International Journal of Applied Pharmaceutics

ISSN- 0975-7058 Vol 16, Issue 1, 2024

Original Article

FORMULATION AND EVALUATION OF TRANSDERMAL PATCHES FROM *ELEUTHERINE BULBOSA* URB. BULB EXTRACT WITH PLASTICIZER VARIATIONS

WAHYUDIN BIN JAMALUDIN[1*], RAHMI MUTHIA[2], KARTINI KARTINI[3], FINNA SETIAWAN[3], SITI JUHRAH[1], NURIL YULIDA[1]

[1]Department of Pharmaceuticals, Faculty of Pharmacy, Universitas Borneo Lestari, Indonesia. [2]Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Borneo Lestari, Indonesia. [3]Department of Pharmaceutical Biology, Faculty of Pharmacy, University of Surabaya, Indonesia

[*]Corresponding author: Wahyudin Bin Jamaludin; [*]Email: wahyudinbj@unbl.ac.id

Received: 22 Sep 2022, Revised and Accepted: 30 Oct 2023

ABSTRACT

Objective: This research aimed to develop a transdermal drug delivery system from *Eleutherine bulbosa* Urb. bulbs as an alternative treatment with minimum side effects compared to other pain medications and increased drug penetration by determining the optimum formula(s) for transdermal patches prepared with varying plasticizer concentrations.

Methods: *Eleutherine bulbosa* Urb. bulbs were extracted by maceration using 96% ethanol. The extract was formed into transdermal patches using the solvent casting method with six formulations (F1-F6) and different types and concentrations of the plasticizer: polyethylene glycol (PEG) 400 or dibutyl phthalate. The derived patches were then evaluated for their organoleptic properties, homogeneity, weight uniformity, thickness, folding endurance, pH level, moisture content, and acceptability (hedonic scale).

Results: The evaluation of the physical properties found that all patches were dark brown, opaque, smooth-textured, and had a typical odor of the bulb's ethanol extract and uniform weight and thickness. Other characteristics included pH ranging from 5.0±0.00 to 5.86±0.04 and a moisture content between 1.04±0.04% and 4.13±0.08%. In addition, the folding endurance was 267 times for F1 and >300 times for F2-F6. The acceptability test using the five-point hedonic scale showed different preferences for these formulas.

Conclusion: F6 is the optimum formula for producing transdermal patches with excellent physical properties.

Keywords: Transdermal patches, Ethanol extract, *Eleutherine bulbosa*

DOI: https://dx.doi.org/10.22159/ijap.2024v16i1.46421 Journal homepage: https://innovareacademics.in/journals/index.php/ijap

INTRODUCTION

Eleutherine bulbosa Urb., locally known as *bawang dayak* in Indonesia, is a medicinal herb commonly sought to relieve pain. The bulb part contains alkaloids, glycosides, phenolics, saponins, triterpenoids, tannins, steroids, flavonoids, and naphthoquinones and their derivatives like elecanacin, eleutherin, eleutherol, and eleutherinon [1-3]. In addition, the 96% ethanol extract of the bulb has been reported to exhibit analgesic activity in mice at a dose of 100 mg/kg BW [4].

Transdermal preparations are an alternative route of drug administration that has been extensively developed for the delivery of numerous active substances. Transdermal use can prevent the first-pass effect, resulting in minimum side effects compared to oral preparations. Transdermal preparations deliver drugs into the body through the skin to be able to exert systemic effects. A transdermal drug delivery system is a formulation used to overcome problems potentially arising from plant extract-based treatment. Formulating plant extracts into some preparations involves complex procedures. Moreover, most of their active substances have low penetration, are unstable in very acidic environments, and are metabolized in the liver [5]. An example of a transdermal drug delivery system is a transdermal patch that is prepared with polymers. Polymers are the most essential materials in making patch matrices that determine the speed of drug release as an indicator of the success of therapy. A transdermal patch is a medicated adhesive patch pasted on the skin to deliver drugs at a specific dose percutaneously into the bloodstream [6].

One of the patch components that affect its stability and elasticity is plasticizers [7]. Plasticizers are resins or liquids of low molecular weight, thus decreasing secondary bonds in polymer chains and forming ones with polymer chains instead [8]. Adding plasticizers to polymer materials can extend the resting time and increase toughness and flexibility. On the other hand, tensile strength and hardness are expected to decrease. Incorporating plasticizers in transdermal drug delivery systems can improve the properties and appearance of patch formulation, reduce the transition temperature of polymer glass, prevent cracks, increase flexibility, and obtain the mechanical properties desired from transdermal patches [9]. Polyethylene glycol (PEG) 400 is a plasticizer with several advantages such as producing elastic, strong patches with increased tensile strength; the percent water content of patch preparations increases with the concentration of PEG 400 used [10]. In addition to PEG, dibutyl phthalate, especially at 30%, can be used as a plasticizer to create medicated patches with improved homogeneity, tensile strength, and percent elongation [11].

Considering the above description, it is necessary to study the formulation of transdermal patches from the 96% ethanol extract of *Eleutherine bulbosa* Urb. bulbs using PEG 400 or dibutyl phthalate as the plasticizer. This is intended to identify the effect of various plasticizers on the physical properties of transdermal patches.

MATERIALS AND METHODS

Eleutherine bulbosa Urb. bulbs were obtained from a farmer in Banjarbaru, Indonesia. The collected plant parts were identified at the Herbarium Bogoriense, Research Center for Biology, Indonesian Institute of Sciences (LIPI), Bogor (No. 2242/IPH.1.01/If.07/XII/2019). They were then extracted by maceration using 96% ethanol following the procedure described in Muthia *et al.* [12]. Technical grade chemicals and ingredients used to create the transdermal patches from this extract were ethyl cellulose and hydroxypropyl methylcellulose (HPMC) as polymers, PEG 400 and dibutyl phthalate as plasticizers (to enhance elasticity), propylene glycol as humectant and penetration enhancer, methylparaben as a preservative, and ethanol and aquadest as solvents. All the chemicals were purchased from Eralika (Indonesia).

Table 1: Formulations of transdermal patches from *Eleutherine bulbosa* Urb. bulb extract

Ingredients		F1	F2	F3	F4	F5	F6
Bulb extract	(gram)	1.21	1.21	1.21	1.21	1.21	1.21
Ethyl cellulose	(%b/b)	2	2	2	2	2	2
HPMC	(%b/b)	1	1	1	1	1	1
PEG 400	(%b/v)*	40	50	60	-	-	-
Dibutyl phthalate	(%b/v)*	-	-	-	40	50	60
Propylene glycol	(%b/v)	15	15	15	15	15	15
Methylparaben	(%b/b)	0.2	0,2	0,2	0,2	0,2	0,2
96% ethanol	(%b/v)	20	20	20	20	20	20
Distilled water	(gram)	ad 15	ad 15	ad 15	ad 15	ad 15	ad 15

*Percentage of the polymer weight

Preparation of transdermal patches

The transdermal patch was prepared with solvent casting using six formulas (table 1). This method involves dissolving polymers and other components in a solvent, pouring the resulting solution into the mold, and evaporating the solvent, leaving only the active drug in the patch [13]. In this research, the bulb extract was first dissolved in propylene glycol. Then, HPMC and ethyl cellulose were dispersed in distilled water and 96% ethanol, respectively, and then mixed and stirred for 15 min. The mixture was added to the dissolved bulb extract and PEG 400 and stirred for 20 min. Next, methylparaben was dissolved in 96% ethanol and then added to the mixture. The resulting mixture was then poured into the mold and oven-dried at 60 °C for 20 h until a dry patch was formed. Afterward, it was cut into smaller round-shaped patches with a diameter of 3 cm and then stored in a desiccator [14, 15]. The same procedure was repeated for the other plasticizer, dibutyl phthalate.

Physical appearance evaluation

Transdermal patches were evaluated visually based on their physical characteristics: color, transparency, and surface texture [16].

Weight uniformity test

In this test, three patches were weighed. Their weight variations were observed and then averaged for each formula [17].

Patch thickness measurement

For each formula, the patch thickness was measured on several different sides using a caliper. The thickness of the patch matrix is the average of measurements on three sides [7].

Folding endurance test

The folding endurance was determined by repeatedly folding the patch at the same point until it broke [18]. A patch has excellent folding endurance if it can be folded>300 times [19].

pH measurement

This test aimed to measure the pH of the patch surface. First, the patch was submerged in 10 ml of CO_2-free aquadest. Then, after one hour, the surface pH was read using a pH meter [19].

Moisture content test

The patch was weighed to determine its initial weight and then stored in a desiccator containing silica at room temperature for 24 h. afterward, the patch was weighed again to obtain its constant weight [17].

Acceptability test using the hedonic scale

Twenty respondents selected for the acceptability test were asked to use the transdermal patches made with different formulations. Then, their responses to the patch application were recorded using a questionnaire, including color, elasticity, aroma, surface condition, surface adhesiveness, and skin sensation [20]. Their acceptability was assessed with a five-point hedonic scale: like extremely (5), like very much (4), like (3), dislike slightly (2), and dislike very much (1) [21].

RESULTS AND DISCUSSION

The test sample used in this study was the bulb of *Eleutherine bulbosa* Urb., which has proved efficacious as an analgesic in rats when administered at a dose of 100 mg/kg BW [4]. The sample has been standardized for specific and non-specific parameters [12] and tested for safety using the OECD 425 toxicity test [22]. Based on the organoleptic test results, the transdermal patches were round (shaped as the mold used), slightly blackish-brown (fig. 1), opaque, smooth-textured, and had a typical odor of the bulb's ethanol extract. These results indicate that the drying process at 60 °C is the optimum condition for making transdermal patches. In addition, the weight uniformity test found that the transdermal patches weighed 3.91–4.18 g, suggesting heterogeneity or variation across the formulas [23].

Table 2: Plant determination results

No.	Sample	Species	Family
1	Onion bulbs	*Eleutherine bulbosa* Urb.	*Iridaceae*

Table 3: Physical characteristics of transdermal patches prepared from *Eleutherine bulbosa* Urb. bulb extract with different formulas

Formulas	Physical characteristics		
	Color	Transparency	Surface texture
F1	Dark brown	Opaque	Smooth
F2	Dark brown	Opaque	Smooth
F3	Dark brown	Opaque	Smooth
F4	Dark brown	Opaque	Smooth
F5	Dark brown	Opaque	Smooth
F6	Dark brown	Opaque	Smooth

Table 4: **Weight uniformity, thickness, folding endurance, pH level, and moisture content of transdermal patches prepared from *Eleutherine bulbosa* Urb. bulb extract with different formulas**

Formulas	Weight uniformity* (gram)	Thickness* (mm)	Folding endurance* (times)	pH*	Moisture content* (%)
F1	4.02±0.04	1.28±0.06	266.66±20.89	5.43±0.04	1.21±0.01
F2	4.12±0.07	1.22±0.02	493±102.01	5.5±0.00	1.21±0.02
F3	4.18±0.05	1.41±0.01	746±44.1	5.86±0.04	4.13±0.08
F4	4.15±0.04	1.30±0.04	989.66±123.3	5.36±0.04	1.19±0.008
F5	3.96±0.05	1.40±0.04	1314±177	5.4±0.00	1.50±0.004
F6	3.91±0.01	1.28±0.01	1594±93.35	5.0±0.00	1.04±0.04

*mean±Standard Deviation, n = 3 observations

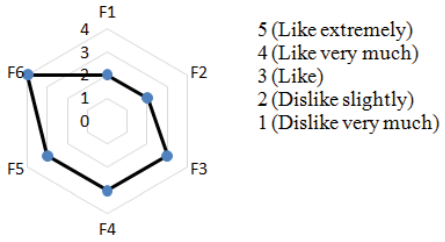


Fig. 1: Diagram of the acceptability test of the transdermal patches made from *Eleutherine bulbosa* Urb. bulb extract using the five-point hedonic scale

Likewise, the transdermal patches also had different thicknesses, ranging from 1.22 mm to 1.41 mm. Patch thickness varies proportionally with the amount of the added polymer. More polymers in the formulation thicken the patch, increase water absorption into the matrix, and prolong the drying time [24]. Moreover, using large doses of extracts and other components (ingredients) also thickens the resulting patches. As for the folding endurance, F1 (40% PEG 400) produced patches with poor durability when repeatedly folded, whereas F2 (50% PEG 400) and F3 (60% PEG 400) exhibited good endurance to folding. In contrast, all formulas with dibutyl phthalate as the plasticizer, namely F4 (40% dibutyl phthalate), F5 (50%), and F6 (60%), produced patches that could be folded>300 times without breaking. On average, F4 patches could be folded about 989 times, F5 1,314 times, and F6 1,594 times. Therefore, it can be concluded that the higher the plasticizer concentration used in the formula, the more durable the resulting transdermal patch to folding.

In Ameliana *et al.* [19], PEG 400 produced elastic patches with a folding endurance of>300 folds. PEG 400 increases permeability and wetting, thus creating patches with improved hydrophilicity. At the same time, it lowers polymer crystals, resulting in favorable elasticity and flexibility. Using dibutyl phthalate as a plasticizer, Singh and Vijaykumar [9] produced a strong and elastic patch. Because dibutyl phthalate has a low molecular weight, it can enter the polymer chain to form a patch film and interact with specific groups in the polymer [25]. The interaction of the plasticizer molecules is responsible for the high percentage of patch elongation.

The formulas produced varying pH levels, from 5.0 to 5.86. This pH range is between 4.5 and 6.5, which meets the requirement for transdermal patches, i.e., that the preparation is safe to use as it can be tolerated by or does not irritate the skin. Furthermore, the resulting transdermal patches had 1.04–4.13% moisture content, meaning that all formulas produced medicated patches that comply with the specified requirements, 1–10%. A relatively low moisture content creates a stable patch and impedes microbial contamination. In contrast, high moisture content reduces patch stability and increases the possibility of contamination by microbes present in the air and water. In addition, microbes proliferate rapidly in humid temperatures [26]. Moisture content also contributes to the percutaneous penetration of active substances, which occurs by skin hydration [27].

Adopting the procedures and provisions in SNI 01-2346-2006, the acceptability test revealed different levels of public preference for the preparations, ranging from 2 (dislike slightly) to 4 (like very much). The five-point hedonic scale is a relative measurement for color, elasticity, aroma, surface condition, surface adhesiveness, and skin sensation. F6 (60% dibutyl phthalate) was the most preferred formula (fig. 1), particularly because it produced highly elastic patches.

CONCLUSION

The study created transdermal patches from the 96% ethanol extract of *Eleutherine bulbosa* Urb. bulbs with various types and concentrations of plasticizers: PEG 400 (40, 50, 60% of the polymer weight) and dibutyl phthalate (40, 50, 60% of the polymer weight). Their organoleptic characteristics are, among others, blackish-brown to dark brown, opaque, and smooth-textured, with a typical odor of the bulb's ethanol extract. Other characteristics include weight in the range of 3.91–4.18 g, thickness 1.22–1.41 mm, folding endurance 266.66–1594 times, pH level at 5.0–5.86, and 1.04–4.13% moisture content. In addition, based on the acceptability test results using the five-point hedonic scale, the patches receive different responses, from 2 (dislike slightly) to 4 (like very much). It has been found that compared with other formulas, F6 (60% dibutyl phthalate) is optimum for producing patches with high folding endurance and acceptability.

ACKNOWLEDGMENT

The authors would like to thank the Ministry of Research, Technology, and Higher Education, Republic of Indonesia (Kemenristekdikti), for funding the research project under the scheme of collaborative research grants between universities (*Hibah Penelitian Kerja Sama Antar Perguruan Tinggi SPPK*, No: 191/SP2H/AMD/lT/DRPM/2019, SK No: B/87/E3/RA.00/2020) with the Decree No. 171/E4.1/AK.04/PT/2021; 28/lL11/KM/2021.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

REFERENCES

1. Wijayanti SD, Noor H. Potency of bawang dayak (*Eleutherine palmifolia* (*L.*) *Merr.*) bulbs extract in preventing ulcerative colitis in DSS (dextran sulphate sodium) Iinduced mice. Jurnal Ilmu Pangan Dan Hasil Pertanian. 2018;2(1):40-52. doi: 10.26877/jiphp.v2i1.2288.
2. Hidayah AS, Mulkiya K, Purwanti L. Antioxidant activity test of dayak onion (*Eleutherine bulbosa* Merr.) bulbs. Prosiding penelitian spesitas akademi unisba. Bandung: Universitas Islam Bandung; 2015. doi: 10.29313/.v0i0.1956.
3. Muthia R, Karunita IA. The immunomodulatory effect of dayak onion bulb infusion (*Eleutherine palmifolia l. Merr*) using the carbon clearance method. Pharmascience. 2018;5(1):63-70. doi: 10.20527/jps.v5i1.5787.
4. Fathurriziq MA. Phytochemical screening and evaluation of anti-inflammatory activity of 96% ethanol extract of dayak onion (*Eleutherine bulbosa Urb.*) from South Kalimantan. STIKES Borneo Lestari; 2021.

5. Goyal A, Kumar S, Nagpal M, Singh I, Arora S. Potential of novel drug delivery systems for herbal drugs. Indian J Pharm Educ Res. 2011;45(3):225-35.
6. Patel D, Chaudhary SA, Parmar B, Bhura N. Transdermal drug delivery system. J Pharm Innov. 2012;1(4):77-87.
7. Quan D. Passive transdermal drug delivery systems (TDDS): challenges and potential. Transdermal Mag. 2011;3:6-12.
8. Rajan R, Sheba RND, Kajal G, Sanjoy KD, Jasmina K. Design and *in vitro* evaluation of chlorpheniramine maleate from different Eudragit based matrix patches: effect of plasticizer and chemical enhancers. Ars Pharm. 2010;50(4):77-194.
9. Singh A, Vijaykumar M. The effect of plasticizer concentration on polymeric transdermal patch. J Drug Delivery Ther. 2014;4(1):59-62. doi: 10.22270/jddt.v4i1.736.
10. Rifqiani A, Desnita R, Luliana S. The effect of using PEG 400 and glycerol as plasticizers on the physical properties of the ethanol extract patch preparation of herb Pegagan (*Centella asiatica* (L.) Urb.). J Mahasiswa Farmasi Fak Kedokteran Untan. 2019;4(1):1-10.
11. Mundada AS, Avari JG. Evaluation of gum copal as rate controlling membrane for transdermal application: effect of plasticizers. Acta Pharm Sci. 2010;52(1):31-8.
12. Muthia R, Wati H, Jamaludin WB, Kartini KK, Setiawan F, Fikri M. Standardization of *Eleutherine bulbosa* Urb. bulbs and total flavonoid content from three locations in Kalimantan, Indonesia. Pharmacogn J. 2021;13(1):73-80. doi: 10.5530/pj.2021.13.11.
13. Valeveti SK, Pashikanti S. Design, development, and evaluation of transdermal patches containing memantine hydrochloride. Int J App Pharm. 2023;48481:181-97. doi: 10.22159/ijap.2023v15i5.48481. doi: 10.22159/ijap.2023v15i5.48481.
14. Purnamasari N, Alatas F, Gozali D. Formulation and evaluation of diclofenac potassium transdermal Patch. J Ilmiah Farmasi. 2019;7(1):43-8. doi: 10.26874/kjif.v7i1.209.
15. Hardainiyan S, Kumar K, Nandy BC, Saxena R. Design, formulation and *in vitro* drug release from transdermal patches containing imipramine hydrochloride as model drug. Int J Pharm Pharm Sci. 2017;9(6):220-5. doi: 10.22159/ijpps.2017v9i6.16851.
16. Reveny J, Sumaiyah S. Formulation and evaluation of *in vitro* transdermal patch diclofenac sodium using chitosan polymer and polyvinyl alcohol cross-linked tripolyphosphate sodium. Asian J Pharm Clin Res. 2018;11(8):171. doi: 10.22159/ajpcr.2018.v11i8.25145.
17. Allena RT, Yadav HKS, Sandina S, Prasad SC. Preparation and evaluation of transdermal patches of metformin hydrochloride using natural polymer for sustained release. Int J Pharm Pharm Sci. 2012;4:297-302.
18. Patel DJ, Vyas AM, Rathi SG, Shah SK. Formulation and evaluation of transdermal patch of apixaban. IJPSRR. 2021;69(2):57-63. doi: 10.47583/ijpsrr.2021.v69i02.009.
19. Ameliana L, Dwiputri HR, Nurahmanto D. The effect of propylene glycol in solid dispersion patch of ketoprofen to the characteristic of chemical physics and *in vitro* penetration rate. J Pustaka Kesehatan. 2018;6(2):230-4. doi: 10.19184/pk.v6i2.7572.
20. Astuti DP, Husni P, Hartono K. Formulation and physical stability test of lavender essential oil (*Lavandula angustifolia Miller*) antiseptic hand gel preparation. J Farmaka. 2017;15(1):176-84. doi: 10.24198/jf.v15i1.13252.g6132.
21. Standarisasi Badan. Nasional. Organoleptic and/or sensory testing instructions. SNI 01-2346-2006. Jakarta: Badan Standarisasi Nasional; 2006.
22. Wati H, Muthia R, Kartini SF, Setiawan F. Acute toxicity study of the ethanolic extract of *Eleutherine bulbosa* Urb I. wistar rats. Pharm Educ. 2021;21(2):143-7. doi: 10.46542/pe.2021.212.143147.
23. Ulaen SPJ, Banne Y, Suatan RA. The preparation of anti-acne ointment from ginger rhizomes (*Curcuma xanthorrhiza*). J Ilmiah Farmasi. 2012;3:45-9.
24. Nurfitriani W, Desnita R, Luliana S. Optimization of HPMC concentration in the areca (*Areca catechu* L.) nut ethanol extract patch formula. J Mahasiswa Farmasi Fak Kedokteran Untan. 2015;3(1):1-8.
25. Gungor S, Erdal MS, Ozsoy Y. Plasticizer in transdermal drug delivery systems. Tech Shanghai. 2012:91-112. doi: 10.5772/38156.
26. Hermanto FJ, Lestari F, Hemawati C, Nurviana V. Evaluation of handeuleum (*Graptophyllum griff l.*) leaf patch preparations as an antipyratic. J Kesehatan Bakti Tunas Husada. 2019;19(2):209-17. doi: 10.36465/jkbth.v19i2.499.
27. Forestryana D, Ramadhan H. Formulasi dispersi padat pentagamavunon-0 (PGV-0) dalam bentuk sediaan hidrogel dengan kombinasi basis polimer kitosan-agar-PVP. J Sains Farm Klin. 2020;7(1):(PGV-0). doi: 10.25077/jsfk.7.1.66-75.2020.

International Journal of Applied Pharmaceutics
ISSN 0975–7058

International Journal of Applied Pharmaceutics
ISSN 0975–7058

International Journal of Applied Pharmaceutics (Int J App Pharm) is a peer-reviewed, bimonthly (onward March 2017) open-access journal devoted to excellence and research in pharmaceutics. This journal publishes original research work that contributes significantly to adding scientific knowledge in conventional dosage forms, formulation development and characterization, controlled and novel drug delivery, biopharmaceutics, pharmacokinetics, molecular drug design, polymer-based-drug delivery, nanotechnology, nanocarrier-based drug delivery, novel routes and modes of delivery; responsive delivery systems, prodrug design, development and characterization of the targeted drug delivery systems, ligand carrier interactions, etc. Studies on analytical method developments and physical pharmacy are part of the journal's scope. Furthermore, pharmacological and toxicological studies of Active Pharmaceutical Ingredients (APIs) and their formulations are considered.

The journal publishes original research work either as an Original Article or a Short Communication. Review Articles on a current topic in the mentioned fields are also considered for publication in the journal.

Special issues on dedicated subjects or conference proceedings within the broader stated scope of the journal shall be considered for publication. Articles in the concerned may be permitted beyond the scope but on the merit of quality and when within the theme of the conference/special issue.

Onward 2021, for instant and swift access to current applied research that may have an impact on the subjects of the journal's scope, including allied subjects having an impact on mass human/living population, especially the cases of endemic/ pandemics (like COVID-19 and H1N1, others), are considered.

International Journal of Applied Pharmaceutics is a (Q2) Scopus-indexed journal.

Abstracting and Indexing

Google Scholar, Scopus [Q2], EMBASE, SCI mago (SJR), CNKI (China Knowledge Resource Integrated Database), CAS, CASSI (American Chemical Society), Open-J-Gate, OAI, LOCKKS, OCLC (World Digital Collection Gateway), UIUC.

UGC Listed Journal

Online ISSN: 0975–7058

CONTINUED IN 2025 [Q2]

How we claim? Click Scopus indexing IJAP 2025 to learn and understand

1.4 2023 CiteScore

52nd percentile

Powered by Scopus

Editorial Board

Online ISSN: 0975–7058

CONTINUED IN 2025 [Q2]

How we claim? Click Scopus indexing IJAP 2025 to learn and understand

1.4 2023 CiteScore

52nd percentile

Powered by Scopus

International Journal of Applied Pharmaceutics
ISSN 0975–7058

Vol 16, Issue 1 (Jan-Feb), 2024

PUBLISHED: 07-01-2024

REVIEW ARTICLE(S)

ORIGINAL ARTICLE(S)

Online ISSN: 0975–7058

INDEXED By Scopus

CONTINUED IN 2025 [Q2]

How we claim? Click Scopus indexing IJAP 2025 to learn and understand

1.4 2023 CiteScore
52nd percentile
Powered by Scopus

UGC Approved

doi Crossref Content Registration

Plagiarism Check
grammarly

Embase
It's Embase, Not Expanded Embase, Learn in 1 Min

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49189

REVOLUTIONIZING THERAPEUTIC DELIVERY: DIOSGENIN-LOADED SOLID LIPID NANOPARTICLES UNLEASH ADVANCED CARRIERS

RAMSHA ASLAM, VARSHA TIWARI, PRASHANT UPADHYAY, ABHISHEK TIWARI

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49306

DESIGN AND OPTIMIZATION OF NANO ENCAPSULATED BIO COMPOUNDS OF ASPARAGUS RACEMOSUS: BOX BEHNKEN APPROACH

BHARGAVI POSINASETTY, SRIVIDYA KOMMINENI, K. K. RAJASEKHAR, KISHORE BANDARAPALLE, SYED NAZIYA, CHANAMBATLA YAMINI, DARURI SEEMANTHINI

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49377

MODIFIED CYCLODEXTRIN-BASED THERMOSENSITIVE IN SITU GEL FOR VORICONAZOLE OCULAR DELIVERY AGAINST FUNGAL KERATITIS

SUNITHA SAMPATHI, SRAVYA MADDUKURI, RAMDAS RAMAVATH, SUJATHA DODOALA, VIJAYA KUCHANA

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.48817

DEVELOPMENT AND IN VIVO EVALUATION OF ABACAVIR SULPHATE MUCOADHESIVE BUCCAL FILMS

MADHURI P.; RADHA G. V.

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49765

DEVELOPMENT AND OPTIMIZATION OF POLYMERIC NANOPARTICLES OF GLYCYRRHIZIN: PHYSICOCHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY

DIVYA JYOTHI, SNEH PRIYA, JAINEY P. JAMES

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49164

IMPROVED CHARACTERISTICS OF GLIBENCLAMIDE AS TRANSETHOSOME VESICULAR SYSTEM: PHYSICOCHEMICAL, SOLUBILITY AND IN VITRO PERMEATION STUDY

NURUL ARFIYANTI YUSUF, MARLINE ABDASSAH, IYAN SOPYAN, RACHMAT MAULUDIN, I. MADE JONI, ANIS YOHANA CHAERUNISAA

VIEW ABSTRACT PDF DOWNLOAD PDF HTML

10.22159/ijap.2024v16i1.49245

BIOANALYTICAL OF UPLC METHOD DEVELOPMENT AND VALIDATION OF XANTHORRIZOL AND ITS APPLICATION TO PHARMACOKINETIC STUDY

DENI NOVIZA, TOMMY JULIANTO, ABU BAKAR ABDUL MAJEED, KHURIAH ABDUL HAMID

HTML VIEW ABSTRACT PDF DOWNLOAD PDF

10.22159/ijap.2024v16i1.49340

BIOANALYTICAL METHOD DEVELOPMENT AND VALIDATION OF 2-(4-ETHOXYPHENYL SULPHONAMIDO) PENTANE-DIAMIDE, A NOVEL ANTITUMOR AND ANTIANGIOGENIC AGENT, IN RAT SERUM AND APPLICATION OF THE METHOD IN DETERMINATION OF PHARMACOKINETIC PARAMETERS

International Journal of Applied Pharmaceutics

COUNTRY

India

Universities and research institutions in India

Media Ranking in India

SUBJECT AREA AND CATEGORY

Pharmacology, Toxicology and Pharmaceutics
- Pharmaceutical Science
- Pharmacology, Toxicology and Pharmaceutics (miscellaneous)

PUBLISHER

Innovare Academics Sciences Pvt. Ltd

H-INDEX

25

PUBLICATION TYPE

Journals Journals

ISSN

09757058

COVERAGE

2011-2023

SCOPE

Information not localized

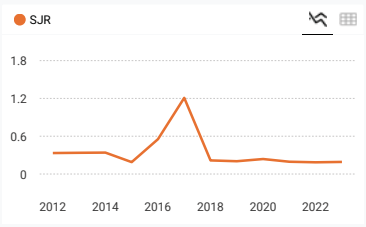
Join the conversation about this journal

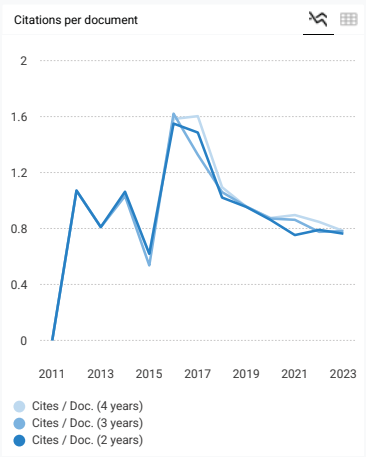
Quartiles

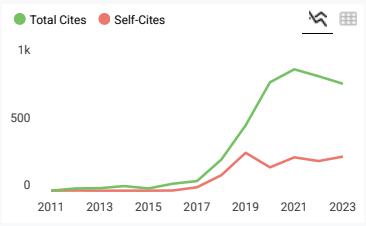
FIND SIMILAR JOURNALS

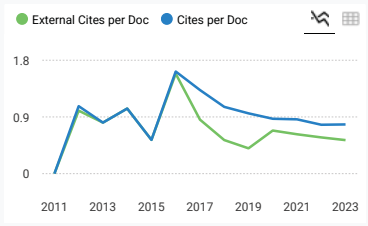
options

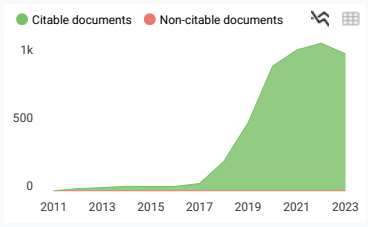
1	2	3	4	5
International Journal of Pharmaceutical Sciences and	Current Drug Delivery	Assay and Drug Development Technologies	Journal of Drug Delivery Science and Technology	Pharmaceutical Nanotechnology
IND	ARE	USA	FRA	NLD
63% similarity	60% similarity	58% similarity	56% similarity	56% similarity

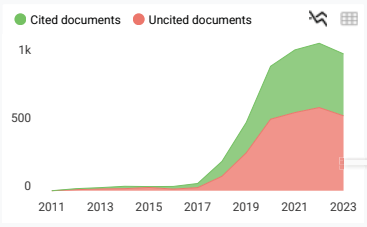


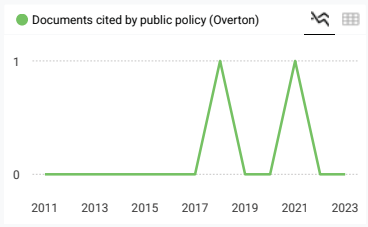


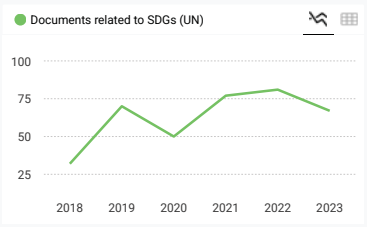


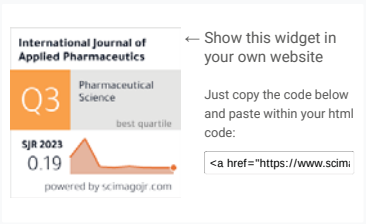


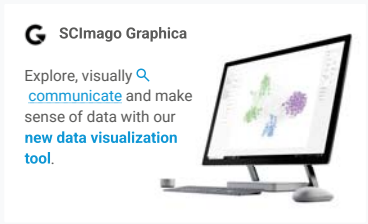












Metrics based on Scopus® data as of March 2024

Okta 10 months ago

Dear Editor,
Is IJAP Q2 or Q3 in Pharmacology, Toxicology, and Pharmaceutics? in the list appear as Q3, but in the Scopus and the journal website it's categorized as Q2 since the last year (2023).

reply

SCImago Team

Melanie Ortiz 10 months ago

Dear Okta,
Thank you for contacting us.
As you probably already know, our data come from Scopus, they annually send us an update of the data. This update is sent to us around April / May every year.
The calculation of the indicators is performed with the copy of the Scopus database provided to us annually. Regarding your inquiry about the Quartile distribution process at SCImago, the journals are ranked and distributed in 4 equal groups based on their SJR value, unlike Scopus, who ranks the publications by percentiles based on the journal's CiteScore.
The Quartile methodology, like others that are used to group results such as percentiles, can be applied to any indicator. Currently, Scopus offers information on the journals ranking and the percentile they occupy according to the CiteScore indicator (https://service.elsevier.com/app/answers/detail/a_id/14880/supporthub/scopus/), which is perceived as an impact indicator, but that is different from the SJR, as the latter is also a normalized impact indicator (https://www.scimagojr.com/files/SJR2.pdf).

Both Scopus and SCImago Journal and Country Rank offer information on the SJR indicator for every journal, although the position of each of the publications and the quartile in which it is located according to the SJR can be consulted at https://www.scimagojr.com.
According to the above, the difference in the information consulted on the Scopus journal's profile and in Scimagojr.com lies in the fact that they represent the position of the journal based on two different indicators, which are not directly comparable because they measure two different dimensions: Impact (CiteScore) and Normalized Impact (SJR). Additionally, it is important to keep in mind that, although the quartiles in SJR tend to be distributed in 4 groups of equal size and that the journals appear sorted by the highest SJR to the lowest SJR, it is not always possible due to ties in SJR values and, therefore, journals with the same SJR must be distributed within the same quartile, which may lead to differences in the number of journals within that quartile.
Best Regards,
SCImago Team

A **Azad Sadraddin** 11 months ago

If the scientific journal has a Q2, how much does it compare to the IF?

reply

SCImago Team

Melanie Ortiz 11 months ago

Dear Azad, thank you very much for your comment. SCImago Journal and Country Rank uses Scopus data, our impact indicator is the SJR (Check it above). We suggest you consult the Journal Citation Report for other indicators (like Impact Factor) with a Web of Science data source. Best Regards, SCImago Team

M **Michelle** 2 years ago

Dear SCImago Team,

Is this journal still indexed as Q3 since the coverage is only until 2022 and it's already 2023.
Thankyou

reply

SCImago Team

Melanie Ortiz 2 years ago

Dear Michelle,
Thank you for contacting us. Our data come from Scopus, they annually send us an update of the data. This update is sent to us around April / May every year. The SJR for 2022 was released on 1st May 2023. Therefore, the indicators for 2023 will be available in May/June 2024.
Best Regards, SCImago Team

L **Lana** 2 years ago

Publisher this journal is difference with list from scimago. What is right?

reply

SCImago Team

Melanie Ortiz 2 years ago

Dear Lana,
Thank you for contacting us. Could you please expand a little bit on your comment?
Best Regards, SCImago Team

N **Neelam Pawar** 3 years ago

Hi

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear Neelam, welcome and thanks for your participation! Best Regards, SCImago Team

N

Nur Alam Abdullah 3 years ago

Dear editorial team of the International Journal of Applied Pharmaceutics, I would like to ask how long it will take us as authors to get confirmation of the rejection or acceptance of our manuscript. tx regards.

reply

SCImago Team

Melanie Ortiz 3 years ago

Dear Nur,
Thank you for contacting us.
We are sorry to tell you that SCImago Journal & Country Rank is not a journal. SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.
We suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team

S

sri laksemi 4 years ago

Dear Schimago, Is International Journal of Applied Pharmaceutics still in schimago journal rank? usually there is homepage of the journal in the site of the journal in Schimago, but why there is no homepage or how to publish in this journal site in schimago?

reply

SCImago Team

Melanie Ortiz 4 years ago

Dear Sri,
Thank you for contacting us.
We inform you that all the information referring to the website of this Journal is not available in our website (you'll see "Information not localized") due to the fact that we could not verify that information with absolute reliability.
Best Regards,
SCImago TEAM
Dear Sir/Madam,
Thank you for contacting us.
We inform you that all the information referring to the website of this Journal is not available in our website (you'll see "Information not localized") due to the fact that we could not verify that information with absolute reliability.
Best Regards,
SCImago TEAM

B

Burhanuddin D Pasiga 4 years ago

Dear

How much APC ?

reply

T

T S Saraswathi 8 months ago

Dear Schimago, after publication in the International Journal of Applied Pharmaceutics, how long it would take to reflect in the scopus page.

SCImago Team

Melanie Ortiz 7 months ago

Dear Saraswathi,
Thank you very much for your comment. We suggest you contact the Scopus support team: https://service.elsevier.com/app/answers/detail/a_id/14883/kw/scimago/supporthub/scopus/
Best Regards, SCImago Team

SCImago Team

Melanie Ortiz 4 years ago

Dear Burhanuddin,
thank you for contacting us.
Unfortunately, we cannot help you with your request, we suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team

F **Faridah** 5 years ago

Dear sir

I would like to ask. Whether this journal accepts computational chemistry research and how much it costs for publication in this journal.

Thank you

Faridah

reply

SCImago Team

Melanie Ortiz 5 years ago

Dear Faridah,
thank you for contacting us.
Unfortunately, we cannot help you with your request, we suggest you visit the journal's homepage or contact the journal's editorial staff , so they could inform you more deeply.
Best Regards, SCImago Team

J **Julaeha Julaeha** 5 years ago

Is this predatory journal? Or every journals in scimagojr database are guaranteed none predatory journal

reply

SCImago Team

Melanie Ortiz 5 years ago

Dear Julaeha, SJR is a portal with scientometric indicators of journals indexed in Scopus. All the data have been provided By Scopus /Elsevier and SCImago doesn´t have the authority over this data. For more information about predatory journals you can check the link below:
https://beallslist.weebly.com/.

Best regards, SCImago Team

BISWARANJAN PAITAL 6 years ago

Thanks Elena.

reply

Biswaranjan Paital 6 years ago

Hello there,
Is there any correlation exist between Scimago journal value with that of SCI impact factor provided by Claryvate Analytics.
Best
Dr. Paital

reply

SCImago Team

Elena Corera 6 years ago

Dear Biswaranjan, Ttey are two indicators that are calculated differently and with different databases and number of different indexed journals. There is a bibliography on the degree of correlation, which is high, but taking into account the three existing differences. Best Regards,
SCImago Team

D **Dr. Amer taqa** 7 years ago

Dear sir
Greetings
Have a nice day. Did your journal indexed in Scopus database and if it publish in medical field.
Waiting for your reply.
Best regards

reply

Elena Corera 7 years ago

SCImago Team

Dear Dr Amer, all the journals included in the SJR are indexed in Scopus. Elsevier / Scopus is our data provider. We suggest you look at the journal report to see which thematic fields are indexed. Best Regards, SCImago Team

Leave a comment

Name

Email
(will not be published)

Submit

The users of Scimago Journal & Country Rank have the possibility to dialogue through comments linked to a specific journal. The purpose is to have a forum in which general doubts about the processes of publication in the journal, experiences and other issues derived from the publication of papers are resolved. For topics on particular articles, maintain the dialogue through the usual channels with your editor.

Source details

International Journal of Applied Pharmaceutics

Years currently covered by Scopus: from 2011 to 2025

Publisher: Innovare Academics Sciences Pvt. Ltd

ISSN: 0975-7058

Subject area: Pharmacology, Toxicology and Pharmaceutics: Pharmacology, Toxicology and Pharmaceutics (miscellaneous)

Source type: Journal

View all documents > | Set document alert | Save to source list

CiteScore 2023
1.4

SJR 2023
0.192

SNIP 2023
0.352

CiteScore | CiteScore rank & trend | Scopus content coverage

CiteScore 2023

$$1.4 = \frac{1{,}706 \text{ Citations } 2020 - 2023}{1{,}196 \text{ Documents } 2020 - 2023}$$

Calculated on 05 May, 2024

CiteScoreTracker 2024

$$1.7 = \frac{2{,}117 \text{ Citations to date}}{1{,}255 \text{ Documents to date}}$$

Last updated on 05 March, 2025 • Updated monthly

CiteScore rank 2023

Category	Rank	Percentile
Pharmacology, Toxicology and Pharmaceutics	#21/43	52nd
Pharmacology, Toxicology and Pharmaceutics (miscellaneous)		

View CiteScore methodology > | CiteScore FAQ > | Add CiteScore to your site

About Scopus

What is Scopus

Content coverage

Scopus blog

Scopus API

Privacy matters

Language

日本語版を表示する

查看简体中文版本

查看繁體中文版本

Просмотр версии на русском языке

Customer Service

Help

Tutorials

Contact us