INTRODUCTION

Indonesia is a country that has enormous biodiversity potential. Geographically, Indonesia has many types of plants that can be used traditionally as medicines for various diseases (von Rintelen et al., 2017). One of them is the island of Borneo or also known as Kalimantan, which has the potential of traditional medicine knowledge by various tribes and is rich in useful plants (Khoo et al., 2016).

Sangkareho (Callicarpa longifolia Lam.) is one of the native plants of Borneo which belongs to the genus Callicarpa (Novaryatiin et al., 2018; Qamariah et al., 2016). This plant contains a source of natural compounds and can be used as traditional medicines (Harley et al., 2004). The Callicarpa genus is utilized by one of the indigenous tribes of Kalimantan, the Dayak Tunjung tribe (Setyowati, 2010). Callicarpa longifolia, also called “karehau”, is traditionally used as a treatment for cold symptoms and inflammation of the roots, while the leaves are useful as a wet powder with analgesic, anti-inflammatory, antimicrobe, and antioxidant activity (Handayani & Natasia, 2018; Erwin et al., 2015).

Pharmacognostic studies are the first step in the standardization process of medicines derived from plants (Yuan et al., 2016). This research helps identify the nature and characteristics of a plant material. Identification and quality assurance of an ingredient are important prerequisites for ensuring plant quality that will contribute to safety and efficacy (Castillo et al., 2020; Ekor, 2013).
According to previous research it was revealed that the leaves of *C. longifolia* with 70% ethanol extract had several secondary metabolite compounds such as flavonoids, tannins, saponins, and terpenoids (Supomo et al., 2016; Semiawan et al., 2015). However, research on the content of chemical compounds from the roots of *C. longifolia* plants especially those originating from South Kalimantan has never been done before, so researchers are interested in examining the pharmacognostic study of *C. longifolia* by organoleptic, macroscopic, microscopic, identification of groups of chemical compounds, and thin-layer chromatography (TLC). This pharmacognostic study is expected to be able to assist in identifying the content of efficacious compounds especially those found in the roots of the *C. longifolia* plant.

**MATERIALS AND METHODS**

*Plant material*

*C. longifolia* plant was collected from Pelaihari, South Kalimantan in the month of January 2018. The plant was identified by Laboratory of Pharmacognosy, Faculty of Mathematics and Natural Sciences, Universitas Lambung Mangkurat.

*Pharmacognostic study*

Coarse root powder of *C. longifolia* is used to study organoleptic, macroscopic, microscopic, phytochemical identification, and TLC profiles of *C. longifolia* ethanol extract (Supomo et al., 2016; Wulandari, 2011; Hanani, 2014; Gandjar & Rohman, 2007; Puspadewi et al., 2013).

**RESULTS AND DISCUSSION**

*Organoleptic test*

*C. longifolia* root observed shape, color, taste, and odor based on five respondents' opinions. Organoleptic examination of fresh *C. longifolia* root color was light brown while the root simplicia was brown. Fresh roots and simplicia of *C. longifolia* has a bitter and some bitter taste, the taste is suspected to have an alkaloid and saponin compound as according to Harborne (2006), alkaloids and saponins have a bitter or bitter taste. The smell of fresh roots and simplicia of *C. longifolia* has a distinctive odor that is a rather pungent odor.

*Macroscopic characteristics*

Macroscopically, the fresh root of *C. longifolia* is the length around ±90 cm; the width of the *C. longifolia* root is around ±1 cm; and for the *C. longifolia* root form it has a spear shape (Tjitrosoepomo, 2005) with a tapering system, as presented in Figure 1.

![Figure 1. Callicarpa longifolia root](image-url)

*Microscopic characteristics*

Based on microscopic anatomy at a 10 x 10 magnification including epidermis, exodermis, cortex, endodermis, transport file, and pith, as can be observed in Figure 2. At a magnification of 40 x 10 available stone cells and Ca oxalate crystal. In the anatomy of root powder with a magnification of 10 x 10 fibers have the epidermis and exodermis are the outermost part of the root, the epidermis consists of a tightly arranged cell membrane, which does not have space between cells. The function of the epidermis is to protect the underlying tissue (Javelle et al., 2011). Endodermis is the layer that separates the cortex with the central cylinder, the function of the endodermis is the part that is inserted by ground water...
into the ship. The cortex is composed of several layers of cells, which are close to the epidermal layer (Palmgren, 2018).

At the root of the transport beam system consists of xylem and phloem arranged alternately. The transportation file consists of xylem or a means of transportation used to transport food and nutrient extracts from the soil to the whole body of the plant, and phloem, which is a file that functions as a carrier of photosynthesis from the leaves to the entire body of the plant (Turner & Sieburth, 2003). Pith is located between transport vessels that are in the parenchymal tissue. The function of the pith itself is used to store nutrients for plants, travel nutrients in the stems, branches, leaves and roots of plants. Stone cells (sclereids) is a network of sclerenchyma cells that are relatively round with a thick cell wall, this network serves to strengthen the body of the plant (Whitehill et al., 2016).

Calcium oxalate crystal as can be seen in Figure 3 is indicated by black dots (Toolakou et al., 2016). The function of calcium oxalate crystal is as a protector for plants, because calcium oxalate can react allergically to animals that eat it. Fibers are sclerenkim tissue, consisting of cells that are elongated with thick and pointed-ended cell walls, which function as supporting tissues (Whitehill et al., 2016).
Phytochemical screening

Phytochemical screening of *C. longifolia* roots showed positive results on the presence of alkaloid, flavonoid, saponin, and triterpenoid compounds. These results are in line with previous studies reported by Ardhany et al. (2019) and Saputra (2016).

Thin-layer chromatography profile

Thin-layer chromatography results using ethyl acetate : methanol : water (8 : 2 : 1) eluent provide good stain management and quite clearly separated. On observations using UV$_{254}$ nm obtained three stains with the Rf value of 0.72; 0.61; and 0.54. Observation using UV$_{366}$ nm appeared single white stain with Rf value of 0.54. Observation using H$_2$SO$_4$ stain viewer which was then heated in an oven obtained four stains with Rf value of 0.14; 0.54; 0.61; and 0.72. From the results of TLC profiles obtained four spots that showed about samples using eluent ethyl acetate : methanol : water (8 : 2 : 1). For the value of Rf is in accordance with the range, while the value of Rf between 0.2 - 0.8 (Gandjar & Rohman, 2007).

The Rf value can be made to prove in identifying the composition. If the value of Rf has the same value, then the composition can be claimed to have the same or similar characteristics. Meanwhile, if the Rf value is different from the complement that can be claimed to represent a different composition (Kartini et al., 2020).

Based on the description, seen from the TLC profile and Rf value of 70% ethanol extract of *C. longifolia* root with ethyl acetate eluent : methanol : water (8 : 2 : 1). The eluent optimization is good for improvement, but for development it can be done by increasing the polarity of the eluent mixture used (Zhang et al., 2018). The TLC plate with multiple spotting views is presented in Figure 4, while a comparison of the Rf values obtained is presented in Table I.

**CONCLUSION**

Characteristics of *C. longifolia* root there are several examinations consisting of organoleptic examination of *C. longifolia* root has a light brown root color, a bitter taste and a bit bland and a rather pungent characteristic odor. Macroscopic examination of *C. longifolia* root has a length of approximately 490 cm; width of approximately ≥ 1 cm; and for the shape of the roots of *C. longifolia* is a spear with a tapered root system. In microscopic examination of the identified fragments the cell forms are epidermis, exodermis, cortex, endodermis, transport beam, calcium oxalate crystal, and stone cells. From the results of identification of chemical compounds, the compounds contained in *C. longifolia* root are alkaloids, flavonoids,
saponins, and triterpenoids. The results of the TLC profile showed four stains on the plate using eluent ethyl acetate: methanol: water (8:2:1).

ACKNOWLEDGMENT

The authors would like to thank Department of Pharmacy Sekolah Tinggi Ilmu Kesehatan Borneo Lestari for providing the support.

REFERENCES

Ardhany, S.D., Chusna, N., Utar, Z., Zakaria, Z., & Pascalo, B. (2019). Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (Callicarpa longifolia Lam) from Central Kalimantan. Letters in Applied NanoBioScience, 8(4), 739-743. doi:10.33263/LIANBS84.739742

Castillo, L., Baltodano, E., Ramirez, N., Vargas, R., & Hanley, G. (2020). Design of Experiments Assessment for the Determination of Moisture Content in Five Herbal Raw Materials Contained in Tea Products. Borneo Journal of Pharmacy, 3(1), 22-35. doi:10.33084/bjop.v3i1.1236

Ekor, M. (2013). The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. Frontiers in Pharmacology, 4, 177. doi:10.3389/fphar.2013.00177

Erwin, E., Nisa, R.A., & Daniel, D. (2015). Phytochemical Test, Toxicity and Antioxidant Activity Leaves Kerehau (Callicarpa longifolia Lam) With DPPH Method. Jurnal Akta Kimia Indonesia (Indonesia Chimica Acta), 8(1), 52-59. doi:10.20956/ica.v8i1.2481

Gandjar, I.G. & Rohman, A. (2007). Kimia Farmasi Analisis. Yogyakarta, Indonesia: Pustaka Pelajar.

Hanani, E. (2014). Analisis Fitokimia. Jakarta, Indonesia: Penerbit Buku Kedokteran EGC.

Handayani, R. & Natasia, G. (2018). Uji Daya Hambat Ekstrak Etanol Daun Sangkareho (Callicarpa longifolia Lam.) terhadap Escherichia coli. Jurnal Surya Medika (JSM), 3(2), 54-61. doi:10.33084/jsm.v3i2.98

Harborne, J.B. (2006). Metode Fitokimia, Penentuan cara modern menganalisis Tumbuhan. Bandung, Indonesia: ITB Press.

Harley, R.M., Atkins, S., Budantsev, A.L., Cantino, P.D., Conn, B.J., Grayer, R., de Kok, R., Krestovskaja, T., Morales, R., Paton, A.J., Ryding, O., Upson, & Labiatae, T. In: Kadereit, J.W., Ed. (2004). Flowering Plants, Dicotyledons: Lamiales, except Acanthaceae, including Avicenniaceae, The Families and Genera of Vascular Plants. New York, U.S: Springer. doi:10.1007/978-3-642-18617-2

Javelle, M., Vernoud, V., Rogowsky, P.M., & Ingram, G.C. (2011). Epidermis: the formation and functions of a fundamental plant tissue. The New Phytologist, 189(1), 17-39. doi:10.1111/j.1469-8137.2010.03514.x

Kartini, K., Dewi, E.R., Achmad, F., Jayani, N.E., Hadiyat, M.A., & Avanti, C. (2020). Thin Layer Chromatography Fingerprinting and Clustering of Orthosiphon stamineus Benth. from Different Origins. Pharmacognosy Journal, 12(1), 79-87. doi:10.5530/pj.2020.12.13

Khoo, H.E., Azlan, A., Kong, K.W., & Ismail, A. (2016). Phytochemicals and Medicinal Properties of Indigenous Tropical Fruits with Potential for Commercial Development. Evidence-Based Complementary and Alternative Medicine, 2016, 7591951. doi:10.1155/2016/7591951

Novaryatiin, S., Sari, A. A., & Mulyani, E. (2018). Antibacterial Activity of Ethanolic Extract of Sangkareho (Callicarpa longifolia Lam) against Staphylococcus epidermidis. Borneo Journal of Pharmacy, 1(2), 85-88. doi:10.33084/bjop.v1i2.427

Palmgren, M. (2018). Plant epithelia: What is the role of the mortar in the wall? PLoS Biology, 16(12), 3000073. doi:10.1371/journal.pbio.3000073

Puspawati, R., Adirestuti, P, & Menawati, R. (2013). Khasiat Umbi Bawang Dayak (Eleutherine palmifolia (L.) Merr.) Sebagai Herbal Antimikroba Kulit. Kartika: Jurnal Imiah Farmasi, 1(1), 31-37. doi:10.26874/kjif.v1i1.21

Qamariah, N., Handayani, R., & Khadafi, A. (2016). Pemanfaatan Tumbuhan Sangkareho (Callicarpa longifolia Lam) Asal Kalimantan Tengah sebagai Obat Tradisional. Jurnal Surya
Fitriyanti, Yusmalina, Muthia R. 2020. Pharmacognostic Study of Sangkareho Root (Callicarpa longifolia Lam.) from South Kalimantan. *Medika* (JSM), 2(1), 14-22. doi:10.33084/jsm.v2i1.364

von Rintelen, K., Arida, E., & Häuser, C. (2017). A review of biodiversity-related issues and challenges in megadiverse Indonesia and other Southeast Asian countries. *Research Ideas and Outcomes*, 3, 20860. doi:10.3897/rio.3.e20860

Saputra, A.K. (2016). Uji Identifikasi Farmakognostik Tumbuhan Sangkareho (Callicarpa longifolia Lam.) asal Kalimantan Tengah. In: Pratama, M.R.F., Ed. (2016). *Prosiding Seminar Nasional Ilmu Kesehatan SNiK*. Palangka Raya, Indonesia: Universitas Muhammadiyah Palangkaraya.

Semiawan, F., Ahmad, I., & Masruhim, M.A. (2015). Aktivitas Antiinflamasi Ekstrak Daun Kerehau (Callicarpa longifolia L.). *Jurnal Sains dan Kesehatan*, 1(1), 1-4. doi:10.25026/jsk.v1i1.7

Setyowati, F.M. (2010). Etnofarmakologi Dan Pemakaian Tanaman Obat Suku Dayak Tunjung Di Kalimantan Timur. *Media Penelitian dan Pengembangan Kesehatan*, 20(3), 104-112.

Supomo, Supringrum, R., & Junaid, R. (2016). Karakterisasi Dan Skrining Fitokimia Daun Kerehau (Callicarpa longifolia Lamk.). *Jurnal Kimia Mulawarman*, 13(2), 89-96.

Tjitrosoepomo, G. (2005). *Morfologi Tumbuhan*. Yogyakarta, Indonesia: Gadjah Mada University Press.

Toolakou, G., Giannopoulos, A., Nikolopoulos, D., Bresta, P., Dotsika, E., Orkoula, M.G., Kontoyannis, C.G., Fasseas, C., Liakopoulos, G., Klapa, M.I., & Karabourniotis, G. (2016). Alarm Photosynthesis: Calcium Oxalate Crystals as an Internal CO2 Source in Plants. *Plant Physiology*, 171(4), 2577-2585. doi:10.1104/pp.16.00111

Turner, S. & Sieburth, L.E. (2003). Vascular Patterning. *The Arabidopsis Book*, 2, 0073. doi:10.1199/tab.0073

Whitehill, J.G., Henderson, H., Schuetz, M., Skyba, O., Yuen, M.M., King, J., Samuels, A.L., Marsfield, S.D., & Bohlmann, J. (2016). Histology and cell wall biochemistry of stone cells in the physical defence of conifers against insects. *Plant, Cell & Environment*, 39(8), 1646-1661. doi:10.1111/pce.12654

Wulandari, L. (2011). *Kromatografi Lapis Tipis*. Jember, Indonesia: Taman Kampus Presindo.

Yuan, H., Ma, Q., Ye, L., & Piao, G. (2016). The Traditional Medicine and Modern Medicine from Natural Products. *Molecules*, 21(5), 559. doi:10.3390/molecules21050559

Zhang, Q.W., Lin, L.G., & Ye, W.C. (2018). Techniques for extraction and isolation of natural products: a comprehensive review. *Chinese Medicine*, 13, 20. doi:10.1186/s13020-018-0177-x