



Jurnal Tumbuhan Obat Indonesia



Volume 17 No. 1 2024

JURNAL TUMBUHAN OBAT INDONESIA

THE JOURNAL OF INDONESIAN MEDICINAL PLANT



ISSN : 1979-892X
E-ISSN : 2354-8797



p-ISSN 1979-892X

Fakultas Pertanian Universitas Tidar
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EDITORIAL

Peneliti dan Pencinta tumbuhan obat di Indonesia yang berbahagia,

Indonesia dikaruniai keberlimpahan biodiversitas tumbuhan. Dari sekitar 30.000 spesies tumbuhan, 7.000 di antaranya dimanfaatkan oleh masyarakat. Sejarah panjang menunjukkan bahwa tumbuhan yang dimanfaatkan sebagai obat memiliki peran dalam merawat kesehatan masyarakat, utamanya bagi warga yang bertempat tinggal jauh dari akses kesehatan formal. Riset tumbuhan obat dan jamu (Ristoja) yang dilaksanakan tahun 2012, 2015, dan 2017 melaporkan terdapat 2.848 spesies telah dimanfaatkan oleh masyarakat Indonesia sebagai obat.

Keterbatasan eksplorasi tumbuhan berkhasiat obat dari aspek keselamatan, kemanfaatan, dan mutu masih menjadi pembatas penggunaan tumbuhan obat dalam pelayanan kesehatan formal. Oleh karenanya jurnal tumbuhan obat Indonesia (JTOI) diterbitkan untuk mengeksplorasi, mengembangkan, dan mendiseminasikan pemahaman tentang kekayaan flora Indonesia dan potensi pemanfaatannya sebagai alternatif perawatan kesehatan. Melalui kerja sama konstruktif lintas disiplin ilmu-ilmu botani, farmakologi, etnobotani, pengobatan tradisional, klinisi, budidaya, dan peneliti bidang terkait lainnya, kami memublikasi artikel tentang biodiversitas tumbuhan obat dan kearifan lokal berdasarkan pendekatan penelitian.

Jurnal TOI volume 17 nomor 1 yang diterbitkan oleh Fakultas Pertanian Universitas Tidar ini merupakan kelanjutan dari sebelumnya. Jurnal yang terbit 2 kali setahun ini pada awalnya dikelola oleh balai besar pengembangan tanaman obat dan obat tradisional (B2P2TOOT) Tawangmangu yang bernaung di bawah badan penelitian dan pengembangan kesehatan (Balitbangkes). Perubahan struktur organisasi di B2P2TOOT pun memengaruhi pengelolaan JTOI. Jurnal TOI volume 17 nomor 1 ini menerbitkan 7 artikel dengan dua bahasa, yaitu Bahasa Indonesia dan Bahasa Inggris terkait riset aktivitas farmakologi tumbuhan obat, dengan judul artikel sebagai berikut:

1. *Chemical Characterization of Moringa oleifera Lam. from Six Growth Locations in Central of Java: An Initiation of Standardization.*
2. *Antifungal Activity the Active Fraction of Orange Jasmine (Murraya Paniculata (Linn) Jack) Leaves and Stem Bark against Malassezia Furfur.*
3. *Increasing Artemisinin Content on Artemisia Plants Through Endophytic Bacteria Inoculation as An Effort to Support the Availability of Malaria Drugs*
4. *In Silico Study of Acetogenin Compounds from Soursop (Annona Muricata) Leaves as Sodium-Glucose Cotransporter-2 (SGLT2) Inhibitors.*
5. Peningkatan Aktivitas Afrodisiak Mikroemulsi Icariin, Ekstrak Purwaceng dan Ekstrak Pasak.
6. Potensi Tanaman Ganjan (*Artemisia vulgaris*) dalam Penyembuhan Luka Sayat pada Tikus (*Sprague Dawley*).
7. Uji Toksisitas Akut Ekstrak Etanol Daun Alpukat (*Persea Americana* Mill.) dan Pengaruhnya terhadap Hepar Mencit BALB/C.

Untuk merawat, menjaga kesinambungan, serta meningkatkan isi jurnal ini, kami mengundang Bapak/Ibu untuk menyampaikan artikel hasil kajian, *review*, atau studi kasus untuk



pengembangan ilmu tumbuhan obat. Kami mengharapkan artikel yang dimuat di jurnal ini meliputi aspek tumbuhan obat Indonesia, termasuk namun tidak terbatas pada topik berikut:

- **Penelitian Botani:** Identifikasi, klasifikasi, dan karakterisasi tumbuhan obat yang ada di Indonesia, serta studi tentang ekologi dan habitatnya;
- **Aspek Farmakologi:** Penelitian tentang senyawa aktif dan mekanisme aksi tumbuhan obat, serta potensi aplikasi dalam pengobatan dan pencegahan penyakit;
- **Etnobotani dan Kearifan Lokal:** Penelitian tentang penggunaan tradisional tumbuhan obat dalam beragam budaya di Indonesia;
- **Pengembangan Produk Herbal:** Inovasi dalam ekstraksi, formulasi, dan pengolahan produk herbal yang ramah lingkungan dan efektif;
- **Konservasi dan Keberlanjutan:** Upaya untuk melestarikan keanekaragaman hayati tumbuhan obat dan mengembangkan praktik pengelolaan yang berkelanjutan;
- **Studi Pra-klinik dan Klinik:** Uji klinis dan penelitian terkait yang menilai efektivitas dan keamanan penggunaan tumbuhan obat dalam pengobatan modern.

Kami meyakini berkembangnya ilmu pengetahuan akan ditentukan oleh penelitian yang memiliki kaidah baku dan bermutu. Oleh karena itu, setiap artikel yang diterbitkan dalam jurnal ini akan melalui proses *review* terukur oleh para ahli di bidangnya. Kami mengedepankan untuk menerbitkan karya-karya yang otentik, orisinal, berkualitas, dan berkontribusi positif bagi perkembangan ilmu tumbuhan obat di Indonesia.

Jurnal Tumbuhan Obat Indonesia adalah jurnal dengan akses terbuka untuk memastikan bahwa pengetahuan yang disajikan dapat diakses secara luas oleh para peneliti, praktisi medis, akademisi, dan masyarakat umum. Kami berharap jurnal ini mampu menyumbang dan mendorong penelitian, inovasi, dan pemanfaatan tumbuhan obat Indonesia.

Terima kasih atas dukungan dan kerja sama Ibu/Bapak dalam untuk merawat kekayaan alam Indonesia dan mengoptimalkan potensi tumbuhan obat bagi peningkatan derajat kesehatan dan kesejahteraan bersama.

Salam,

Tim Redaksi
Jurnal Tumbuhan Obat Indonesia



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Chemical Characterization of Moringa oleifera Lam. from Six Growth Locations in Central of Java: An Initiation of Standardization

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ABSTRACT

Moringa oleifera Lam. is in high demand as a raw material for pharmaceutical constituents and dietary supplements, particularly for producing stunting supplements. However, recommendations regarding M. oleifera quality standards have not supported this claim as scientific evidence of its safety and effectiveness. This research intends to expand knowledge regarding the quality standards of M. oleifera leaves, particularly their chemical properties. Height-variant samples of M. oleifera were collected from six locations in the Central Java, Indonesia. A hierarchical cluster analysis (HCA) was performed to group the most each parameter's values. The parameters included water-soluble extract, ethanol-soluble extract, total ash content, acid-insoluble ash, total flavonoid content was quantified as quercetin, and thin-layer chromatography (TLC) fingerprint. The suggestion of specific value for each parameter as a future reference for M. oleifera, including water- and ethanol-soluble extract content of at least 41% and 19%, and a total- and acid-insoluble ash content of a maximum of 11% and 4%, respectively. The minimal quercetin contains as the chemical marker compound of M. oleifera was a minimum of 1.285%. The chromatogram profile of TLC suggested 7 (254 nm) and 8 (366 nm) spots.

Keywords: Chemical profile, cluster analysis, moringa, quality standard, standardization

Antifungal Activity the Active Fraction of Orange Jasmine (Murraya paniculata (Linn) Jack) Leaves and Stem Bark Against Malassezia furfur

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ABSTRACT

Leaves and stem bark of orange jasmine have bioactive compounds such as phenol and flavonoids, which these compounds could be extracted by organic solvent and have antifungal activity against Malassezia furfur which cause excema, dandruff and tinea versicolor in humans. Fractionation of the extract would obtain a specific compound based on the polarity of the solvent. This research aims to know the active fraction of leaves and stem bark of orange jasmine which had antifungal activity against Malassezia furfur. The simplicia powder of leaves and stem bark orange jasmine was macerated with 96% ethanol solvent and then fractionated as gradually with n-hexane, ethyl acetate, and water solvent. The antifungal activity of ethanol extract and fractions was tested against Malassezia furfur with 80; 90; 100% concentration by disk diffusion method at 37°C for 48 hours of incubation. The data of antifungal activity was analyzed by two-way ANOVA. The result of this research showed antifungal activity from active fraction as water fraction of leaves and stem bark of orange jasmine against Malassezia furfur. The diameter of inhibition zones for the active fraction of leaves and stem bark of orange jasmine such as 8.6 – 14 mm and 12.3 – 15.8 mm respectively.

Keywords: Antifungal, active fraction, Malassezia furfur, Murraya paniculata



***Increasing Artemisinin Content on
Artemisia Plants
Through Endophytic Bacteria
Inoculation
as An Effort to Support the Availability
of Malaria Drugs***

Farida Yuliani¹⁾, Fadila Rona Nureida¹⁾, Fazat Fairuzia^{1*)}, Eva Hana Rosidah¹⁾, Agung Wahyu Nugroho¹⁾, Afifatul Amiroh²⁾

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ABSTRACT

In 2020, malaria cases worldwide increased from 219 million cases to 241 million cases with 627 thousand deaths. This creates problems in terms of the availability of malaria drugs. In addition, resistance to Plasmodium sp. against the commonly used malaria drug chloroquine is another problem. Therefore, in the treatment of malaria, combination-based treatment with artemisinin is highly recommended. However, there are obstacles in the production of artemisinin because its content in plants is relatively low. Therefore, this research aims to increase artemisinin content using endophytic bacteria. The method used is a factorial design with 2 factors, namely Accessions (Green & Purple) and endophytic bacteria concentration (0%, 1%, and 2%). Endophytic bacteria isolated from artemisinin plants were first cultured in a nutrient-rich medium to increase their population. Then, they were inoculated by spraying them twice a week for two months with each accession in each treatment combination. The results showed that inoculation with endophytic bacteria had the best concentration in increasing artemisinin content, namely 1% in green and purple Artemisia accessions. Artemisinin inoculation of 1% was able to increase artemisinin by 27.85% compared to control plants in green Artemisia and purple Artemisia accessions with an increase of 32.89% compared to control plants. The best concentration of endophytic bacteria in increasing artemisinin content is 1%.

Keywords: *Artemisia annua* L., endophytic bacteria, malaria

***In Silico Study of Acetogenin
Compounds from Soursop
(Annona muricata) Leaves as Sodium-
Glucose Cotransporter-2 (SGLT2)
Inhibitors***

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ABSTRACT

Acetogenin derived from soursop (Annona muricata) leaves are known to have antidiabetic and anticancer activities. Nevertheless, there has been no study related to the compounds found in A. muricata leaves, such as acetogenin, as SGLT2 inhibitors. This research aims to investigate the activity of acetogenin compounds as SGLT2 inhibitors while maintaining low selectivity against SGLT1 using molecular docking methods using Molegro Virtual Docker (MVD). Based on the Rerank score, five acetogenin compounds, namely muricin H, annonacin A, annopentocin B, murihexocin C, and corossolone, are predicted to be SGLT2 inhibitors with better selectivity compared to empagliflozin. Among these five compounds, muricin H and corossolone exhibit the most similarity in interaction with amino acid residues in the SGLT2 A-chain compared to empagliflozin. In silico ADMET analysis results indicate that both compounds have absorption, distribution, and metabolism capabilities, similar to empagliflozin. However, it should be noted that both compounds are more toxic, with muricin H predicted to have hepatotoxic properties.

Keywords: *Annona muricata*, SGLT2, antidiabetic, acetogenin, molecular docking



Enhancement of Aphrodisiac Activity of Icariin, Purwaceng Extract, and Pasak Bumi Extract Microemulsion

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ABSTRACT

Erectile dysfunction (ED) refers to medical issues concerning men's sexual health. Purwaceng, pasak bumi, and epimedium plants contain aphrodisiac compounds that can boost stamina, libido (sexual desire), and male fertility. The formula for microemulsions is 80: PEG 400: oil shavings in a ratio of 73.6711: 12.5705: 13.7584, with icariin, purwaceng, and pasak bumi added. The microemulsion system was created because it contained a large number of active ingredients. The stability of a microemulsion is further influenced by surfactants (tween 80) and cosurfactants (PEG 400) as emulsifiers, as well as the oil used as a solvent for the active component (bottled oil). The goal of this study was to create a microemulsion that would mix icariin, pasak bumi, and purwaceng substances to improve solubility and synergize pharmacological effects. The formulation is optimized using Simplex Lattice Design (SLD) to produce the optimal formula. The microemulsion formulations of icariin, pasak bumi extract, and purwaceng extract produce optimal microemulsions and enter into good microemulsion susceptibility. They can also increase the aphrodisiac effectiveness when compared to the administration of the single active substance icariin, pasak bumi extract, and purwaceng extract. As a result, this product exhibits microemulsion capabilities, allowing it to minimize dose while increasing effect.

Keyword: Aphrodisiac, erectile dysfunction, icariin, microemulsion, pasak bumi, purwaceng

The Potential of Ganjan (Artemisia vulgaris) in Wound Healing in Rats (Sprague Dawley)

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ABSTRACT

Recent studies have focused on exploring natural remedies to accelerate wound healing. One such herbal plant is the Ganjan plant (*Artemisia vulgaris*), which contains essential oils, coumarins, flavonoids, triterpenoids, and phenolic acids, which make it a good candidate for natural remedies. This study analyzed the wound-healing potential of the Ganjan plant using a true experimental research design on 16 male Sprague Dawley rats. The rats were divided into four groups and subjected to different treatments, including a negative control group without treatment (K1), a 10% Ganjan herbal extract ointment group (K2), a 30% Ganjan herbal extract ointment group (K3), and a positive control group with 10% betadine ointment (K4). The ointments were applied once daily for 21 days or until the wounds healed, and wound area measurements were taken every three days. The results showed that the 10% and 30% Ganjan ointments effectively reduced the wound area, and there was no difference in wound contraction between 10% and 30% Ganjan ointment and 10% Betadine. The study concludes that Ganjan plant extract ointment is an effective natural remedy for wound healing and that the best results are seen in the 30% Ganjan extract ointment group.

Keywords: Wound healing, ganjan, *Artemisia vulgaris*



***Acute Toxicity Testing of The Ethanol
Extract of Persea americana Mill.
and Its Influence on The Hepars of
BALB/c Mice***

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ABSTRACT

Avocado leaf ethanol extract as a traditional medicine has been proven to have various pharmacological activities, but the safety of its use is not yet known. This study aims to determine the range of LD50 values, toxic symptoms, changes in body weight, and SGPT SGOT levels of Balb/c mice. The research was carried out experimentally using a fixed dose toxicity test method with a randomized matched pre and post-test control group design. EEDA is made by 70% ethanol maceration. The acute toxicity test consists of 2 stages: preliminary and main tests. Preliminary tests were carried out with a dose of extract 300 mg/kg BW once administered. After 24 hours of observation, there were no toxic symptoms, the test dose was increased to 2000 mg/kg BW. The main test was carried out using 10 test animals which were divided into 2 groups, each given a dose of extract 2000 mg/kg BW once and CMC Na 1% (negative control). Observation of toxic symptoms and death was carried out for 14 days. The LD50 value is determined from the results of toxic symptoms and death of test animals. Toxic symptoms were analyzed descriptively, and changes in body weight and SGOT SGPT levels were analyzed statistically (95% confidence level). The research results show that avocado leaf ethanol extract has an LD50 value range of >2000 mg/kg BW. The test dose of 2000 mg/kg BW did not cause toxic symptoms and death. SGOT and SGPT levels were still within normal limits, however, changes in SGPT levels were significantly different from controls. Thus, an extract dose of 2000 mg/kg BW has an acute toxic effect on the liver of mice.

Keywords: Acute toxic, ethanol extract, Persea americana Mill, fixed dose, liver