulu Regency, West Kalimantan Province. The study identified one *Zingiberaceae* species used for postpartum care: Turmeric. The rhizome is used to expel lochia after childbirth, although the preparation method was not mentioned. Additional ethnobotanical findings from Kapuas Hulu Regency were reported by Supiandi et al. (2024), focusing on the use of medicinal plants by the Dayak Tamambaloh ethnic group in Temau Village, West Kalimantan Province. Two *Zingiberaceae* species were found to have potential for postpartum treatment: 1) Turmeric, locally known as *kunus*, is used to treat postpartum bleeding. The rhizome is prepared by grating and applying it directly to the wound. Alternatively, the grated rhizome can be boiled, and the liquid can be consumed. The duration of treatment, however, was not specified, and 2) Ginger, locally called *laiya*, is used

to aid recovery after childbirth. The rhizome is boiled, and the resulting liquid is consumed. Nonetheless, the duration of use was not described in detail.

The ethnobotanical review by Efremila et al. (2015) on medicinal plants used by the Dayak community in Kayu Tanam Village, Landak Regency, West Kalimantan, identified one *Zingiberaceae* species used for postpartum care: Aromatic ginger. However, the specific plant part and preparation method were not detailed. The study by Fardana et al. (2024) focused on the ethnobotany of medicinal plants for postpartum women in Sepangah Village, Landak Regency, West Kalimantan Province. It reported six *Zingiberaceae* species used for postpartum treatment: 1) Turmeric, used to help release blood after childbirth; 2) Ginger, also used to release blood after childbirth; 3) Red ginger, used to dry wounds after childbirth; 4) Java ginger, to release blood post-delivery; 5) Aromatic ginger, also for releasing blood; and 6) Galangal, used to release blood post-delivery. For all six plants, the rhizome is the part used in postpartum treatment. The rhizomes are boiled, and the water is consumed. However, the frequency and duration of use were not specified.

According to the study by Julung and Ege (2020) on the Dayak Uud Danum community in Sintang Regency, West Kalimantan Province, two *Zingiberaceae* species were recorded as postpartum medicinal sources: 1) Turmeric, locally known as *henak*, is used to accelerate postpartum recovery. The rhizome is grated, and the juice is consumed. The frequency and duration of use were not provided, and 2) Ginger, locally called *liok mangan*, is used to increase stamina and aid wound recovery after childbirth. The rhizome is boiled, and the water is consumed, but usage frequency was also not described.

Turmeric was also documented in a study by Takoy et al. (2015) conducted in the forest area of Ensabang Village, Sintang Regency, West Kalimantan Province, focusing on medicinal plants used by the Dayak Seberuang community. Two *Zingiberaceae* species were identified as postpartum medicinal sources: 1) Ginger, locally known as *liak*, is used to stimulate and increase breast milk production and for general postpartum care. Although the plant part was not mentioned, it is prepared by boiling, and the water is consumed, and 2) Turmeric is used to treat wounds after childbirth. The specific part was not mentioned, but the preparation involves grating the plant and drinking the juice.

The ethnobotanical study by Julung et al. (2024) on the use of *Zingiberaceae* as medicinal plants among the Dayak Linoh ethnic group in Sintang Regency, West Kalimantan, identified nine *Zingiberaceae* species used as postpartum medicinal sources: 1) Aromatic ginger, locally known as *cokur*, is used to restore or improve stamina after childbirth. The rhizome is crushed by squeezing or grinding, then applied or sprayed onto the abdomen; 2) Mango ginger, locally known as *entomu mango*, is used to help restore stamina after childbirth. The rhizome is mixed with cogongrass (*Imperata cylindrica*) roots, yellow bamboo roots, turmeric, and yellow roots, then boiled, and the decoction is consumed; 3) Java ginger, locally known as *kunyit entomu*, is also used to restore stamina postpartum. The rhizome is combined with cogongrass roots, yellow bamboo roots, turmeric, and yellow roots, then boiled, and the water is consumed; 4) White turmeric, locally known as *entomu putih*, is used to recover stamina after childbirth. The rhizome is mixed with red ginger, turmeric, galangal, and a small quantity of false mangosteen (*Garcinia xanthochymus*), mashed, then either

consumed directly or boiled first and mixed with honey before drinking; 5) Turmeric, used for postpartum stamina recovery. The rhizome is mixed with red ginger, galangal, and false mangosteen, ground into a paste, and consumed directly or boiled and mixed with honey before drinking; 6) Red ginger, locally known as *loyak merah*, helps restore stamina after childbirth. The rhizome is mixed with turmeric, galangal, and false mangosteen, ground into a paste, and consumed directly or boiled and mixed with honey before drinking; 7) small white ginger, locally known as *loyak padi* or *jahe putih kecil*, is used to help stabilize stamina after childbirth. The rhizome is combined with turmeric, galangal, and seven pieces of false mangosteen, ground into a paste, and either consumed directly or boiled, mixed with honey before drinking; 8) Ginger, locally known as *loyak bumbu*, is used to restore stamina after childbirth. The rhizome is pounded and boiled, and the decoction is consumed; and 9) Cassumunar ginger, locally known as *ngemelai*, is used to accelerate recovery after childbirth. The rhizome is finely pounded and applied externally to the entire body. Nonetheless, no specific information was provided regarding the duration or frequency of use required for recovery for all nine *Zingiberaceae* species mentioned previously.

The study by Julung et al. (2024) on the use of traditional medicinal plants among the Malay ethnic group in Sintang Regency, West Kalimantan Province, found one *Zingiberaceae* species used for postpartum treatment: Cassumunar ginger, locally known as *ngemelai*. The rhizome is used for treatment by pounding it into a paste and applying it to body parts experiencing aches. However, the duration of use was not specified. In another study by Julung et al. (2024) on the use of traditional medicinal plants among the Javanese ethnic group in Sintang Regency, West Kalimantan Province, four *Zingiberaceae* species were documented for postpartum care: 1) Red ginger, used to speed up postpartum recovery. The rhizome is boiled, and the water is consumed; 2) Turmeric, used to aid recovery after childbirth. The rhizome is boiled, and the decoction is consumed; 3) Aromatic ginger, used to help the body recover after childbirth. The rhizome is pounded and then boiled; and 4) Cassumunar ginger, locally known as *ngemelai*, used to relieve body and joint aches after childbirth. The rhizome is crushed and applied to the affected areas. Nonetheless, the length of use for all these treatments was not provided.

A market survey by Suciyati and Retnaningati (2024) involving interviews with herbal and spice traders at the Dayak Market in Tarakan City, North Kalimantan Province, revealed that only one species was considered effective for postpartum treatment: Aromatic ginger. The rhizome is grated or blended, then boiled, filtered, and the liquid is consumed. Haziki et al. (2021) documented the use of aromatic ginger leaves, locally known as *cakur*, by residents of Setapuk Kecil Subdistrict, Singkawang City. The leaves are boiled and consumed as part of postpartum treatment.

Research by Hikmah (2018), based on interviews with the Dayak Kenyah community in Bahau Hulu District, Malinau Regency, North Kalimantan Province, found that to dry postpartum wounds, fresh ginger rhizomes are cleaned, pounded, wrapped in banana leaves, heated over glowing charcoal, and then applied around the vaginal area. For stamina recovery after childbirth, galangal, ginger, cassava (*Manihot esculenta*), cayenne pepper (*Capsicum frutescens*), and sugar cane (*Saccharum officinarum*) are mixed into a traditional concoction called *ciu*, which is then

cooked with porridge. This remedy can also be prepared with black chicken meat, boiled, and consumed.

A recent study by Wulan (2025) on herbal plants used by the Malay community in Ketapang City, West Kalimantan Province, found that ginger, aromatic ginger, and Java ginger are believed to improve blood circulation in postpartum mothers. The preparation includes two segments of aromatic ginger, three of Java ginger, three of ginger, 100 grams of rice, and a sufficient amount of water. The ingredients are washed, chopped into small pieces, and sun-dried. Once dried, they are ground into powder, which is then sieved to remove coarse particles. This powder is then applied to the body 2–3 times a day for 1–2 weeks. In addition, a decoction of turmeric and aromatic ginger rhizomes, along with betel and papaya leaves, is consumed 1–2 times before breakfast and dinner to improve the health of postpartum mothers. Another preparation, *kunyit asam*, a traditional herbal tonic made by boiling turmeric and aromatic ginger rhizomes with tamarind leaves and papaya fruit, is consumed before lunch and is believed to help maintain stamina in postpartum women. There is also a traditional herbal mixture known as *jamu peluncur*, which is used to promote blood flow after childbirth. This herbal remedy includes turmeric and ginger rhizomes, long pepper (*Piper retrofractum*) fruit, clove seeds, guava leaves, and pepper, all of which are sun-dried, ground into powder, and consumed three times a week. Another herbal tonic, *jamu tuntas*, is taken to cleanse lochia from the body. It is made from powdered Java ginger, turmeric, and ginger rhizomes, along with long pepper and nutmeg seeds, boiled in water and consumed three times a week in the morning or evening.

A study by Supiandi et al. (2021) found that the Jangkang Dayak people in Sanggau District, West Kalimantan Province, use the rhizomes of turmeric, locally known as *bongah,* and ginger for healing postpartum women. Research conducted by Karimah et al. (2021) in Baruh Kembang Village, Daha Utara District, Hulu Sungai Selatan Regency, South Kalimantan Province, reported the use of *jamu untalan*, a traditional herbal tonic that promotes postpartum wound healing. This tonic consists of 23 herbal plant ingredients, three of which belong to the *Zingiberaceae* family: turmeric, aromatic ginger, and Java ginger. Further findings by Pirmansyah et al. (2021) in Pentek Village, Sadaniang District, Mempawah Regency, West Kalimantan Province, revealed that ginger, locally called *liyak merah,* is used to stop bleeding and reduce postpartum fever, while aromatic ginger is utilized in general postpartum care.

Phytochemistry of *Zingiberaceae*

The *Zingiberaceae* family is one of the plant groups rich in phytochemical compounds and has been traditionally used in various parts of the world for medicinal purposes (Kumar et al., 2021). Phytochemical studies demonstrate that plants from this family contain a variety of secondary metabolites such as terpenoids, flavonoids, phenolics, alkaloids, and essential oils, which play significant roles in their pharmacological activities (Mao et al., 2019).

The rhizomes of *Zingiberaceae* are used by women in the remote regions of Kalimantan for postpartum treatment. The rhizome of galangal is used to expel lochia (impure blood) and to restore stamina after childbirth. This plant is considered effective for postpartum recovery, owing to its analgesic content that helps reduce and eliminate pain, thereby aiding recovery (Sumando et al., 2021). In addition, galangal contains

flavonoids with anti-inflammatory properties (Baldo & Serrano, 2016). However, the specific chemical compounds responsible for expelling lochia have not been identified. Other chemical constituents in galangal include flavonoids such as galangin, kaempferol, and quercetin, all exhibiting antioxidant properties (Lallo et al., 2019).

Aromatic ginger is also used to expel lochia, promote uterine dryness, restore stamina, and improve blood circulation in postpartum women. This plant is considered beneficial due to its anti-inflammatory and analgesic activities (Vittalrao et al., 2011). The compounds responsible for its anti-inflammatory properties include flavonoids, saponins, and essential oils. Signs of inflammation in the body include swelling, redness, and pain, and the presence of these compounds helps relieve such symptoms and supports stamina recovery (Andriyono, 2019). The plant also contains ethyl-p-methoxycinnamate, which has analgesic properties that help reduce pain (Silalahi, 2019). However, the specific chemical compounds that promote uterine dryness and enhance blood circulation have not been further examined.

The rhizome of mango ginger is used in some regions of Kalimantan to restore stamina after childbirth. This species is believed to have anti-inflammatory activity due to the presence of alkaloids, flavonoids, and tannins. It also contains tannins with antioxidant properties (Nugraha et al., 2020). Additionally, this plant contains flavonoids, curcumin, saponins, essential oils, terpenoids, and polyphenols (Susiloningrum & Sari, 2021). The curcumin content in this plant is known to have immunomodulatory activity that contributes to stamina improvement (Ambarwati et al., 2023; Moehady, 2015).

The rhizome of turmeric is helpful in promoting uterine dryness, healing internal wounds in the uterus after childbirth, expelling lochia, improving postpartum bleeding, and accelerating recovery. Its efficacy in treating uterine wounds is attributed to the presence of curcumin, the main phytochemical compound in turmeric. Curcumin has been shown to possess various biological activities, including anti-inflammatory, antioxidant, and anticancer effects, by modulating several cellular signaling pathways (Chattopadhyay et al., 2019). Its wound-healing potential in the uterus is similar to its effects on wound healing in other organs, such as the skin (Wathoni, 2016). Curcumin also helps improve physical stamina, facilitating postpartum recovery (Moehady, 2015). However, the specific compounds that promote uterine dryness, expel lochia, and improve postpartum bleeding have not been explicitly described.

The rhizome of Java ginger is utilized as a medicinal agent to expel retained blood from the uterus after childbirth. This plant contains chemical compounds such as flavonoids, saponins, and quinones (Wahidah et al., 2021). The curcuminoid content in Java ginger possesses anti-inflammatory and antioxidant properties (Devaraj et al., 2014; Kim et al., 2014).

Specifically, the rhizome of white turmeric is used by women in the remote regions of Kalimantan after childbirth to restore stamina. The medicinal use of Java ginger is supported by the presence of compounds such as turmerin, essential oils, and curcuminoids (Sagita et al., 2022). Extraction results by Sagita et al. (2022) revealed that the phenolic compound curcumin was predominantly detected in Java ginger. Curcumin functions as an immunomodulator, helping to strengthen a weakened immune system and stabilize the body. In

addition, various chemical compounds in this plant exhibit antioxidant and anti-inflammatory activity (Sagita et al., 2022).

The rhizome of ginger is used for postpartum body recovery, to support breast milk production, expel blood after childbirth, improve blood circulation in postpartum women, stop postpartum bleeding, and treat postpartum fever. The potential of ginger to aid in recovery after childbirth is due to the presence of gingerol and shogaol compounds (Ambarwati et al., 2023). Its effectiveness in reducing postpartum fever is attributed to the anti-inflammatory and antipyretic properties of gingerol and shogaol, which help lower body temperature (Lizhen & Suhartina, 2024). Sandrasari et al. (2023) reported that the plant contains [6]-gingerol, 8-gingerol, and 10-gingerol. These compounds contribute to restoring stamina (Ambarwati et al., 2023). The plant's ability to improve blood circulation in postpartum women is associated with its chemical constituents. The main sesquiterpene groups found in this plant, such as bisabolene, zingiberene, and zingiberol, play a role in facilitating blood flow in the body (Rehman et al., 2011). However, the specific compounds that promote breast milk production, expel blood, and stop bleeding after childbirth are not explicitly identified.

The rhizome of ginger is used by women postpartum to dry wounds and speed up physical recovery. This plant contains gingerol, shogaol, flavonoids, alkaloids, tannins, saponins, and terpenoids, all exhibiting antioxidant activity (Azizah, 2023). Gingerol and shogaol can boost energy, ultimately aiding recovery (Ambarwati et al., 2023). This plant also contains immunomodulatory compounds. Curcumin plays a role as an immunomodulator that helps enhance a weakened immune system (Sagita et al., 2022). The potential of the rhizome of ginger to dry wounds after childbirth is related to the anti-inflammatory properties of gingerol and shogaol, which help reduce inflammation in wounds (Wahyudi et al., 2022).

The rhizomes of small white ginger and red ginger are also used as a herbal remedy to restore stamina after childbirth. The presence of gingerol and shogaol in these plants contributes to the recovery of physical stamina (Ambarwati et al., 2023; Fathona & Wijaya, 2011; Sha'diah et al., 2019).

The rhizome of cassumunar ginger is used to restore physical condition after childbirth. It contains phenylbutenoids, curcuminoids, sesquiterpenoids, benzaldehyde, quinones, and essential oils that include monoterpenoids (Han et al., 2021). The curcuminoid content, especially curcumin, contributes to enhancing immune endurance, which in turn helps restore physical strength and maintain energy and vitality (Ambarwati et al., 2023).

Conclusion

The *Zingiberaceae* family plays a significant role in postpartum treatment among the indigenous communities of Kalimantan. A total of 10 *Zingiberaceae* species are used for postpartum care in women, namely galangal, aromatic ginger, mango ginger, turmeric, Java ginger, white turmeric, ginger, red ginger, small white ginger, and cassumunar ginger. The plant part used for medicinal purposes is the rhizome. The types of postpartum ailments treated with *Zingiberaceae* include body recovery, enhancing breast milk production, expelling lochia, improving blood circulation, stopping postnatal bleeding, and reducing postpartum fever. The bioactive compounds contributing to these healing properties include curcumin, shogaol, and

gingerol. Therefore, the potential and indigenous knowledge regarding the use of *Zingiberaceae* as a source of postpartum remedies for women should be preserved and further explored for future development.

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