JIMR: Journal Of International Multidisciplinary Research

http://azramedia-indonesia.azramediaindonesia.com/index.php/JIMR/index
DOI : https://doi.org/10.62668/jimr.v4i02.2008
Email : info@azramediaindonesia.com

Open Access

STANDARDIZATION OF SPECIFIC AND NON-SPECIFIC PARAMETERS OF DAYAK ONION BULB (*ELEUTHERINE PALMIFOLIA L. MERR.*)

Wiwit Zuriati Uno*[1], Nazwa Salfadila Hasan[2], Serlin N. Tilola[3], Salwa Rumampuk[4], Mohammad Qarlan Pratama[5], Meira Kumala Arista[6]
[1,2,3,4,5,6] Gorontalo State of University, Gorontalo, Indonesia
*Corresponding Author: wiwit@ung.ac.id

Info Article
Received :
01 Oktober 2025
Revised :
02 November 2025
Accepted :
02 Desember 2025
Publication :
30 Desember 2025

Keywords:
Eleutherine Palmifolia, Phytochemical Screening, Thin Layer Chromato graphy, Herbal Standardization.

Kata Kunci:
Eleutherine Palmifolia, Skrining Fitokimia, KLT, Standarisasi Herbal

Abstract: *This study aimed to determine the specific and non-specific parameters of Dayak onion bulb extract as a basis for herbal standardization. The research methods included organoleptic identification, phytochemical screening, Thin Layer Chromatography (TLC) analysis, and determination of non-specific parameters, namely moisture content, total ash content, Total Plate Count (TPC), and Yeast and Mold Count (YMC). Phytochemical screening showed the presence of alkaloids, flavonoids, tannins, and saponins, while steroids and terpenoids were not detected. The TLC profile showed several spots with varying Rf values, indicating the presence of compounds with different polarity levels. The moisture content (5.07%) and total ash content (4.31%) met the standards of the Indonesian Herbal Pharmacopoeia. TPC (5.4 × 10² CFU/mL) and YMC (3.2 × 10² CFU/mL) were below the permissible limits. These results indicate that Dayak onion bulb extract meets the required specific and non-specific parameters and is suitable for use as a standardized herbal raw material.*

Abstrak: Penelitian ini bertujuan untuk menentukan parameter spesifik dan nonspesifik ekstrak umbi bawang dayak sebagai dasar standarisasi bahan herbal. Metode penelitian meliputi identifikasi dan pengujian organoleptis ekstrak, skrining fitokimia, analisis Kromatografi Lapis Tipis (KLT), serta penetapan parameter nonspesifik yang meliputi kadar air, kadar abu total, Angka Lempeng Total (ALT), dan Angka Kapang Khamir (AKK). Hasil skrining fitokimia menunjukkan bahwa ekstrak mengandung alkaloid, flavonoid, tanin, dan saponin, sedangkan steroid dan terpenoid tidak terdeteksi. Profil KLT menunjukkan beberapa noda dengan nilai Rf yang bervariasi, yang mengindikasikan adanya senyawa bersifat polar, semipolar, dan nonpolar. Kadar air ekstrak sebesar 5,07% dan kadar abu total sebesar 4,31% memenuhi standar Farmakope Herbal Indonesia. Hasil pengujian ALT menunjukkan jumlah mikroba sebesar 5,4 × 10² CFU/mL dan AKK sebesar 3,2 × 10² CFU/mL, yang keduanya berada di bawah batas maksimum yang diizinkan. Berdasarkan hasil tersebut, ekstrak umbi bawang dayak memenuhi parameter spesifik dan nonspesifik sehingga layak digunakan sebagai bahan herbal terstandar.

INTRODUCTION

The use of medicinal plants as alternative therapy continues to increase along with public awareness of natural materials that are relatively safe and easily accessible. Indonesia, as a country with high biodiversity, has significant potential for the development of herbal medicines based on local plant resources. One medicinal plant that has been widely used empirically is the Dayak onion bulb (Eleutherine palmifolia L. Merr.), which has long been utilized by the people of Kalimantan to maintain health and treat various diseases Mahfuzah, L., & Kurniawan, T. (2017).

Previous studies have reported that Dayak onion bulb exhibits various pharmacological activities, including antihypertensive, antidiabetic, antimicrobial, anti-inflammatory, and antioxidant effects. These biological activities are closely related to its secondary metabolite content, such as flavonoids, alkaloids, tannins, saponins, and naphthoquinone compounds. The composition of secondary metabolites in medicinal plants may be influenced by environmental conditions, post-harvest processing, extraction methods, and the quality of raw materials used (Widyawati, F., & Nasution, A. 2020).

Therefore, standardization is essential to ensure the quality, safety, and consistency of herbal extracts. Herbal standardization is conducted by evaluating specific parameters, including identification, organoleptic characteristics, phytochemical screening, and chromatographic profiles, as well as non-specific parameters such as moisture content, ash content, and microbiological contamination. This study aimed to analyze the specific and non-specific parameters of Dayak onion bulb extract as a scientific basis for its development as a standardized herbal medicinal product (Putra et al., 2021).

METHOD

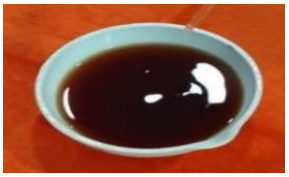
The materials used in this study included Dayak onion bulb extract (*Eleutherine palmifolia L. Merr.*), methanol, ethyl acetate, n-hexane, Dragendorff, Mayer, and Wagner reagents, ferric chloride ($FeCl_3$), hydrochloric acid (HCl), magnesium powder, Liebermann–Burchard reagent, Nutrient Agar (NA), Potato Dextrose Agar (PDA), and 0.9% sodium chloride (NaCl) solution. The instruments employed were an analytical balance, drying oven, furnace, desiccator, test tubes, porcelain crucibles, TLC plates, chromatographic chamber, capillary tubes, ultraviolet lamps at 254 nm and 366 nm, incubator, and standard microbiological equipment. The research procedures involved

organoleptic evaluation of the extract based on color, odor, and consistency, phytochemical screening to identify secondary metabolites using specific reagents for alkaloids, flavonoids, tannins, saponins, steroids, and terpenoids, and Thin Layer Chromatography (TLC) analysis using silica gel as the stationary phase and a mixture of n-hexane and ethyl acetate as the mobile phase, with spot observation under visible and ultraviolet light and calculation of Rf values. Non-specific parameters were determined through moisture content analysis using the oven-drying method, total ash content analysis using the furnace ashing method, and microbiological testing, including Total Plate Count (TPC) and Yeast and Mold Count (YMC), using the plate count method on NA and PDA media. The obtained data were analyzed descriptively using qualitative and quantitative approaches by comparing the results with the standards of the Indonesian Herbal Pharmacopoeia.

RESULTS AND DISCUSSION

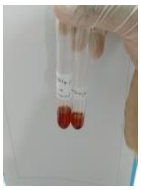
Results

Organoleptic Table

Sample	Form	Color	Smell
			
Umbi Bawang Dayak (*Eleutherine Palmfolia*)	Ekstrak Kental	Coklat kehijauan gelap	Bau khas bawang dayak, sedikit tajam

Organoleptic testing was performed as an initial examination of the extract's physical characteristics. Dayak onion bulb extract exhibited a dark reddish-brown color, a distinctive odor with a slightly pungent aroma, and a thick, homogeneous consistency without lumps. These characteristics align with a report by Onion *et al.,* 2022 which stated that Dayak onion ethanol extract has a reddish-brown color, distinctive aroma, and a thick consistency due to its high flavonoid and phenolic compound content.

Screening Fit

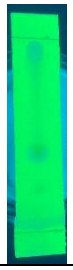
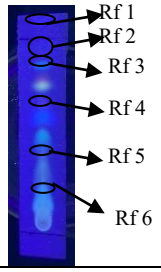
Sample	Reagen	Results	Comparison	Reaction	Reaction Results
	Flavonoid			Mg + HCl	(-) Merah

T Umbi Bawang Dayak (*Eleutherine Palmfolia*)	Alkaloid Mayer			Pereaksi Mayer	(-) Endapan Coklat
	Alkaloid Wagner			Pereaksi Wagner	(-) Endapan Coklat
	Alkaloid Dragendorf			Pereaksi Dragendorf	(+) Endapan Coklat
	Tanin			$FeCl_3$	(+) Katekol
	Saponin			Air panas + HCl	(+) Berbusa
	Steroid			Etil asetat + liebermann burchard	(-) Warna kuning
	Terpenoid			Etil asetat + liebermann burchard	(-) Warna Kuning

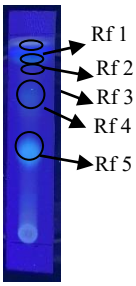
The phytochemical screening of the Dayak onion (Eleutherine palmifolia) bulb extract revealed the presence of several major secondary metabolites. Alkaloids were positively detected using Mayer and Wagner reagents, although a negative result was observed with Dragendorff reagent, indicating that the alkaloid content was relatively low. The flavonoid test using the Shinoda method (Mg–HCl) produced a red color change, confirming the presence of flavonoids, particularly naphthoquinone derivatives as the dominant compounds. Tannins were also positively identified by the formation of a white precipitate with $FeCl_3$ reagent, indicating the presence of phenolic compounds. In addition, the saponin test showed the formation of stable foam, qualitatively

confirming the presence of saponins. In contrast, steroid and terpenoid tests using the Liebermann–Burchard reagent yielded negative results, suggesting that these compounds were either absent or present in very low amounts, possibly due to their non-polar nature, which limits their extract. by polar solvents (Roihatul Muti'ah, 2020).

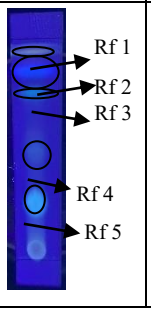
Ratio table 3.5: 1.5

No.	Sampel	Eluen	Hasil Pengamatan		Rf
			254 nm	366 nm	
1.	Umbi Bawang Dayak (*Eleutherine Palmfolia*)	N-Heksan : Etil Asetat (4;1)			Rf 1 =0,3 (Biru) Rf 2 = 0,6 (Biru) Rf 3 = 0,9 (Biru) Rf 4 = 1 (Biru) Rf 5 = 1,1 (Biru)

Ratio table 3: 2

No.	Sampel	Eluen	Hasil Pengamatan		Rf
			254 nm	366 nm	
1.	Umbi Bawang Dayak (*Eleutherine Palmfolia*	N-Heksan : Etil Asetat (4;1)			Rf 1= 0,3 (Biru) Rf 2= 0,5 (Biru) Rf 3= 0,6 (Biru) Rf 4= 0,8 (Biru) Rf 5= 0,9 (Hijau)

Ratio table 3,5: 1,5

No.	Sampel	Eluen	Hasil Pengamatan		Rf
			254 nm	366 nm	
1.	Umbi Bawang Dayak (*Eleutherine Palmfolia*	N-Heksan : Etil Asetat (4;1)			Rf 1= 0,6 (Biru) Rf 2= 0,8 (Biru) Rf 3= 0,9 (Biru) Rf 4= 1 (Biru) Rf 5= 1,1 (Hijau)

Ratio table 3,5 : 1,5

N	Nilai (N)	Perhitungan	Hasil
N1	1,2 cm	1,2 / 4	0,3
N2	2,4 cm	2,4 / 4	0,6
N3	3,7 cm	3,7 / 4	0,9
N4	4,0 cm	4,0 / 4	1
N5	4,3 cm	4,3 / 4	1.1

Ratio table 4 : 1

NO	Nilai (N)	Perhitungan	Hasil
N1	1,2 cm	1,2 / 4	0.3
N2	1,4 cm	1,9 / 4	0.5
N3	2,5 cm	2,5 / 4	0,6
N4	3,2 cm	3,2 / 4	0,8
N5	3,4 cm	3,4 / 4	0,9
N6	3,8 cm	3,8 / 4	1

Ratio table 3 : 2

NO	Nilai (N)	Perhitungan	Hasil
N1	2,3 cm	2,3 / 4	0,6
N2	3,3 cm	3,3 / 4	0,8
N3	3,6 cm	3,6 / 4	0.9
N4	3,9 cm	3,9 / 4	1
N5	4,2 cm	4,2 / 4	1,1

Thin Layer Chromatography (TLC) analysis of the Dayak onion bulb extract demonstrated that variations in eluent composition strongly influenced the compound separation profile. Eluent ratios of 3.5:1.5 and 4:1 provided optimal separation of polar compounds (Rf 0.0–0.3) and semi-polar compounds (Rf 0.5–0.6), indicating the presence of aglycone flavonoids and moderately phenolic compounds, whereas the 3:2 eluent failed to produce spots in these ranges due to its limited ability to elute highly polar compounds. Spots with high Rf values (0.8–1.0) consistently appeared across all eluent systems, indicating the dominance of non-polar compounds such as lipids, resins, and terpenoids in the extract. Overall, the TLC results revealed metabolic diversity with a tendency toward non-polar compound dominance and confirmed that eluent polarity balance plays a crucial role in effective separation, in agreement with literature reports that Dayak onion flavonoids typically appear at Rf values of 0.4–0.6, while non-polar compounds migrate close to Rf 1.0.

Total Ash Content

sampel	%kadar air
 Umbi bawang dayak (Eleutherine palmifolia)	 5,07%

The determination of the moisture content of the extract showed values of 4.31% and 5.07%, both of which are within the acceptable limits for thick extracts. The relatively low moisture content indicates good storage stability, as it can minimize the risk of microbial

growth and slow down degradation processes. Moreover, these results suggest that the solvent evaporation process was optimal, making the extract safe for formulation and long-term storage, which specifies that the moisture content of thick extracts should be less than 10%.

Total Ash Content

sampel	%kadar air
 Umbi bawang dayak (Eleutherine palmifolia)	 4,31%

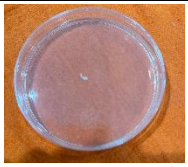
A total ash content of 4.31% indicates that the mineral residue and inorganic components in the extract are mainly derived from the plant's natural minerals and do not suggest excessive inorganic contamination such as soil, sand, or heavy metals. This value falls within an acceptable range, reflecting good extract quality in terms of inorganic purity. which states that the total ash content of herbal materials generally ranges from 3–12% as an indicator of natural mineral content and material purity.

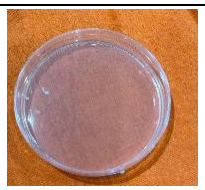
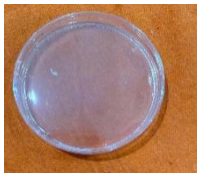
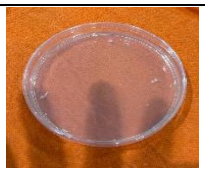
Total Plate Number Testing

Faktor Pengenceran	Gambar
ALT 10^{-1}	

The Total Plate Count (TPC) test on Dayak onion bulbs showed that at a dilution of 10^{-1}, 54 colonies were obtained, corresponding to 5.4×10^2 CFU/mL. This value is far below the maximum allowable TPC limit for dried simplicia according to the, which is $\leq 10^5$ CFU/g, indicating a low level of bacterial contamination. In addition, the number of colonies falls within the ideal range of 30–300 colonies, indicating that this dilution is valid and can be used as the basis for TPC calculation (Wigati & Rahardian, 2018).

Pengujian Angka Kapang Khamir

Faktor Pengenceran	Hasil Gambar
AKK 10^{-1}	

AKK 10^{-2}	
AKK 10^{-3}	
AKK 10^{-4}	
AKK 10^{-5}	
AKK 10^{-6}	

The enumeration of molds and yeasts (Total Yeast and Mold Count) in Dayak onion bulbs showed that at dilutions of 10^{-1}, 10^{-2}, and 10^{-3}, the numbers of colonies were 32, 22, and 13, corresponding to 3.2×10^2, 2.2×10^3, and 1.3×10^4 CFU/mL, respectively. The results at dilutions of 10^{-1} and 10^{-2} were well below the maximum allowable limit, ($\leq 10^4$ CFU/g), while the result at dilution 10^{-3} was at the threshold limit but still acceptable. All three dilutions fell within the ideal range of 10–150 colonies, indicating that the data were valid and representative. In contrast, dilutions of 10^{-4} and 10^{-6} produced CFU/mL values exceeding the permitted limit and yielded colony numbers that were not representative, and therefore could not be used as the basis for AKK calculation (Tiara Nur Annisa et al., 2024).

CONCLUSION

Identification and organoleptic evaluation showed that the extract exhibited characteristics consistent with Dayak onion bulbs, as indicated by its reddish-brown color, distinctive aroma, and thick, homogeneous texture, suggesting that the extraction process was optimal and free from contamination. Phytochemical screening revealed that the extract is rich in bioactive secondary metabolites such as alkaloids, flavonoids,

tannins, and saponins, which are known to play important roles in the pharmacological activities of Dayak onion, while steroid and terpenoid groups were not detected or were present in non-dominant amounts. Thin Layer Chromatography (TLC) analysis produced a clear and well-defined separation pattern across various Rf values, reflecting the diversity of polar, semi-polar, and non-polar compounds and indicating flavonoids and phenolic compounds as major components. Overall, the results of physical, chemical, and chromatographic analyses demonstrate that the Dayak onion bulb extract has good quality, a complex metabolite composition, and is suitable for further research and the development of herbal formulations

REFERENCES

Mahfuzah, L., & Kurniawan, T. (2017). KARAKTERISASI FITOKIMIA DAN AKTIVITAS FARMAKOLOGIS UMBI BAWANG DAYAK (ELEUTHERINE PALMIFOLIA). Jurnal Farmasi dan Bahan Alam Indonesia, 12(1), 44–51.

Onion, D., Hidayat, N., Rusman, R., Suryanto, E., & Sudrajat, A. (2022). PEMANFAATAN BAWANG DAYAK (ELEUTHERINE PALMIFOLIA (L.) MERR.) SEBAGAI SUMBER ANTIOKSIDAN ALAMI PADA NUGGET ITIK AFKIR. AGRITECH, 42(1), 30–38.

Putra, D. R., Amelia, S., & Zahra, H. (2021). PENGAMATAN KONSISTENSI EKSTRAK SEMI-PADAT UNTUK PENILAIAN STABILITAS FISIK. Journal of Herbal Material Quality, 4(3), 27–35.

Muti'ah, R., & Listiyana, A. (2020). KAJIAN EFEK EKSTRAK UMBI BAWANG DAYAK (ELEUTHERINE PALMIFOLIA (L.) MERR.) SEBAGAI ANTIKANKER. Islamic Pharm, 5(2), 14–26.

Annisa, T. N., Pratiwi, R. H., & A. M. (2024). ANALISIS TOTAL BAKTERI COLIFORM PADA AIR SUMUR DI MUARA BARU PENJARINGAN JAKARTA UTARA. Bio Sains: Jurnal Ilmiah Biologi, 4(1), 1–5.

Wigati, D., & Rahardian, R. R. (2018). PENETAPAN STANDARISASI NON SPESIFIK EKSTRAK ETANOL HASIL PERKOLASI UMBI BAWANG DAYAK (ELEUTHERINE PALMIFOLIA (L.) MERR.). Jurnal Ilmu Farmasi dan Farmasi Klinik (JIFFK), 15(2), 36–40.

Widyawati, F., & Nasution, A. (2020). IDENTIFIKASI EKSTRAK TANAMAN OBAT MELALUI PENDEKATAN FITOKIMIA DASAR. Journal of Biopharmaceutical Studies, 9(1), 33–41.