

DAFTAR PUSTAKA

- Aditya, R., & Permana, F. (2026). Efek sitoprotektif triterpenoid daun jarak pagar (*Jatropha curcas* L.) terhadap stres oksidatif sel pankreas mencit. *Jurnal Farmasi Tradisional*, 11(1), 45-52.
- Abdelgadir, H. A., Van Staden, J. & Finnie, J. F., 2018. Phytochemical screening and biological activities of *Jatropha curcas* L. leaves. *Journal of Ethnopharmacology*, 221, pp. 128–136.
- Anita, N., Rahmawati, D., & Putri, S. A. (2023). Skrining fitokimia dan aktivitas farmakologi daun jarak pagar (*Jatropha curcas* L.). *Jurnal Farmasi Indonesia*, 15(2), 45–53. Jakarta: Ikatan Apoteker Indonesia.
- Amanda, S., & Lubis, Z. (2025). Analisis resistensi insulin pada tikus diabetes melitus tipe 2 setelah pemberian ekstrak daun jarak pagar. *Jurnal Farmasi Klinis Indonesia*, 14(2), 88-95.
- American Diabetes Association. (2024). Standards of care in diabetes. *Diabetes Care*, 47(Suppl. 1), S1-S321.
- American Diabetes Association, 2023. Standards of medical care in diabetes—2023. *Diabetes Care*, 46(Suppl. 1), pp. S1–S291.
- Azwanida, N. N., 2015. A review on the extraction methods use in medicinal plants, principle, strength and limitation. *Medicinal & Aromatic Plants*, 4(3), pp. 1–6.
- Budiman, A., & Akbar, M. (2024). Studi histopatologi pulau langerhans tikus wistar setelah terapi ekstrak etanol daun jarak pagar (*Jatropha curcas* L.). *Majalah Farmasi Indonesia*, 35(2), 112-120.
- Carels, N. (2018). *Jatropha curcas*: A review. In *Advances in Botanical Research*. London: Academic Press.
- Dewanti, K., Utami, S., & Pratama, R. (2025). Pengaruh ekstrak etanol daun jarak pagar terhadap penurunan kadar hemoglobin terglikasi (HbA1c) pada tikus diabetes. *Jurnal Sains Farmasi & Klinis*, 12(1), 23-31.
- DiPiro, J. T., DiPiro, C. V., Wells, B. G., & Schwinghammer, T. L. (2023). *Pharmacotherapy handbook* (12th ed.). McGraw-Hill Education.
- DeFronzo, R. A. et al., 2015. Type 2 diabetes mellitus. *Nature Reviews Disease Primers*, 1, pp. 15019.
- Fitriani, N., & Utomo, B. (2024). Perbaikan profil metabolik dan berat badan hewan uji diabetes melitus menggunakan ekstrak daun jarak pagar. Jakarta: *Jurnal Fitofarmaka Indonesia*, 11(3), 140-147.
- Gunawan, H., & Utami, P. (2023). Aktivitas antihiperglikemia ekstrak etanol 96% daun jarak pagar (*Jatropha curcas* L.) pada mencit yang diinduksi aloksan. *Jurnal Ilmiah Farmasi*,
- Gubitz, G. (2018). *Exploitation of the tropical oil seed plant Jatropha curcas L.* Bioresource Technology. Amsterdam: Elsevier.

- Harborne, J. B., 2017. *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. 3rd ed. London: Chapman & Hall.
- Inzucchi, S. E. et al., 2015. Management of hyperglycemia in type 2 diabetes. *Diabetes Care*, 38(1), pp. 140–149.
- Katzung, B. G. (2025). *Basic & clinical pharmacology* (16th ed.). McGraw-Hill Education.
- Kementerian Kesehatan Republik Indonesia, 2020. Infodatin Diabetes Melitus. Jakarta: Kementerian Kesehatan Republik Indonesi.
- Kemenkes RI. (2020). Pedoman nasional pelayanan kedokteran: Tata laksana diabetes melitus tipe 2 dewasa. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Lubis, R., Harahap, N., & Siregar, M. (2026). Efektivitas ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) terhadap penurunan kadar glukosa darah mencit jantan yang diinduksi glukosa monohidrat. *Jurnal Farmasi dan Kesehatan Indonesia*, 8(1), 34–42. Medan: Universitas Sumatera Utara.
- Nasution, I., Rahmah, N., & Siregar, M. (2023). Efek ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) pada uji toleransi glukosa oral (TTGO) tikus wistar. Jakarta: Universitas Indonesia
- Nugroho, E., Prasetyo, B., & Cahyono, T. (2024). Aktivitas antidiabetes jangka panjang ekstrak daun jarak pagar pada mencit hiperglikemia. *Jurnal Biomedika dan Farmasi*, 7(1), 18-25.
- Page, M. J., dkk. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71.
- Panigoro, M., Yusuf, N., & Abdullah, R. (2025). Uji aktivitas antihiperglikemia ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) pada mencit jantan (*Mus musculus*). *Jambura Journal of Health Sciences and Research*, 7(1), 115–123. Gorontalo: Universitas Negeri Gorontalo.
- Patel, D. K., Prasad, S. K., Kumar, R. & Hemalatha, S., 2017. An overview on antidiabetic medicinal plants having insulin mimetic property. *Asian Pacific Journal of Tropical Biomedicine*, 7(4), pp. 320–330.
- Pingkan, M., Wuisan, J., & Bodhi, W. (2020). Uji efek antihiperglikemik ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) pada tikus putih jantan (*Rattus norvegicus*). *Jurnal e-Biomedik*, 8(2), 125–132. Manado: Universitas Sam Ratulangi.
- Rahman, M.(2020). Leaf morphological variation of *Jatropha curcas* under different environmental conditions. *International Journal of Botany*, New York: Science Publications.
- Sabandar, C. (2017). Antioxidant and antihyperglycemic activities of *Jatropha curcas* leaf extracts. London: BioMed Central.

- Sharma, S. K., Singh, H. & Ahirwar, D., 2016. Pharmacological potential of *Jatropha curcas* L.: A review. *International Journal of Pharmaceutical Sciences and Research*, 7(3), pp. 1023–1035.
- Sukmawati, M., Ningsih, R., & Hasanah, U. (2024). Formulasi dan evaluasi patch transdermal ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) sebagai antihiperglikemia. *Media Farmasi*, 20(2), 235–245. Makassar: Poltekkes Kemenkes Makassar.
- Wulandari, D., Lestari, S. & Putri, A. R., 2020. Aktivitas antihiperglikemia ekstrak daun jarak pagar (*Jatropha curcas* L.) pada hewan uji. *Jurnal Farmasi Indonesia*, 12(2), pp. 85–92.
- World Health Organization, 2025. Diabetes. Geneva: WHO.
- World Health Organization. (2019). Classification of diabetes mellitus. WHO Press.
- Yaakob, Z. (2017). Morphological characteristics and growth performance of *Jatropha curcas* L. New York: Science Publicatio

Lampiran

Lampiran 1 Literatur 1



Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (*Jatropha curcas L.*) dalam Menurunkan Kadar Gula Darah pada Mencit (*Mus musculus*) yang Diinduksi Glukosa Monohidrat

Nadira Aisyah Lubis¹, Erida Novriani^{2*}, Finna Piska³

¹Bachelor of Clinical Pharmacy, Faculty of Health Sciences, Universitas Prima Indonesia, Medan, 20118, Indonesia

²Department of Clinical Pharmacy, Faculty of Health Sciences, Universitas Prima Indonesia, Medan, 20118, Indonesia

³PUI Phyto Degenerative & Lifestyle Medicine, Universitas Prima Indonesia, Medan, 20118, Indonesia

*Penulis Korespondensi: eridanovriani@unprimdn.ac.id

Abstract. Diabetes mellitus is a chronic metabolic disorder with an increasing global prevalence, emphasizing the need for safe, effective, and affordable alternative therapies. This study aimed to evaluate the antidiabetic potential of ethanol extract from physic nut leaves (*Jatropha curcas L.*) in reducing blood glucose levels in glucose monohydrate-induced mice (*Mus musculus*). An experimental design was applied using 25 male mice divided into five groups: a negative control group receiving Na-CMC, a positive control group treated with glibenclamide (5 mg), and three treatment groups administered ethanol extract doses of 21.8 mg/25 g body weight, 43.7 mg/25 g body weight, and 65.6 mg/25 g body weight. Blood glucose levels were measured to assess the hypoglycemic effect of each treatment. The results showed that the ethanol extract of *Jatropha curcas* leaves significantly reduced blood glucose levels compared to the control groups ($p < 0.05$). The highest dose, 65.6 mg/25 g body weight, demonstrated the greatest reduction in blood glucose levels. These findings suggest that ethanol extract of physic nut leaves has promising potential as a natural antidiabetic agent and may serve as an alternative therapeutic option for diabetes management.

Keywords: Blood Glucose Level; Diabetes Mellitus; Ethanol Extract; *Jatropha Curcas L.*; Mice.

Abstrak. Diabetes melitus adalah gangguan metabolisme kronis dengan prevalensi global yang meningkat, yang menekankan perlunya terapi alternatif yang aman, efektif, dan terjangkau. Studi ini bertujuan untuk mengevaluasi potensi antidiabetes ekstrak etanol dari daun jarak pagar (*Jatropha curcas L.*) dalam menurunkan kadar glukosa darah pada tikus yang diinduksi glukosa monohidrat (*Mus musculus*). Desain eksperimental diterapkan menggunakan 25 tikus jantan yang dibagi menjadi lima kelompok: kelompok kontrol negatif yang menerima Na-CMC, kelompok kontrol positif yang diberi glibenklamida (5 mg), dan tiga kelompok perlakuan yang diberi ekstrak etanol dengan dosis 21,8 mg/25 g berat badan, 43,7 mg/25 g berat badan, dan 65,6 mg/25 g berat badan. Kadar glukosa darah diukur untuk menilai efek hipoglikemik dari setiap perlakuan. Hasil menunjukkan bahwa ekstrak etanol daun *Jatropha curcas* secara signifikan menurunkan kadar glukosa darah dibandingkan dengan kelompok kontrol ($p < 0,05$). Dosis tertinggi, 65,6 mg/25 g berat badan, menunjukkan penurunan kadar glukosa darah terbesar. Temuan ini menunjukkan bahwa ekstrak etanol daun jarak memiliki potensi yang menjanjikan sebagai agen antidiabetes alami dan dapat berfungsi sebagai pilihan terapi alternatif untuk pengelolaan diabetes.

Kata kunci: Diabetes Melitus; Ekstrak Etanol; *Jatropha Curcas L.*; Kadar Glukosa Darah; Mencit.

1. PENDAHULUAN

Diabetes melitus (DM) juga dikenal sebagai penyakit kencing manis, adalah gangguan metabolik yang ditandai dengan hiperglikemia, atau tingginya kadar gula darah. Penderita diabetes akan menderita penyakit ini seumur hidup. Karena rendahnya produksi insulin pankreas, gangguan metabolisme menyebabkan peningkatan kadar gula darah (Iestari 2021).

Diabetes adalah penyakit multifaktor yang insidensinya meningkat dengan pesat di negara berkembang. Pada penderita DM, ada dua jenis utama diabetes yaitu Diabetes Tipe 1 dan Diabetes Tipe 2. Diabetes mellitus (DM) tipe 2 adalah jenis diabetes yang paling umum ditemukan (Piska et al., 2024), dm tipe 2 disebabkan oleh resistensi tubuh terhadap insulin dan

EFEK EKSTRAK ETANOL DAUN JARAK PAGAR (*Jatropha curcas* L.) TERHADAP KADAR TRIGLISERIDA PADA TIKUS HIPERTENSI YANG DIBERI PAKAN LEMAK TINGGI

EFFECT OF ETHANOL EXTRACT OF JARAK PAGAR LEAVES (*Jatropha curcas* L.) ON TRIGLYCERIDE LEVELS IN HYPERTENSIVE RATS WITH HIGH FAT FEEDING

Wiki Yuli Anita¹, Moch. Saiful Bachri¹, Sapto Yuliani¹, Wahyu Widyarningsih¹,
Vivi Sofia¹, Daru Estiningsih²

¹Laboratorium Farmakologi Toksikologi, Fakultas Farmasi,
Universitas Ahmad Dahlan, Yogyakarta

²Laboratorium Farmakologi, Fakultas Ilmu-ilmu Kesehatan, Universitas Alma Ata, Yogyakarta

Submitted: 3 Januari 2023 Reviewed: 25 Januari 2023 Accepted: 29 Maret 2023

ABSTRACT

Jatropha curcas L. leaves contain several active compounds, such as alkaloids, saponins, tannins, terpenoids, steroids, glycosides, phenol compounds, and flavonoids which can lower the levels of triglycerides in the blood serum, so they can prevent the state of hypertriglyceridemia. The research aims to know the activity of serum triglyceride levels decrease after giving the ethanol extract of Jarak Pagar leaves (EEDJP) variation in hypertension dosage in rats induced by NaCl and given a high-fat feed. Experimental research with *pre-post test control group design* against male Wistar strain rats. Rats were divided into seven groups, namely the group of normal, control, Captopril, Simvastatin, and EEDJP doses of 1.8 g/KgBB, 2.7 g/KgBB, and 4.05 g/KgBB. Analysis of serum triglyceride levels with GPO-PAP method. Data were analyzed with the test *One-Sample Kolmogorov-Smirnov Test*, *Variance Homogeneity*, *One-Way ANOVA*, *Kruskal-Wallis*, and *Mann-Whitney Test*. Induction of NaCl and high-fat feeding can significantly increase serum triglyceride levels ($p < 0.050$). EEDJP can lower the levels of serum triglycerides significantly ($p < 0.050$) on all variations of the dose. The conclusion EEDJP can decrease triglyceride levels significantly at doses of 1.8 g/KgBB, 2.7 g/KgBB, and 4.05 g/KgBB.

Keywords: *Jatropha curcas* L. leaves, triglycerides, GPO-PAP method

ABSTRAK

Daun jarak pagar (*Jatropha curcas* L.) mengandung beberapa senyawa aktif, seperti alkaloid, saponin, tanin, terpenoid, steroid, glikosida, senyawa fenol, dan flavonoid yang diduga dapat menurunkan kadar trigliserida dalam serum darah, sehingga dapat mencegah keadaan hipertrigliseridemia. Penelitian ini bertujuan untuk mengetahui aktivitas penurunan kadar trigliserida serum setelah pemberian ekstrak etanol daun jarak pagar (EEDJP) variasi dosis pada tikus hipertensi yang diinduksi dengan NaCl dan diberi pakan lemak tinggi. Penelitian eksperimental dengan *pre-posttest control group design* terhadap tikus jantan galur Wistar. Tikus dibagi menjadi 7 kelompok, yaitu kelompok normal, kontrol (diinduksi NaCl dan diberi pakan tinggi lemak), Captopril, Simvastatin, EEDJP dosis 1,8 g/KgBB, 2,7 g/KgBB, dan 4,05 g/KgBB. Analisis kadar trigliserida serum dengan metode GPO-PAP. Data dianalisis dengan uji *One-Sample Kolmogorov-Smirnov Test*, *Homogeneity of Variances*, *One-Way ANOVA*, *Kruskal-Wallis*, dan *Mann-Whitney*. Induksi NaCl dan pemberian pakan lemak tinggi dapat meningkatkan kadar trigliserida serum yang signifikan ($p < 0,050$). Pemberian EEDJP dapat menurunkan kadar trigliserida serum yang signifikan ($p < 0,050$) pada semua variasi dosis. Kesimpulannya EEDJP dapat menurunkan kadar trigliserida secara signifikan pada dosis 1,8 g/KgBB, 2,7 g/KgBB, 4,05 g/KgBB.

Kata kunci: Daun jarak pagar, *Jatropha curcas* L., trigliserida, metode GPO-PAP

PENDAHULUAN

Hipertensi adalah keadaan dimana seseorang mengalami peningkatan tekanan

Alamat korespondensi:
msaifulbachri@yahoo.co.id

darah lebih dari normal. Menurut *World Health Organization* (WHO) pada tahun 2011, satu milyar orang di dunia menderita hipertensi, dari 2/3 diantaranya berada di negara berkembang yang berpenghasilan rendah sampai sedang

Lampiran 3 Literatur 3

EFFECTIVENESS TEST OF ETHANOL EXTRACT OF JARAK PAGAR LEAVES (*Jatropha curcas* L.) AS ANTIHYPERGLYCEMIA AGAINST WHITE MALE RATS (*Rattus norvegicus*)

UJI EFEKTIVITAS EKSTRAK ETANOL DAUN JARAK PAGAR (*Jatropha curcas* L.) SEBAGAI ANTIHIPERGLIKEMIA TERHADAP TIKUS PUTIH JANTAN (*Rattus norvegicus*)

Aprilia Pingkan¹⁾, Paulina V. Y. Yamlean¹⁾, Widdhi Bodhi¹⁾

¹⁾ Program Studi Farmasi FMIPA UNSRAT Manado, 95115

*pingkan.aprilia.18@gmail.com

ABSTRACT

Hyperglycemia is condition where blood sugar levels surge or excessive, which will eventually become a disease called Diabetes Mellitus (DM). One of the plants that can be used for antidiabetic activity or to repair pancreatic β cells is jarak pagar. The study conducted using 15 rats induced with 3 mL of 60% glucosa. Animals then divided into 5 groups, Metformin (10.557 mg), Na-CMC, 125 mg/kg BW, 250 mg/kg BW and 375 mg/kg BW of ethanol extract of jarak pagar leaves. The results showed the percentage value of decrease in blood sugar D1 (19.46%), D2 (15.91%), D3 (53.17%) and the positive group (Metformin) (10.24%). Conclusion: the extract group dose 375 mg/kgBW can reduce blood sugar levels better than the group given extracts dose D1 and D2.

Keywords: Jarak Pagar Leaves (*Jatropha curcas* L.), Ethanol Extract, Antihyperglycemia, Diabetes.

ABSTRAK

Hiperglikemia adalah keadaan dimana kadar gula darah melebihi nilai normal dan merupakan salah satu indikasi pada penyakit Diabetes Melitus. Salah satu tumbuhan yang dapat dimanfaatkan untuk aktifitas antidiabetes atau memperbaiki sel β pankreas adalah jarak pagar. Penelitian dilakukan untuk mengetahui efektivitas ekstrak etanol daun jarak pagar dalam menurunkan kadar gula darah tikus putih jantan. Penelitian menggunakan hewan uji sebanyak 15 ekor untuk diinduksikan dengan glukosa 60% sebanyak 3 mL/ekor. Hewan uji kemudian dibagi menjadi 5 kelompok, kelompok positif, kelompok negatif, dosis 125 mg/kgBB, dosis 250 mg/kgBB, dan dosis 375 mg/kgBB. Hasil penelitian menunjukkan nilai persentase penurunan gula darah D1 (19.46%), D2 (15.91%), D3 (53.17%) dan kelompok positif (Metformin) (10.24%). Kesimpulan: kelompok ekstrak dosis 375 mg/kgBB dapat menurunkan kadar gula darah lebih baik dibandingkan kelompok yang diberikan ekstrak dosis D1 dan D2.

Kata kunci: Daun Jarak Pagar (*Jatropha Curcas* L.), Ekstrak Etanol, Antihiperglikemia, Diabetes.



Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (*Jatropha Curcas* L.) Sebagai Antidiabetes Terhadap Mencit Jantan (*Mus Musculus*)

*Effectiveness Test of Ethanol Extract of Physic Nut (*Jatropha curcas* L.) Leaves as an Antidiabetic Agent on Male Mice (*Mus musculus*)*

Mohammad Lutfi Panigoro^{1*}, Sunarto Kadir², Vidya Avianti Hadju³

¹Jurusan Kesehatan Masyarakat UNG, e-mail: lutfipanigoro29042003@gmail.com

²Jurusan Kesehatan Masyarakat UNG, e-mail: sunartokadir@ung.ac.id

³Jurusan Kesehatan Masyarakat UNG, e-mail: vidya.avianti@ung.ac.id

*Corresponding Author: E-mail: lutfipanigoro29042003@gmail.com

Artikel Penelitian

Article History:

Received: 2 May, 2025

Revised: 3 Jun, 2025

Accepted: 30 Jul, 2025

Kata Kunci:

Jatropha Curcas L.,
Antidiabetes, Ekstrak Etanol,
Mencit Jantan

Keywords:

Jatropha curcas L.,
antidiabetic, ethanol extract,
male mice

DOI: 10.56338/jks.v8i7.7571

ABSTRAK

Diabetes Mellitus merupakan penyakit metabolik kronis yang ditandai dengan peningkatan kadar glukosa darah. Alternatif Farmakologi daun jarak pagar yaitu sebagai anti-diabetes, anti bakteri dan anti-oksidasi. Rumusan masalah adalah apakah ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) efektif menurunkan kadar gula darah mencit jantan (*Mus Musculus*). Tujuan penelitian ini untuk menguji efektivitas ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) sebagai antidiabetes menggunakan model hewan uji mencit jantan (*Mus musculus*). Jenis penelitian adalah quasi eksperimen dan menggunakan metode rancangan acak lengkap, melakukan lima kelompok perlakuan: kontrol negatif (Na-CMC), kontrol positif (Metformin), dan ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) dengan dosis 17,5 mg/kgBB, 35 mg/kgBB, serta 70 mg/kgBB. Populasi adalah hewan mencit jantan (*Mus musculus*). Sampel adalah mencit jantan (*Mus musculus*) berjumlah 15 ekor. Data dianalisis menggunakan uji One Way ANOVA dan uji post hoc LSD. Hasil penelitian menunjukkan total kadar glukosa darah untuk kontrol negatif Na-CMC (202,7 mg/dl) dan kontrol positif metformin (173,36 mg/dl), sedangkan pemberian ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) untuk dosis 17,5 mg/kgBB (224,98 mg/dl), dosis 35 mg/kgBB (184,16 mg/dl), dan dosis 70 mg/kgBB (165,7 mg/dl). Simpulan penelitian menunjukkan kontrol negatif Na-CMC tidak efektif menurunkan kadar gula darah, sedangkan pada kontrol positif metformin dan pada kelompok perlakuan ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) dosis 17,5 mg/kgBB, dosis 35 mg/kgBB serta dosis 70 mg/kgBB efektif menurunkan kadar gula darah. Diharapkan penelitian ini bisa menjadi bahan masukan bagi institusi terkait penggunaan bahan alami untuk mengendalikan peningkatan diabetes melitus.

ABSTRACT

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels. Physic nut (*Jatropha curcas* L.) leaves have pharmacological potential as antidiabetics, antibacterials, and antioxidant agents. This study aimed to determine the effectiveness of the ethanol extract of physic nut leaves in reducing blood glucose levels in male mice (*Mus musculus*). This study employed a quasi-experimental design using a completely randomized design (CRD) with five treatment groups: negative control (Na-CMC), positive control (metformin), and treatment groups receiving ethanol extract of physic nut leaves at doses of 17.5 mg/kg BW, 35 mg/kg BW, and 70 mg/kg BW. The population consisted of male mice (*Mus musculus*), with a total sample of 15 subjects. Data were analyzed using One-Way ANOVA followed by LSD post hoc testing. The results showed the following average blood glucose levels: negative control (Na-CMC) at 202.7 mg/dl, positive control metformin at 173.36 mg/dl, ethanol extract at 17.5 mg/kg BW at 224.98 mg/dl, 35 mg/kg BW at 184.16 mg/dl, and 70 mg/kg BW at 165.7 mg/dl. The findings indicate that the negative control (Na-CMC) was ineffective in lowering blood glucose levels, while the positive control (metformin) and the ethanol extract at all tested doses (17.5, 35, and 70 mg/kg BW) effectively reduced blood glucose levels. This study is expected to provide input for relevant institutions in utilizing natural ingredients to help control the rising incidence of diabetes mellitus.

PENDAHULUAN

International Diabetes Federation (IDF) memproyeksikan jumlah penderita diabetes pada penduduk umur 20-79 tahun sekitar 537 juta di seluruh dunia, pada beberapa negara di dunia yang telah mengidentifikasi 10 negara dengan jumlah penderita tertinggi. Cina, India, dan Amerika Serikat menempati urutan tiga teratas dengan jumlah penderita berturut-turut 116,43 juta, 77 juta, dan 31 juta.



Media Farmasi p.issn 0216-2083 e.issn 2622-0962 Vol. 20 No.2 Oktober 2024

Media Farmasi

<https://ojs3.poltekkes-mks.ac.id/index.php/medfar/>



Open access article

INKORPORASI EKSTRAK DAUN JARAK PAGAR (*Jatropha Curcas* L) DALAM PATCH TRANSDERMAL SEBAGAI ANTI HIPERGLIKEMI FORMULASI DAN PANKREATIK HISTOPATOLOGI

*Incorporation Of Jarak Pagar Leaves Extract (*Jatropha Curcas* L) In Transdermal Patch As Antihyperglycemic Formulation And Pancreatic Histopathology*

Penulis / Author (s)

Muli Sukmawaty¹  ¹ Poltekkes Kemenkes Makassar, Makassar, Indonesia

Arisanty¹ 

Dwi Rachmawaty Daswi¹ 

Hendra Stevani¹  Koresponden : Muli Sukmawaty¹ 

Dicky Alexander Daton¹  e-mail korespondensi: muli.sukmawaty@poltekkes-mks.ac.id

Mf Media Farmasi Poltekkes Makassar

DOI: <https://doi.org/10.32382/mf.v20i2.1060>

ARTICLE INFO	ABSTRACT / ABSTRAK
Keywords: Antidiabetic; <i>Jatropha curcas</i> L.; transdermal patch; pancreas histopathology; ex vivo evaluation; Kata Kunci Antidiabetes; <i>Jatropha curcas</i> L.; Patch Transdermal; Histologi Pankreas; Uji ex vivo;	Transdermal patches are known to have a more immediate therapeutic effect and could avoid the risk of side effects that may arise compared to oral. This study aimed to produce Jarak Pagar leaves ethanolic extract transdermal patch (JPL-EETP) to enhance the penetration of Jarak Pagar leaves extract (JPL-EE) to maximize the systemic therapeutic effect of antidiabetics. In addition, easy and enjoyable medication could improve patient compliance. Transdermal patch was prepared by making the formula of JPL-EETP with different concentrations of extract with solvent-evaporated methods. JPL-EETP optimization was carried out by determining the pH, aeration, folding resistance, and organoleptic. Furthermore, the optimal JPL-EETP formulas were followed by the in vivo assay, ex vivo assay, and pancreatic histopathology assay. The JPL-EETP physical determination were carried out the appropriate of transdermal patch measurements. F3 with an JPL-EE concentration of 1.75 g can provide an antidiabetic effect on in vivo assay that is as good as oral antihyperglycemic drugs ($p>0.05$). Ex vivo study confirmed that the gallate acid permeation across the porcine skin of F2 showed higher percentage of permeation of 94,2% respectively after 24 h. The histopathology assay presence no significant difference between the surface area of the islets of Langerhans and the histopathological after administration of metformin or Jarak Pagar leaves extract transdermal patch. The results suggest that Jarak Pagar leaves ethanolic extract transdermal patch is a potential candidate of antidiabetics drug from natural source and can provide a higher patient compliance along with effectiveness in the management and treatment of diabetes which can be easily applied to the skin. Sediaan patch transdermal diketahui memiliki efek terapi yang lebih cepat dan dapat menghindari resiko efek samping yang mungkin timbul dibanding sediaan oral. Penelitian ini bertujuan untuk membuat

ANTIDIABETIC EFFECT OF *JATROPHA CURCAS* L. LEAVES EXTRACT IN NORMAL AND ALLOXAN-INDUCED DIABETIC RATS

¹Shanti Bhushan Mishra*, M. Vijayakumar², Sanjeev Kumar Ojha², Amita Verma³

¹Roorkee College of Pharmacy, Roorkee (UA), India.

²Ethnopharmacology Division, National Botanical Research Institute, Lucknow (UP), India

³Department of Pharmaceutical Sciences, College of Health Sciences, AAI-DU, Allahabad (UP)

E-mail: shanti321181@yahoo.co.in

ABSTRACT

Jatropha curcas (Euphorbiaceae) is a multipurpose plant with many attributes and considerable potential. Different parts of the *jatropha curcas* plant are employed in Indian traditional medicine for the treatment of several disorders. Our aim was to investigate the antihyperglycemic effect of 50% ethanolic extract of leaves of *jatropha curcas* (JCE) in alloxan induced diabetic rats. Oral administration of JCE at a dose of 250 and 500 mg kg⁻¹ bw respectively showed potent antihyperglycemic activity in alloxan induced diabetic rats. The LD₅₀ determination was done in mice by OECD guidelines 423. The LD₅₀ of the JCE was found to be 2500 mg/kg. At the end of treatment, reduction in blood glucose level in treated rats with dose 250 mg/kg was 219.5 – 116.5, (p< 0.001). and oral administration of 500 mg/kg of JCE on blood glucose level was found to be 237.0- 98.83, (p< 0.001). While in case of Glibenclamide 600µg/kg, the results was found to be 232.33 – 94.5 mg/dl, (p< 0.001). Our results indicate that JCE have prominent antidiabetic effect in experimental diabetes and can therefore be used as an alternative remedy for the treatment of diabetes mellitus and its complications.

Key Words: *Jatropha curcas*, antidiabetic, ethanolic extract, Glibenclamide, Alloxan

INTRODUCTION:

The incidence of each type of diabetes varies widely throughout the world. The vast majority of diabetes patients have type II DM. About 90% of all diabetic patients have type II DM. There are more than 125 million persons with diabetic in the world today. There is increase in current interest and demand for herbs as worldwide phenomenon, WHO currently encourages, recommends and promotes traditional/herbal remedies in national health care programmes because such drugs are easily available

at low cost, and comparatively safe with the people's faith in such remedies.^[1] A plenty of traditional herbal medicinal practices have been adopted for the diagnosis, prevention and treatment of diabetes. *Jatropha curcas* L. (physic nut or purging nut) is a drought resistant shrub or tree belonging to the family Euphorbiaceae, which is cultivated in Central and South America, South-East Asia, India and Africa^[2]. Some of the ethnomedical uses of the extracts of *Jatropha curcas* leaves and roots include use as a remedy for cancer, as an abortifacient,

Lampiran 7 Pencarian artikel melalui *Google Scholar*

The screenshot shows a Google Chrome browser window with the Google Scholar search results for the query "ekstrak etanol daun jarak pagar". The search results list several articles, including one from Pharmacy Rorano Journal (2024) and another from scholar.archive.org (2023). The browser's address bar shows the search URL. The Windows taskbar at the bottom displays the date and time as 09:23 on 23/07/2026.

Lampiran 8 Pencarian artikel melalui *ScienceDirect*

The screenshot shows a Google Chrome browser window with the ScienceDirect search results for the query "Ethanol extract of Jatropha leaves in lowering blood sugar levels". The search results show 327 results, sorted by relevance. The first result is a research article titled "Trypanocidal potentials of Jatropha curcas L. 1753 leaf extracts and fractions in vivo" from Pharmacological Research - Modern Chinese Medicine (September 2025). The browser's address bar shows the search URL. The Windows taskbar at the bottom displays the date and time as 10:33 on 23/07/2026.

Lampiran 9 Pencarian artikel melalui GARUDA

The screenshot shows the GARUDA (Garba Rujukan Digital) search interface. The search bar contains the query: "ekstrak etanol daun jarak pagar dalam menurunkan kadar gula darah". The results show 1 document found. The document title is "Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (*Jatropha curcas* L.) dalam Menurunkan Kadar Gula Darah pada Mencit (*Mus musculus*) yang Diinduksi Glukosa Monohidrat". The document is by Nadira Aisyah Lubis, Erida Nowriani, and Rinna Piska, published in Jurnal Ilmiah Kedokteran dan Kesehatan Vol. 5 No. 2 (2026). The interface includes filters for "Search By" (Title), "Keywords", "Publisher", and "Filter By Year" (1945 to 2024). The bottom of the page shows a navigation bar with links to Sinta, Bima, Arjuna, PDDIKTI, Risbang, Scopus, and Rama.

Lampiran 10 Penyaringan artikel berdasarkan tahun terbit melalui ScienceDirect

The screenshot shows the ScienceDirect search interface. The search bar contains the query: "Ethanol extract of Jatropha leaves in lowering blood sugar levels". The results show 121 results. The first result is a research article titled "Trypanocidal potentials of *Jatropha curcas* L. 1753 leaf extracts and fractions in vivo" by Pharmacological Research - Modern Chinese Medicine, September 2025. The second result is a research article titled "Nutritional Profile, GC-MS Analysis and In-silico Anti-diabetic Phytocompounds Candidature of *Jatropha gossypifolia* Leaf Extracts" by Current Drug Discovery Technologies, 2024. The interface includes filters for "Refine by" (Years: 2026 (24), 2025 (41), 2024 (31)), "Article type" (Review articles (60)), and "Advanced search". The bottom of the page shows a navigation bar with links to Journals & Books, Help, My account, and Sign in.

Lampiran 11 Penyaringan artikel berdasarkan tahun terbit melalui *Google Scholar*

The screenshot shows a Google Scholar search interface. The search bar contains the query "ekstrak etanol daun jarak pagar dalam menurunkan kadar gula darah". The results list several articles, including "Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (Jatropha Curcas L) Sebagai Antidiabetes Terhadap Mencit Jantan (Mus Musculus)" by ML Panigoro, S Kadir, and VA Hadju, published in 2025. Other articles include "Uji Efektivitas Antihiperglikemia Fraksi Etil Asetat Daun Jarak Pagar (Jatropha curcas L.) terhadap Mencit Jantan (Mus musculus) Diabetes" and "Standarisasi Parameter Spesifik Ekstrak Etanol Daun Jarak Pagar (Jatropha Curcas L) sebagai Vasorelaxan". The interface includes filters for publication year (2023-2026) and sorting options.

Lampiran 12 Penyaringan artikel berdasarkan tahun terbit melalui GARUDA

The screenshot shows the GARUDA search interface. The search bar contains the query "ekstrak etanol daun jarak pagar dalam menurunkan kadar gula darah". The results show "Found 1 documents" with the title "Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (Jatropha curcas L) dalam Menurunkan Kadar Gula Darah pada Mencit (Mus musculus) yang Diinduksi Glukosa Monohidrat". The document is published in "Jurnal Ilmiah Kedokteran dan Kesehatan Vol. 5 No. 2 (2026): Mei". The interface includes filters for publication year (1945-2024) and sorting options.

Lampiran 13 Penyaringan artikel berdasarkan *open access*

The screenshot shows a Google Chrome browser window with multiple tabs. The active tab is titled 'Ethanol extract of Jatropha leaves'. The address bar shows a search query on sciencedirect.com. The page displays search results for 'Ethanol extract of Jatropha leaves'. The results are filtered by 'Access type' to 'Open access & Open archive (33)'. Three articles are visible:

- Zinc oxide nanoparticles: A plant-mediated synthesis, characterizations and their functional applications**
Nano Trends, March 2026
Mohee Shukla, Satya Narain, ... Anupam Dikshit
[View PDF](#)
- Green solvent extraction and eco-friendly novel techniques of bioactive compounds from plant waste: Applications, future perspective and circular economy**
Applied Food Research, December 2025
Muhammad Shahbaz, Mahreen Riaz, ... Tuba Esatbeyoglu
[View PDF](#)
- Distribution, phytochemistry and pharmacological properties of the genus Hugonia**
Scientific African, December 2025
Saidi M. Katundu, Stephen S. Nyandoro, Joan J. E. Munissi
[View PDF](#)

The bottom of the page shows a Windows taskbar with the date 23/07/2026 and time 10:53.

Lampiran 14 Penyaringan artikel berdasarkan judul dan abstrak

The screenshot shows a Google Chrome browser window displaying a journal article. The address bar shows the URL 'garuda.kemdiktisaintek.go.id/documents/detail/6182664'. The article is titled 'Uji Efektivitas Ekstrak Etanol Daun Jarak Pagar (*Jatropha curcas* L.) dalam Menurunkan Kadar Gula Darah pada Mencit (*Mus musculus*) yang Diinduksi Glukosa Monohidrat'. The authors listed are Nadira Aisyah Lubis (Unknown), Erida Novniani (Unknown), and Finna Piska (Unknown). The article is published in 'Jurnal Ilmiah Kedokteran dan Kesehatan', Vol. 5 No. 2 (2026), Mei. The abstract discusses the antidiabetic potential of ethanol extract from physic nut leaves in reducing blood glucose levels in glucose monohydrate-induced mice. The article is dated 09 Feb 2026. The bottom of the page shows a Windows taskbar with the date 23/07/2026 and time 10:56.

Lampiran 15 Penyaringan artikel yang menggunakan daun jarak pagar

Google Chrome bukan browser default [Jadikan default](#)

Diabetes Mellitus Oleh Pengobat Tradisional Di Kecamatan Ambalau Kabupaten ...
VO Pangemanan, [AM Ukrotalo](#) ... - Pasapua Health ..., 2023 - yapindo-cdn.b-cdn.net
... ini memiliki khasiat dalam menurunkan kadar gula darah ... yang digunakan untuk menurunkan kadar gula darah pada pasien ... Uji efektivitas ekstrak etanol daun jarak pagar (Jatropha ...
☆ Simpan 99 Kutip Dirujuk 10 kali Artikel terkait 00

PENGARUH PEMBERIAN EKSTRAK ASETON DAUN SIRIH CINA (Peperomia pellucida) TERHADAP PENURUNAN KADAR GULA DARAH MENCIT (Mus musculus) ...
[D Saputri](#), [H Pagarra](#), [A Mu'nisa](#) - Jurnal Keilmuan dan ..., 2025 - journal.fexaria.com
... mengetahui potensi ekstrak aseton daun sirih cina dalam menurunkan kadar gula darah pada mencit ... ekstrak etanol daun sirih cina (Peperomia pellucida L.) terhadap Staphylococcus ...
☆ Simpan 99 Kutip Artikel terkait 00

Studi Tumbuhan Obat Tradisional Ber khasiat Antidiabetes di Kecamatan Balinggi Kabupaten Parigi Moutong Provinsi Sulawesi Tengah
[S Anam](#), [NLY Saifri](#), [MR Tandah](#), [K Diana](#) - Jurnal Pharmascience, 2023 - ppjp.ulm.ac.id
... degeneratif dengan karakteristik khas berupa kadar gula darah melebihi angka normal. Data ... Ekstrak etanol daun jarak pagar dosis 375 mg/kgBB efektif sebagai antidiabetes pada tikus ...
☆ Simpan 99 Kutip Dirujuk 7 kali Artikel terkait 2 versi 00

< Goooooooooooo >
Sebelumnya 1 2 3 4 5 6 7 8 9 10 Berikutnya

32°C Cerah Pencarian 11:45 23/07/2026

Lampiran 16 Kartu Bimbingan

 **Kemenkes**
Poltekkes Medan
JURUSAN FARMASI
JL. AIRLANGGA NO. 20 MEDAN

**KARTU LAPORAN PERTEMUAN BIMBINGAN KTI
MAHASISWA T. A. 2025/2026**

Nama : Debora Claudia Sarumaha
NIM : P07533023005
Pembimbing : Maya Handayani, SS. M. Pd.



NO	TGL	PERTEMUAN	PEMBAHASAN	PARAF PEMBIMBING
1	29/9/2025	1	Pengarahan KTI	
2	21/11/2025	2	Bimbingan serta diskusi judul KTI	
3	2/12/2025	3	Pengajuan dan ACC judul KTI	
4	9/01/2025	4	Bimbingan proposal	
5	20/01/2025	5	Bimbingan proposal	
6	21/01/2026	6	Bimbingan & acc proposal	
7	12/06/2026	7	Bimbingan KTI setelah seminar proposal	
8	15/06/2026	8	Bimbingan hasil dan pembahasan	
9	18/06/2026	9	Bimbingan Bab v	
10	22/06/2026	10	Acc hasil dan pembahasan	
11	30/06/2026	11	Seminar hasil	
12	20/07/2026	12	Revisi hasil penelitian setelah seminar hasil	

Ketua,



Nadroh Br Sitepu, M. Si.
NIP. 198007112015032002

Lampiran 17 Hasil Turnitin

Debora Sarumaha

kti debora

 Cek Turnitin Mahasiswa Bimbingan MHS 2026
 Bimbingan Maya 2026
 Politeknik Kesehatan Kemenkes Medan

Document Details

Submission ID
trn:oid::1:3619124232

Submission Date
Jul 29, 2026, 11:08 AM GMT+7

Download Date
Jul 29, 2026, 11:41 AM GMT+7

File Name
Debora_claudia_Sarumaha_3.docx

File Size
152.0 KB

44 Pages

10,208 Words

71,136 Characters



Page 1 of 56 - Cover Page

Submission ID trn:oid::1:3619124232



Page 2 of 56 - Integrity Overview

Submission ID trn:oid::1:3619124232

27% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Top Sources

22%  Internet sources
15%  Publications
9%  Submitted works (Student Papers)

Lampiran 18 *Ethical Clearance*



Kementerian Kesehatan
Poltekkes Medan
Komisi Etik Penelitian Kesehatan
Jalan Jamin Ginting KM. 13,5
Medan, Sumatera Utara 20137
(061) 8368633
<https://poltekkes-medan.ac.id>

KETERANGAN LAYAK ETIK
DESCRIPTION OF ETHICAL EXEMPTION
"ETHICAL EXEMPTION"

No.01.26.3701/KEPK/POLTEKKES KEMENKES MEDAN 2026

Protokol penelitian versi 1 yang diusulkan oleh :
The research protocol proposed by

Peneliti utama : Debora Claudia Sarumaha
Principal In Investigator

Nama Institusi : Komisi Etik Penelitian Kesehatan
Name of the Institution Politeknik Kesehatan Kemenkes Medan

Dengan judul:
Title

**"Studi Literatur Efektivitas Ekstrak Etanol Daun Jarak Pagar (*Jatropha curcas* L.)
Dalam Menurunkan Kadar Gula Darah"**

*"Literature Review On The Efficacy Of Ethanolic Extract Of Physic Nut Leaves (*Jatropha curcas* L.)
In Reducing Blood Glucose Levels"*

Dinyatakan layak etik sesuai 7 (tujuh) Standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Consent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 21 Agustus 2026 sampai dengan tanggal 21 Agustus 2027.

This declaration of ethics applies during the period August 21, 2026 until August 21, 2027.



August 21, 2026
Chairperson,



Dr. Lestari Rahmah, MKT