



Laportea decumana (Robx) Wedd. Herbal Endemic Potential from Indonesia: A Literature Review

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Abstract

Edited by: Sinisa Stojanoski
Citation: Thalib A, Masadah R, Prihartono P, Hamid F, Hasan H, Keliwawa S, Labulawa I. *Laportea decumana* (Robx) Wedd. Herbal Endemic Potential From Indonesia: A Literature Review. Open Access Maced J Med Sci. 2021 Nov 26; 9(F):639-643. <https://doi.org/10.3889/oamjms.2021.7759>
Keywords: *Laportea decumana* (Robx) Wedd.; Itchy leaves; Herbal medicine
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Received: 21-Aug-2021
Revised: 30-Oct-2021
Accepted: 25-Nov-2021
Copyright: © 2021 Abdul Thalib, Rina Masadah, Prihartono Prihartono, Firdaus Hamid, Hulan Hasan, Sudin Keliwawa, Irman Labulawa
Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
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BACKGROUND: Indonesia with its tropical rainforest and its endemic flora, namely, *Laportea decumana* (Robx) Wedd. which is used as a traditional medicine. If we want to adopt it in complementary of nursing therapy as herbal medicine, it must be proven on an evidence-based.

METHODS: The design in this study was a literature review article. Search for articles using relevant ones obtained from data based on Pubmed, Proquest, Ebsco, ScienceDirect, and Google Scholar in the span of the past 10 years (2011–2021) obtained 248 articles.

RESULTS: There are seven articles that are relevant and discuss their content and use in the health.

CONCLUSION: *L. decumana* is found in Indonesia as well as in Papua New Guinea. *L. decumana* (Robx) Wedd. contains alkaloids, glycosides, steroids/triterpenoids, flavonoids, tannins, and saponins which have proven their antioxidant, antibacterial, analgesic, and cytotoxic activity.

Introduction

Indonesia with its tropical rainforests makes it rich in flora, although the area of Indonesia is only about 1.3% of the earth, but it ranks seventh in the world rich in flora with species reaching 20,000 species of which 40% are endemic plants of Indonesia [1].

The existence of endemic flora is very interesting to be developed especially in the field of health. Moreover, when people's interest in traditional medicine with the use of natural ingredients is increasing, this is shown by the increasing research on herbs in recent years. In the field of nursing, the use of herbs in the provision of nursing care especially in nursing interventions is legalized because it is part of complementary nursing therapy. There are four types of complementary therapies in nursing, namely, mind-body-spirit, manipulative and body-based therapy, biologically based therapies, and energy therapies, where herbal therapies are included in biologically based therapies [2].

Utilization of natural materials has basically been done since long ago where the knowledge is obtained through generations so that it is known as traditional medicine in the community. One of the traditional medicines that more used by people in the Eastern Indonesia, especially Papua and Maluku, is itchy leaves. Itchy leaves are scattered around the world as in Asia, Africa, [3] and Europe [4]. There are several types in Indonesia delivered *Laportea interrupta* (L.) Chew, [5], [6] *Laportea aestuans* (Linn.) Chew, [7] *Dendrocnide peltate*, [8] and *Laportea decumana* (Robx) [9].

L. decumana (Robx) is an endemic flora found in the Eastern Indonesia. People believe that *L. decumana* (Robx) is able to relieve aches, fatigue, relieve abdominal pain, and clean the baby's skin when used while pregnant. However, the use of traditional medicine needs to be proven scientifically because the lack of function and apology of traditional medicinal plants can actually turn into harmful ingredients. Therefore, this review will try to check the latest knowledge about *L. decumana* (Robx) with the aim of finding realistic use in the community.

Methods

Design

This study is a literature review. Literature review is a survey whether it comes from scientific articles, books or from relevant sources that will be synthesis informative, critical, and useful for a particular topic [10], [11].

Article criteria

To focus the search for this review article, in this study made the criteria of inclusion: (1) Focus on *L. decumana*, (2) research in the field of health, (3) full texts, (4) published in the range of 2011-2022, and (5) English language articles. The criteria of exclusion: (1) Just abstract, (2) incomplete text, and (3) double publication. The question in this study is how far is the testing of *L. decumana* (Roxb) scientifically and its application in society?

Article search

In the search, the article uses the words "OR" and "AND" with the search word "Laportea AND Decumana" OR "Laportea AND Decumanum." The literature search using five data based: PubMed, ebsco, proquest, sciencedirect, and Google Scholar.

Study selection

In this article, 248 articles were identified from five database searches with descriptions of PubMed: 3, ebsco: 0, proquest: 0, sciencedirect: 0, and Google Scholar: 243, excluded articles that were double published. From these results, three articles were double published, 32 were excluded because they were not articles, and 191 were excluded because they were not in accordance with the research question. Of the 22 articles, 15 articles were excluded because they did not explain the use based on the content of *L. decumana* (Roxb.). The articles that were included were seven research articles.

The article selection process uses the prism method starting from Identification, Screening, Eligibility, until the Included article is obtained as presented in Figure 1.

Results

Characteristic studies

In this systematic review, there are seven articles that are included. This article was published from 2014 to 2020. The research was conducted in Indonesia, one research conducted directly in humans

and six other laboratory-based researches. Articles that meet the criteria are then summarized. The results of this summary are presented in a grid synthesis table as presented in Table 1.

Discussion

This systemic review aims to determine the scientific testing of *L. decumana* and its application. There are seven articles reviewed that discuss about the capabilities of *L. decumana*. *L. decumana* plant is not only found in Indonesia but also found in Papua New Guinea where it is still on land with the island of Papua [18], [19].

Identification of the content of *L. decumana*

Although in the community do not know the content of itchy leaves, they believe that the plant has extraordinary properties and knowledge is inherited hereditary that became part of the family medicinal plant [20]. Some studies discuss the content of *L. decumana* which states that the leaves of positive itching contain compounds of alkaloid group, steroidal glycosides/triterpenoids and negative for saponin, flavonoid, polyphenols, and tannins [15]. However, there is also research that explains that *L. decumana* (Roxb.) kuntze has flavonoids, tannins, and saponins [16].

Identification of *L. decumana* capability

Analgesic

Conventionally, people in Indonesia especially Eastern Indonesia have used it as a traditional medicine to relieve fatigue or as a tired reliever, some areas that use it such as in Maluku, Biak, and Depapre [14] Wulukubun Arso XIV [17]. *L. decumana* has also been used as an analgesic to overcome the problem of myalgia [12] besides it has also been made in the form of preparations and preparations that are water soluble preferred because it is easier to cleaned up [21]. In Papua, there are some itchy leaves commonly used by the community there to relieve aches such as *L. decumana* (Roxb.) Wedd, *Laportea interrupta* (L.) Chew, and *Dendrocnide peltata* (Blume) Miq [17], [22].

Antioxidant

The antioxidant ability of *L. decumana* is not widely known by the public so in its application is still very rare that is found in connection with its use as an antioxidant. There are two articles discussing the antioxidant capabilities of *L. decumana* where the

Table 1: Synthesis of the grid utilization of *L. decumana* (roxb) Wedd

No.	Researcher	Country	Method	Research	Purpose	Sample size	Intervention	Instrument	Result	Conclusion
1.	Reni Ariastuti, Kairul Anam, Idris Yani Pamungkas, 2018, Indonesia [12]		Quasi Experimental pretest-posttest with control design	Design with One group	To see the effectiveness of the use of <i>L. decumana</i> for myalgia sufferers in the village of ATSI District, Asmat District, Papua Province	40 people sampled 20 for control group and 20 for treatment	Rubbing <i>L. decumana</i> (fresh leaves on the fur) on the skin of a myalgia sufferer who feels muscle pain for about 5 min then 25 min after administration of itchy leaves is carried out an assessment/scoring of the degree of pain using the FLACC scale	Face scale observation sheet, lag, activity, cry and consolability (FLACC)	The average degree of myalgia in the treatment group before the use of <i>L. decumana</i> was 5.80 and after treatment decreased to 2.70. The analgesic power of <i>L. decumana</i> was 53.45%. The mean degree of myalgia in the control group (without treatment) was 5.65 early and 5.50 late. There is a significant effect in the use of <i>L. decumana</i> as an analgesic for myalgia sufferers in ATSI village, ATSI district, Asmat district, Papua province	This study shows that the use of <i>L. decumana</i> can be used as a natural analgesic in reducing pain levels in myalgia patients
2.	Gino Nemesio Capeda, Murtiningrum, Dressy Leonora Oriso, 2020, Indonesia [13]		Phytochemical extraction is carried out by infuse method, the design used in this study is a complete randomized design (RAL), consisting of several concentrations. Each of these treatments is carried out Diphthogenous atomic donation capacity testing was conducted using the free radical antidote method 1,1-diphenyl-2-picrylhydrazyl (DPPPH) while metal grade capacity testing using the Fe ²⁺ ion class method. Each concentration treatment was tested by replication 3 times	Design with One group	To find out the antioxidant capacity of itchy leaf water extract (<i>L. decumana</i>) which includes the capacity of hydrogen atom donation to free radicals and metal class capacity and its potential as a source of natural antioxidants	<i>L. decumana</i> extract, which consists of the treatment of water extract concentrations of itchy leaves, namely, 0, 0.1, 0.2, 0.3, 0.4, and 0.5%	-	Observation sheet	Itchy leaves (<i>L. decumana</i> (Robx.) Wedd.) is a medicinal plant that is widespread in Papua and West Papua. This plant is used to relieve body pain, tiredness, aches, headaches, abdominal pain, bone joint pain and bruises. This study test results showed that the donation capacity of hydrogen atoms and the ion class Fe ²⁺ extract <i>L. decumana</i> increased in accordance with the increased concentration where the concentration of 0.3% as the optimal concentration of hydrogen atom donation capacity while the capacity of theoptimum Fe ²⁺ ion class at a concentration of 0.4%. Itchy leaf extract has a capacity of Fe ²⁺ ion class by 6.50 times compared to Vitamin C at the same concentration	This study found that the water extract of Laportea decumana has the potential as a natural source of antioxidants in binding prooxidant metal ions
3.	Simaremare et al., 2018, Indonesia [7]		Samples of itchy leaves taken from Central and Biak Memberamo, extracted with ethanol solvent, then tested for toxicity against Artemia salina Leach larvae by Brine Shrimp Lethality Test (BSLT) Method	Design with One group	To compare the activity of cytotoxic extract ethanol itchy leaves (<i>L. decumana</i>) breed origin by membramo	The extraction of <i>L. decumana</i> from the middle and biak medis is dissolved with concentrations of 50, 100, 250, 500, 750, and 1000 ppm	-	Observation sheet	The results of the itchy leaf toxicity test (<i>L. decumana</i>) from Biak showed LC ₅₀ 1250.05 ppm while the itchy leaves from Memberamo showed LC ₅₀ 350.38 ppm	This study showed that the toxicity test of itchy leaves (<i>L. decumana</i>) from Biak showed LC ₅₀ 1250.05 ppm was not toxic while itchy leaves from Memberamo showed LC ₅₀ 350.38 ppm which is toxic
4.	Simaremare et al., 2015, Indonesia [14]		Simplicia is made by sifting 125 mesh itchy leaves and formulated into a soluble base ointment, then done Organoleptic test, pH, homogeneity, spreadability, adhesion, and effectiveness test	Design with One group	To compare the effectiveness of itchy leaf ointment of Biak origin (<i>L. decumana</i>) with itchy leaf ointment (Laportea sp.) depapre origin	Itchy leaf ointment of Biak origin (<i>L. decumana</i>) with itchy leaf ointment (Laportea sp.) depapre origin	-	Observation Sheet	The results of this study showed that in the organoleptic test the itchy leaves of biak origin are very viscous compared to the itchy leaves of depapre origin, as well as in the test of adhesion where the leaves of itchy of breed origin 18.63 while the itchy leaves of depapre origin 18.54. For homogeneity, pH, sebat power and protection power are all the same	This research shows that itchy leaves from Biak are more effective than ointments from Depapre
5.	Simaremare et al., 2014, Indonesia [15]		Dragendroff method, Mayer, Lieberman burchard test, +achydrate acetic acid, +concentrated sulfuric acid, +FeCl ₃ , + Zinc powder, and+HCl	Design with One group	To develop the use of itchy leaves as a drug other than antinyeri by conducting phytochemical screening	Itchy Leaves (<i>L. decumana</i> (Robx.)	-	Observation Sheet	The results showed that the positive content of alkaloids, glycosides and triterpenoids was seen in the Mayer test, lieberman burchard test, +achydrate acetic acid, +concentrated sulfuric acid, while for the content of saponins, flavanoids, polyphenols, and tannins negative	This study shows that positive itchy leaves contain alkaloid group compounds, steroidal glycosides/triterpenoids and negative for saponin, flavonoid, polyphenols, and tannins tests

(Contd...)

Table 1: (Continued)

No.	Researcher, Country	Method research	Purpose	Sample size	Intervention	Instrument	Result	Conclusion
6.	Bella, Hestiningtyas, Johnson Siallangan, and Elizabeth Holle, 2019, Indonesia [16]	The extraction method of itchy leaves is maceration with methanol solvent p.a. The yield of the extract is 5.75%. Partitioning is carried out with non-polar solvents (n-hexane) and semi-polar (ethyl acetate). The purpose of partitioning is to separate the chemical components on itchy leaf extract in different solvents of polarity. The yield of non-polar fractions was 0.206% and the polar fraction was 0.254%. Test the antioxidant activity of itchy leaves using the DPPH method (1, 1-difenil-2-pikridrazil).	To know the activity of itchy leaves as antioxidants	Itchy Leaves (Laportea decumana (Roxb.)	-	Observation Sheet	Phytochemical test of itchy leaf extract contains flavonoids, tannins, and saponins. I _c value ₅₀ total methanol extract is 90.31 ppm, nonpolar fraction 208.76 ppm, and polar fraction 34.61 ppm	This research shows that <i>L. decumana</i> (Roxb.) kunze has flavonoids, tannins and saponins and has high antioxidant capabilities in polar fractions
7.	Simaremare et al., 2019, Indonesia [17]	<i>L. decumana</i> is made in the form of simplicia powder, extracted with ethanol, and then diffractioned using three solvents, namely, n-hexane, ethyl acetate, and ethanol	To find out the antibacterial and toxicity of the <i>L. decumana</i> fraction	Itch Leaf Extract (<i>L. decumana</i> (Roxb.) from Papua Indonesia	-	Observation sheet	Result research fraction <i>L. decumana</i> has antibacterial activity against bacteria <i>E. coli</i> and <i>Staphylococcus aureus</i> . Toxicity tests showed that the n-hexane and ethyl acetate fractions were toxic while ethanol was not toxic	This research shows that fractionation will affect the toxicity ability of <i>L. decumana</i>

L. decumana: Laportea decumana, *E. coli*: Escherichia coli

research is still in the scope of laboratory tests. The first research says that the water extract of *L. decumana* infused has the potential as a source of natural antioxidants in binding to metal ions that are proximal [13] with the content of flavonoids, tannins, and saponins which are high antioxidants in polar fractions [16].

Antibacterial

One article discusses the antibacterial capabilities of the *L. decumana* fraction where it has antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* bacteria. The fraction is more effective as an antibacterial against the bacteria *S. aureus*.

Cytotoxic

There are two studies that discuss the cytotoxic capabilities of *L. decumana*. The research trying to compare itchy leaves that come from two different places where the results showed itchy leaves (*L. decumana*) from Biak showed LC₅₀ 1250.05 ppm is not toxic while itchy leaves from Memberamo show LC₅₀ 350.38 ppm which is toxic [14]. The technique of fractionation will also affect the ability of toxicity of *L. decumana* [9].

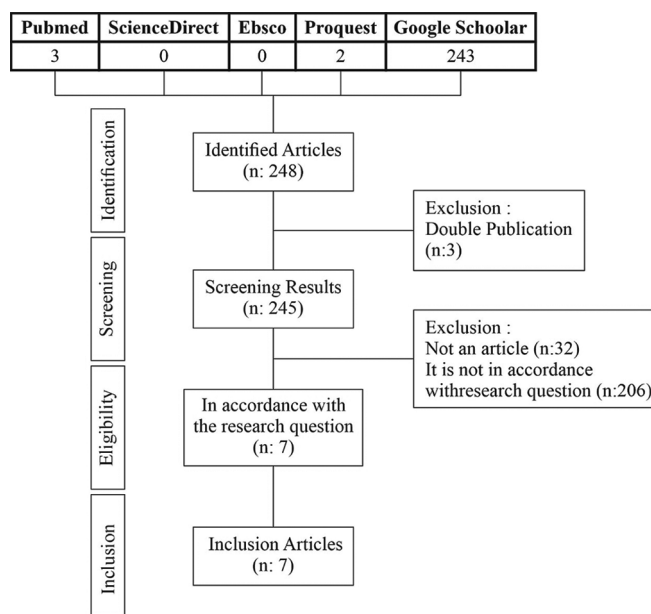


Figure 1: Flowchart of article selection and exclusion

Conclusion

L. decumana in addition to being in Indonesia is also in Papua New Guinea. *L. decumana* contains alkaloids, glycosides, steroids/triterpenoids, flavonoids, tannins, and saponins that have proven antioxidant activity, antibacterial, analgesic, and cytotoxic activity.

However, no one has reported in detail about the compounds they contain specifically and as large as still in the laboratory test phase so it still needs to be done more in-depth research to get more detailed information from this plant.

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