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Lalu Husnul Hidayat, Dr.rer.nat. apt. Yosi Bayu Murti, S.Si., M.Si.; Dr. apt. Nunung Yuniarti, S.F., M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Ahmed, R., 2024. High-Performance Liquid Chromatography (HPLC): Principles, Applications, Versatality, Efficiency, Innovation and Comparative Analysis in Modern Analytical Chemistry and In Pharmaceutical Sciences.

Abraham, E. J., & Kellogg, J. J. (2021). Chemometric-Guided Approaches for Profiling and Authenticating Botanical Materials [Review of Chemometric-Guided Approaches for Profiling and Authenticating Botanical Materials]. Frontiers in Nutrition, 8. Frontiers Media. https://doi.org/10.3389/fnut.2021.780228

Ahanger, M. A., Bhat, J. A., Siddiqui, M. H., Rinklebe, J., & Ahmad, P. (2020). Integration of silicon and secondary metabolites in plants: a significant association in stress tolerance. Journal of Experimental Botany, 71(21), 6758–6774. https://doi.org/10.1093/jxb/eraa291

Ahmed, S., Griffin, T., Kraner, D., Schaffner, K., Sharma, D., Hazel, M., Leitch, A., Orians, C., Han, W., Stepp, J., Robbat, A., Matyas, C., Long, C., Xue, D., Houser, R., & Cash, S. (2019). Environmental Factors Variably Impact Tea Secondary Metabolites in the Context of Climate Change. Frontiers in Plant Science, 10. https://doi.org/10.3389/fpls.2019.00939

Akinniyi, G., Lee, J., Kim, H., Lee, J.-G., dan Yang, I., 2022. A Medicinal Halophyte *Ipomoea pes-caprae* (Linn.) R. Br.: A Review of Its Botany, Traditional Uses, Phytochemistry, and Bioactivity. *Marine Drugs*, **20**: 329.

Alami, M. M., Guo, S., Mei, Z., Yang, G., & Wang, X. (2024). Environmental factors on secondary metabolism in medicinal plants: exploring accelerating factors. Medicinal Plant Biology, 3(1), 0. https://doi.org/10.48130/mpb-0024-0016

Alqarni, M.H., Alam, P., Alam, A., Ali, A., Foudah, A.I., Alshehri, S., dkk., 2021. A Greener HPTLC Approach for the Determination of β-Carotene in Traditional and Ultrasound-Based Extracts of Different Fractions of Daucus carota (L.), Ipomea batatas (L.), and Commercial Formulation. *Agronomy*, **11**: 2443.

Amjadi, Z., Hamzehzarghani, H., Rodriguez, V. M., Huang, Y., & Farahbakhsh, F. (2024). Studying temperature's impact on Brassica napus resistance to identify key regulatory mechanisms using comparative metabolomics. Scientific Reports, 14(1). https://doi.org/10.1038/s41598-024-68345-3

Amri, Z., Amor, I., Zarrouk, A., Chaaba, R., Gargouri, J., Hammami, M., & Hammami, S. (2022). Anti-glycation, antiplatelet and antioxidant effects of different pomegranate parts. BMC Complementary Medicine and Therapies, 22. https://doi.org/10.1186/s12906-022-03824-6

Angelina, M., Mardhiyah, A., Dewi, R., Fajriah, S., Muthiah, N., Ekapratiwi, Y., Dewijanti, I., Sukirno, S., Jamilah, J., & Hartati, S. (2021). Physicochemical and phytochemical standardization, and antibacterial evaluation of Cassia alata leaves from different locations in Indonesia. Pharmacia. https://doi.org/10.3897/pharmacia.68.e76835

UNIVERSITAS
GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Anggista, G., Pangestu, I.T., Handayani, D., Yulianto, M.E., dan Astuti, S.K., 2019. Penentuan Faktor Berpengaruh pada Ekstraksi Rimpang Jahe Menggunakan Extraktor Berpengaduk. *Gema Teknologi*, **20**: 80.

Arnida, A., Maulidia, M., Khairunnisa, A., Sutomo, S., & Faisal, F. (2021). Standardization of Simplicia and Ethanol Extract of Purun Danau (Lepironia articulata (Retz.) Domin) Rhizome. Borneo Journal of Pharmacy. https://doi.org/10.33084/bjop.v4i4.2794

Arrofiqi, M.R., Sakti, A.S., dan Mayangsari, F.D., 2024. Kajian Literatur: Aplikasi Sejumlah Metode Ekstraksi Konvensional untuk Mengekstraksi Senyawa Fenolik dari Bahan Alam. *Jurnal Penelitian Farmasi & Herbal*, **7**: 8–24.

Arya, P., Vaidya, D., Kaushal, M., Devi, S., Gupta, A., & Chand, S. (2025). Effects of different solvents on phytochemical constituents, in-vitro antimicrobial activity, and volatile components of Boehmeria rugulosa Wedd. wood extract. Scientific Reports, 15(1). https://doi.org/10.1038/s41598-025-14506-x

Aryakia, E. (2025). Uncovering the Key Factors Influencing Phytochemical and Phytopharmacological Properties During Medicinal Plant Processing. eFood. https://doi.org/10.1002/efd2.70105

Assefa, A., Ko, E., Moon, S., & Keum, Y. (2016). Antioxidant and antiplatelet activities of flavonoid-rich fractions of three citrus fruits from Korea. 3 Biotech, 6. https://doi.org/10.1007/s13205-016-0424-8

Azzahra, F., Sari, I.S., dan Ashari, D.N., 2022. Penetapan Nilai Rendemen Dan Kandungan Zat Aktif Ekstrak Biji Alpukat (Persea americana) Berdasarkan Perbedaan Pelarut Ekstraksi. *Jurnal Farmasi Higea*, **14**: 159.

Banerjee, D., Hazra, A., Seal, T., Sur, T., Bhattacharya, D., Ray, J., Mukherjee, A., & Mukherjee, B. (2013). Antioxidant and Antiinflammatory Activities of Different Solvent Extracts and Isolated Compounds of *Ipomoea pes-caprae* (L) Sweet of Sunderban Mangrove Eco-complex. Asian Journal of Chemistry, 25. https://doi.org/10.14233/ajchem.2013.14226

Barth, Cristiane da Silva, Hugo Guilherme Tolentino de Souza, Lilian W. Rocha, Camilla Regina de Souza Madeira, Camila Assis, dkk., 2019. RP-HPLC and LC–MS–MS determination of a bioactive artefact from *Ipomoea pes-caprae* extract. *Revista Brasileira de Farmacognosia*, **29**: 570–577.

Bazargani, M. M., Falahati-Anbaran, M., & Rohloff, J. (2021). Comparative Analyses of Phytochemical Variation Within and Between Congeneric Species of Willow Herb, Epilobium hirsutum and E. parviflorum: Contribution of Environmental Factors. Frontiers in Plant Science, 11. https://doi.org/10.3389/fpls.2020.595190

Bellot, P. E. N. R., Braga, E. S., Omage, F. B., Nunes, F. L. da S., Lima, S. C. V. C., Lyra, C. de O., Marchioni, D. M. L., Pedrosa, L. F. C., Barbosa, F., Tasić, L., & Sena-Evangelista, K. C. M. (2023). Plasma lipid metabolites as potential biomarkers for identifying individuals at risk of obesity-induced metabolic complications. Scientific Reports, 13(1). https://doi.org/10.1038/s41598-023-38703-8

UNIVERSITAS
GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Belwal, T., Ezzat, S. M., Rastrelli, L., Bhatt, I. D., Daglia, M., Baldi, A., Devkota, H. P., Orhan, İ. E., Patra, J. K., Das, G., Anandharamakrishnan, C., Gómez-Gómez, L., Nabavi, S. F., Nabavi, S. M., & Atanasov, A. G. (2018). A critical analysis of extraction techniques used for botanicals: Trends, priorities, industrial uses and optimization strategies. TrAC Trends in Analytical Chemistry, 100, 82–102. https://doi.org/10.1016/j.trac.2017.12.018

Bhirde, V.M., Patil, V.M., dan Patil, S.V., 2021. Study Of High Performance Liquid Chromatography. *International Journal of Creative Research Thoughts*, **9**: 879–894.

BPOM, 2012. *Pedoman Teknologi Formulasi Sediaan Berbasis Ekstrak*, Volume 1. BPOM RI, Jakarta.

Bria, E. J., Bani, P. W., Hanas, D. F., Bano, E. N., & Tefa, Y. (2023). Ethnobotany of natural dyes of futus woven fabrics used by Dawan Tribe in North Central Timor Regency. Jurnal Biologi Udayana, 27(1), 95–95. https://doi.org/10.24843/jbiounud.2023.v27.i01.p10

Brown, S.H. dan Frank, M.S., 2020. Railroad Vine (*Ipomoea pes-caprae*): Identification and Uses. *EDIS*.

Buti, M., Checcucci, A., Vergata, C., Renna, L., Pollastri, S., Loreto, F., Mancuso, S., & Martinelli, F. (2025). The transcriptional mechanism behind Mimosa pudica leaf folding in response to mechanical disturbance. Planta, 262(5). https://doi.org/10.1007/s00425-025-04830-x

Cao, Y., Fang, S., Yin, Z., Fu, X., Shang, X., Yang, W., & Yang, H. (2017). Chemical Fingerprint and Multicomponent Quantitative Analysis for the Quality Evaluation of Cyclocarya paliurus Leaves by HPLC–Q–TOF–MS. Molecules : A Journal of Synthetic Chemistry and Natural Product Chemistry, 22. https://doi.org/10.3390/molecules22111927

Chen, S., Pan, Z., Zhao, W., Zhou, Y., Rui, Y., Jiang, C., Wang, Y., White, J. C., & Zhao, L. (2023). Engineering Climate-Resilient Rice Using a Nanobiostimulant-Based “Stress Training” Strategy. ACS Nano, 17(11), 10760–10773. https://doi.org/10.1021/acsnano.3c02215

Cheng, J., Guo, F., Wang, L., Li, Z., Zhou, C., Wang, H., Liang, W., Jiang, X., Chen, Y., & Dong, P. (2024). Evaluating the impact of ecological factors on the quality and habitat distribution of Lonicera japonica Flos using HPLC and the MaxEnt model. Frontiers in Plant Science, 15. https://doi.org/10.3389/fpls.2024.1397939

Cheng, X., Cui, N., Hou, X., Pi, Z., Deng, J., & Liu, S. (2023). Uncovering the effective substances and mechanism of *Ipomoea pes-caprae* against rheumatoid arthritis using LC-MS and targeted network pharmacology.. Journal of separation science, e2200856. https://doi.org/10.1002/jssc.202200856

Cheng, X., Cui, N., Hou, X., Pi, Z., Deng, J., dan Liu, S., 2023. Uncovering the effective substances and mechanism of *Ipomoea pes-caprae* against

UNIVERSITAS
GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

rheumatoid arthritis using liquid chromatography-mass spectrometry and targeted network pharmacology. *Journal of Separation Science*, **46**: 1–10.

Chong, J., Wishart, D., & Xia, J. (2019). Using MetaboAnalyst 4.0 for Comprehensive and Integrative Metabolomics Data Analysis. Current Protocols in Bioinformatics, 68. https://doi.org/10.1002/cpbi.86

Christhuuthayam, M., Nagar, A., & Vijayarengan, P. (2019). ANTIOXIDENT PROPERTIES OF VARIOUS SOLVENT FROM LEAVES EXTRACTS OF *IPOMOEA PES-CAPRAE* L. International Journal of Scientific Research, 8 (3), 2277 – 8179.

Dalimartha, S., 2008. *Atlas tumbuhan obat Indonesia*. Niaga Swadaya, Jakarta.

Dean, J. R., Ahmed, S., Cheung, W., Salaudeen, I., Reynolds, M., Bowerbank, S. L., Nicholson, C., & Perry, J. J. (2023). Use of remote sensing to assess vegetative stress as a proxy for soil contamination. Environmental Science Processes & Impacts, 26(1), 161–176. https://doi.org/10.1039/d3em00480e

Dutra, L.M., Henrique Vieira Teles, P., Diego Da Conceição Santos, A., Franklin De Melo, N., Nagata, N., dan Roberto Guedes Da Silva Almeida, J., 2023. 1H NMR-based metabolic profile and chemometric analysis for the discrimination of Passiflora species genotypic variations. *Food Research International*, **164**: 1–8.

Eric, T., Edith, K., Merveille, K., Donald, K., & Gisele, K. (2025). IN VITRO ANTIOXIDANT ACTIVITY, PHYSICOCHEMICAL AND MICROGRAPHIC STUDIES OF THE LEAFY STEM OF *IPOMOEA PES-CAPRAE* (L) R. BR, A HALOPHYTE FROM IVORY COAST. International Journal of Advanced Research. https://doi.org/10.21474/ijar01/20169

Fadilla, U.B., Aldi, Y., dan Umar, S., 2024. Review Article : Uji Aktivitas In Vivo dan In Vitro Anti Platelet Bromelin Terhadap Penyakit Kardiovaskular. *Jurnal Farmasi Higea*, **16**: 188–193.

Faggio, C., Sureda, A., Morabito, S., Sanches-Silva, A., Mocan, A., Nabavi, S., & Nabavi, S. (2017). Flavonoids and platelet aggregation: A brief review. European Journal of Pharmacology, 807, 91–101. https://doi.org/10.1016/j.ejphar.2017.04.009

Fakhrudin, N., Pertiwi, K.K., Takubessi, M.I., Susiani, E.F., Nurrochmad, A., Widyarini, S., dkk., 2020. A geranylated chalcone with antiplatelet activity from the leaves of breadfruit (Artocarpus altilis). *Pharmacia*, **67**: 173–180.

Fang, S., Lyu, X., Tong, T., Lim, A. I., Li, T., Bao, J., & Hu, Y. H. (2023). Turning dead leaves into an active multifunctional material as evaporator, photocatalyst, and bioplastic. Nature Communications, 14(1), 1203–1203. https://doi.org/10.1038/s41467-023-36783-8

Fitriana, H. N., Purwadi, R., & Kresnowati, M. T. A. P. (2017). Pemetaan Pengaruh Proses Pengolahan pada Kualitas Biji Kakao Menggunakan Metode Metabolik Profiling dengan GC/MS. REAKTOR, 17(3), 132–132. https://doi.org/10.14710/reaktor.17.3.132-139

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Gad, M., Demeyer, K., Heyden, V., & Mangelings, D. (2021). Cytotoxic, Antioxidant, and Antidiabetic Activities versus UPLC-ESI-QTOF-MS Chemical-Profile Analysis of Ipomoea aquatica Fractions. Planta Medica, 87, 1089 - 1100. https://doi.org/10.1055/a-1554-2733

Ghosson, H. (2020). Development of a novel universal proxy to assess the environmental fate and impact of complex (bio)pesticides by Mass Spectrometry-based Metabolomics. HAL (Le Centre Pour La Communication Scientifique Directe). https://tel.archives-ouvertes.fr/tel-03155733

Gil-Martín, E., Forbes-Hernández, T. Y., Romero, A., Cianciosi, D., Giampieri, F., & Battino, M. (2021). Influence of the extraction method on the recovery of bioactive phenolic compounds from food industry by-products [Review of Influence of the extraction method on the recovery of bioactive phenolic compounds from food industry by-products]. Food Chemistry, 378, 131918–131918. Elsevier BV. https://doi.org/10.1016/j.foodchem.2021.131918

Gonçalves, F., Ramos, A., Mathias, M., Sales, Q., Ramos, C., Antunes, F., & Oliveira, R. (2020). Phytochemical analysis and hypotensive activity of *Ipomoea pes-caprae* on blood pressure of normotensive rats, 71. https://doi.org/10.1590/2175-7860202071048

Hani, R., Muhammad Perdana, dan Ayu Rezkitha, Y.A., 2021. Dilema Penggunaan Aspirin dan Proton Pump Inhibitor (PPI) Pada Pasien Gastroesophageal Reflux Disease Dengan Coronary Artery Disease (CAD). *Journal of Islamic Medicine*, **5**: 33–40.

Hidayah, L. A., & Anggarani, M. A. (2022). Determination of Total Phenolic, Total Flavonoid, and Antioxidant Activity of India Onion Extract. Indo J Chem Res, 11(2), 123–135. https://doi.org/10.15294/ijcs.v11i2.54610

Hidayat, R., & Wulandari, P. (2021). Methods of Extraction: Maceration, Percolation and Decoction. Eureka Herba Indonesia, 2(1), 73–79. https://doi.org/10.37275/ehi.v2i1.15

Hunaifi, I., Suryani, D., Hidayat, L., Naufal, M., Ananta, F., Farobbi, M., Hanifa, N., & Hasina, R. (2025). Preliminary In Vitro Antiplatelet Potential of *Ipomoea pes-caprae* from North Lombok with Adenosine Diphosphate-Induced Platelet Aggregation. JURNAL FARMASI DAN ILMU KEFARMASIAN INDONESIA. https://doi.org/10.20473/jfiki.v12i22025.229-246

Irungu, B., Okari, E., Nyangi, M. W., Njeru, S. N., & Koech, L. C. (2023). Potential of medicinal plants as antimalarial agents: a review of work done at Kenya Medical Research Institute [Review of Potential of medicinal plants as antimalarial agents: a review of work done at Kenya Medical Research Institute]. Frontiers in Pharmacology, 14. Frontiers Media. https://doi.org/10.3389/fphar.2023.1268924

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Isah, T. (2019). Stress and defense responses in plant secondary metabolites production [Review of Stress and defense responses in plant secondary metabolites production]. Biological Research, 52(1). BioMed Central. https://doi.org/10.1186/s40659-019-0246-3

Islamy, V. Hasan, N.B. Mamat, Y. Kilawati, dan Y. Maimunah, 2024. Various Solvent Extracts of *Ipomoea pes-caprae*: A Promising Source of Natural Bioactive Compounds Compare With Vitamin C. *Iraqi Journal of Agricultural Sciences*, **55**: 1602–1611.

Ismaını, L., & Surya, M. I. (2023). Metabolite profiling of wild underutilized raspberry (Rubus pyrifolius). Notulae Scientia Biologicae, 15(4), 11695–11695. https://doi.org/10.55779/nsb15411695

Ivanov, I., Sidehmenova, A., Smolyakova, V., Chernysheva, G., & Plotnikov, M. (2014). Inhibition of adenosine diphosphate-induced platelet aggregation by alpha-lipoic acid and dihydroquercetin in vitro. Indian Journal of Pharmacology, 46, 430 - 432. https://doi.org/10.4103/0253-7613.135958

J, J. H., & Rosy, B. A. (2024). Geographical Variation in Morphological Traits of Catharanthus Roseus: A Comparative Study Across Five Distinct Ecological Niches From Southern Tamil Nadu, India. Research Square (Research Square). https://doi.org/10.21203/rs.3.rs-5574070/v1

Jain, A., Parashar, A.K., Nema, R.K., dan Narsinghani, T., 2014. High Performance Thin Layer Chromatography (HPTLC): A Modern Analytical Tool for Chemical Analysis. *Current Research in Pharmaceutical Sciences*, .

Jaybhaye, Dr.S.S. dan Tompe, A.N., 2024. A Review on High Performance Liquid Chromatograpy (HPLC). *EPRA International Journal of Research & Development (IJRD)*, .

Jia, X., Liu, Y., Wang, S., Ma, J., Yu, J., Yue, X., Zhang, Y., & Wang, X. (2022). Screening of metabolic markers present in Oxytropis by UHPLC-Q-TOF/MS and preliminary pharmacophylogenetic investigation. Frontiers in Plant Science, 13. https://doi.org/10.3389/fpls.2022.958460

Jia, X., Liu, Y., Wang, S., Ma, J., Yu, J., Yue, X., Zhang, Y., & Wang, X. (2022). Screening of metabolic markers present in Oxytropis by UHPLC-Q-TOF/MS and preliminary pharmacophylogenetic investigation. Frontiers in Plant Science, 13. https://doi.org/10.3389/fpls.2022.958460

Jin, J., Quinton, T. M., Zhang, J., Rittenhouse, S. E., & Kunapuli, S. P. (2002). Adenosine Diphosphate (ADP)-Induced Thromboxane A(2) Generation In Human Platelets Requires Coordinated Signaling Through Integrin Alpha(Iib)Beta(3) and Receptors. Blood; 99; 10.1182/blood.v99.1.193.

Jing, Y., Chen, W., Qiu, X., Qin, S., Gao, W., Li, C., dkk., 2024. Exploring Metabolic Characteristics in Different Geographical Locations and Yields of Nicotiana tabacum L. Using Gas Chromatography–Mass Spectrometry Pseudotargeted Metabolomics Combined with Chemometrics. *Metabolites*, **14**: 176.

KC, S., Long, L., Liu, M., Zhang, Q., & Ruan, J. (2021). Light Intensity Modulates the Effect of Phosphate Limitation on Carbohydrates, Amino Acids, and

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Catechins in Tea Plants (Camellia sinensis L.). Frontiers in Plant Science, 12. https://doi.org/10.3389/fpls.2021.743781

Kellogg, J. J., Kvalheim, O. M., & Cech, N. B. (2019). Composite score analysis for unsupervised comparison and network visualization of metabolomics data. Analytica Chimica Acta, 1095, 38–47. https://doi.org/10.1016/j.aca.2019.10.029

Kemenkes, 2019. *Pedoman Nasional Pelayanan Kedokteran Tata Laksana Stroke*. Kemenenterian Kesehatan Republik Indonesia, Jakarta.

Kemenkes. 2023. *World Stroke Day 2023, Greater Than Stroke, Kenali dan Kendalikan Stroke*. https://yankes.kemkes.go.id/read/1443/world-stroke-day-2023-greater-than-stroke-kenali-dan-kendalikan-stroke

Kendry, . P, Hernández- Herrera, dan Salgado-Chávez, 2022. Contenido de fenoles totales y actividad antioxidante de extractos foliares de *Ipomoea pes-caprae* (Convolvulaceae). *Temas Agrarios*, **27**: 354–365.

Khan, A., Kanwal, F., Ullah, S., Fahad, M., Tariq, L., Altaf, M. T., Riaz, A., & Zhang, G. (2025). Plant Secondary Metabolites—Central Regulators Against Abiotic and Biotic Stresses. Metabolites, 15(4), 276–276. https://doi.org/10.3390/metabo15040276

Khan, H., Jawad, M., Kamal, M., Baldi, A., Xiao, J., Nabavi, S., & Daglia, M. (2018). Evidence and prospective of plant derived flavonoids as antiplatelet agents: Strong candidates to be drugs of future.. Food and chemical toxicology : an international journal published for the British Industrial Biological Research Association, 119, 355-367. https://doi.org/10.1016/j.fct.2018.02.014

Kinho, J., Arini, D.I.D., Halawane, J., dan Nurani, L., 2011. *Tumbuhan Obat Tradisional di Sulawesi Utara Jilid II*. Manado.

Kubatka, P., Mazurakova, A., Koklesova, L., Samec, M., Sokol, J., Samuel, S.M., dkk., 2022. Antithrombotic and antiplatelet effects of plant-derived compounds: a great utility potential for primary, secondary, and tertiary care in the framework of 3P medicine. *EPMA Journal*, **13**: 407–431.

Kumar, A., Paul, S., Kumari, P., Somasundaram, S., & Kathiresan, K. (2014). ANTIBACTERIAL AND PHYTOCHEMICAL ASSESSMENT ON VARIOUS EXTRACTS OF *IPOMOEA PES-CAPRAE* (L.) R. BRTHROUGH FTIRAND GC- MS SPECTROSCOPIC ANALYSIS. Asian Journal of Pharmaceutical and Clinical Research, 7, 134-138

Latief, M., Fisesa, A.T., Sari, P.M., dan Tarigan, I.L., 2021. Aktivitas Antiinflamasi Ekstrak Etanol Daun Sungkai (Peronema Canescens Jack) pada Mencit Terinduksi Karagenan. *Jurnal Farmasi Sains dan Praktis*, **7**: 144–153.

Le, H., Nguyen, V., Nguyen, T., Nguyen, T., & Le, D. (2023). Potential antiaggregatory and anticoagulant activity of Kaempferia parviflora extract and its methoxyflavones. Industrial Crops and Products. https://doi.org/10.1016/j.indcrop.2022.116030.

Lee, S., Oh, D.-G., Singh, D., Lee, J. S., Lee, S., & Lee, C. H. (2020). Exploring the metabolomic diversity of plant species across spatial (leaf and stem)

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
Lalu Husnul Hidayat, Dr.rer.nat. apt. Yosi Bayu Murti, S.Si., M.Si.; Dr. apt. Nunung Yuniarti, S.F., M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

components and phylogenic groups. BMC Plant Biology, 20(1), 39–39. https://doi.org/10.1186/s12870-019-2231-y.

Lescano, C., De Lima, F., Mendes-Silvério, C., Justo, A., Da Silva Baldivia, D., Vieira, C., Sanjinez-Argandoña, E., Cardoso, C., Mónica, F., & De Oliveira, I. (2018). Effect of Polyphenols From Campomanesia adamantium on Platelet Aggregation and Inhibition of Cyclooxygenases: Molecular Docking and in Vitro Analysis. Frontiers in Pharmacology, 9. https://doi.org/10.3389/fphar.2018.00617

Li, B., Lima, M., Nie, Y., Xu, L., Liu, X., Yuan, H., Chen, C., Dias, A., & Zhang, X. (2021). HPLC-DAD Fingerprints Combined With Multivariate Analysis of Epimedii Folium From Major Producing Areas in Eastern Asia: Effect of Geographical Origin and Species. Frontiers in Pharmacology, 12. https://doi.org/10.3389/fphar.2021.761551

Li, J., Ackah, M., Amoako, F. K., Cui, Z., Sun, L., Li, H., Tsigbey, V. E., Zhao, M., & Zhao, W. (2024). Metabolomics and physio-chemical analyses of mulberry plants leaves response to manganese deficiency and toxicity reveal key metabolites and their pathways in manganese tolerance. Frontiers in Plant Science, 15. https://doi.org/10.3389/fpls.2024.1349456

Li, xueshan, Liu, guoxiang, Wang, J., Ji, Y., Li, Y., Li, Y., Xiang, H., Yang, A., Dai, P., Zhang, X., & Zhou, H. (2023). Metabolomics Analysis of Cigar from China's Major Tobacco Growing Regions. Research Square (Research Square). https://doi.org/10.21203/rs.3.rs-3493864/v1

Liu, Z., Wang, D., Li, D., & Zhang, S. (2017). Quality Evaluation of Juniperus rigida Sieb. et Zucc. Based on Phenolic Profiles, Bioactivity, and HPLC Fingerprint Combined with Chemometrics. Frontiers in Pharmacology, 8. https://doi.org/10.3389/fphar.2017.00198

López-Salazar, H., Camacho-Díaz, B. H., Arenas-Ocampo, M. L., & Jiménez–Aparicio, A. R. (2023). Microwave-assisted extraction of functional compounds from plants: A Review [Review of Microwave-assisted extraction of functional compounds from plants: A Review]. BioResources, 18(3). North Carolina State University. https://doi.org/10.15376/biores.18.3.lopez-salazar

López-Salazar, H., Camacho-Díaz, B. H., Arenas-Ocampo, M. L., & Jiménez–Aparicio, A. R. (2023). Microwave-assisted extraction of functional compounds from plants: A Review [Review of Microwave-assisted extraction of functional compounds from plants: A Review]. BioResources, 18(3). North Carolina State University. https://doi.org/10.15376/biores.18.3.lopez-salazar

Luyen, L., Thom, V., Huong, L., Huong, D., & Anh, N. (2020). Inhibitory effect on human platelet aggregation, antioxidant activity, and phytochemicals of Canna warszewiczii (A. Dietr) Nb. tanaka. Pharmacognosy Research, 12, 47 - 52. https://doi.org/10.4103/pr.pr_72_19

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Madkour, D. A., Ahmed, M. M., Elkirdasy, A. F., Orabi, S. H., & Mousa, A. (2024). Rutin: Chemical properties, Pharmacokinetic properties and Biological activities. Matrouh Journal of Veterinary Medicine/Matrouh Journal of Veterinary Medicine, 4(1), 26–34. https://doi.org/10.21608/mjvm.2024.341806

Malmsten, C.L., 1986. Prostaglandins, Thromboxanes, and Leukotrienes in Inflammation. *The American Journal of Medicine*, **80**: 11–17.

Mamat, S. F., Azizan, K. A., Baharum, S. N., Noor, N. M., & Aizat, W. M. (2018). Metabolomics analysis of mangosteen (Garcinia mangostana Linn.) fruit pericarp using different extraction methods and GC-MS. Plant Omics, 11(2), 89–97. https://doi.org/10.21475/poj.11.02.18.pne1191.

Manalu, Lamhot P dan Adinegoro, Himawan. 2016. Kondisi Proses Pengeringan Untuk Menghasilkan Simplisia Temuputih Standar. Jurnal Standardisasi Volume 18 Nomor 1, Maret 2016: Hal 62 - 68

Markus, H.S., 2022. The inequality of stroke in 2022: The impact of geography, COVID-19, and time of day, on stroke outcomes. *International Journal of Stroke*, **17**: 7–8.

Martin, A.C., Pawlus, A.D., Jewett, E.M., Wyse, D.L., Angerhofer, C.K., dan Hegeman, A.D., 2014. Evaluating solvent extraction systems using metabolomics approaches. *RSC Adv.*, **4**: 26325–26334.

Masitah, M., Pribadi, T., Pratama, M. I., Harrist, R. F., Sari, P. A., Dianita, F., & Setiawan, V. K. (2023). ANALISIS KANDUNGAN METABOLIK SEKUNDER PADA DAUN KENIKIR (Cosmos Caudatus Kunth.) DENGAN PELARUT METANOL, ETANOL, DAN ETIL ASETAT. BIOEDUKASI (Jurnal Pendidikan Biologi), 14(2), 266–266. https://doi.org/10.24127/bioedukasi.v14i2.7805

Matunog, V., & Bajo, L. (2013). Phytochemical Screening and Antioxidative Potentials of “Beach Morning Glory” Ipomoea pes- caprae (Linn.) Roth Leaves Extract. , 1. https://doi.org/10.7828/jmds.v1i1.393

Maulana, I. A., Triatmoko, B., & Nugraha, A. S. (2020). Skrining Fitokimia dan Uji Aktivitas Antibakteri Ekstrak dan Fraksi Tanaman Senggugu (Rotheca serrata (L.) Steane & Mabb.) terhadap Pseudomonas aeruginosa. JPSCR Journal of Pharmaceutical Science and Clinical Research, 5(1), 1–1. https://doi.org/10.20961/jpscr.v5i1.32200

Mayasari, D., Bayu, M. Y., Tunjung, P. S. U., & Sudarsono, S. (2021). Metabolic fingerprinting of Melastoma malabathricum L. extracts using high-performance liquid chromatography-diode array detector combined with chemometric data analysis. Journal of Applied Pharmaceutical Science. https://doi.org/10.7324/japs.2021.110906

Mayasari, D., Murti, Y.B., Pratiwi, S.U.T., Sudarsono, S., Hanna, G., dan Hamann, M.T., 2022. TLC-Based Fingerprinting Analysis of the Geographical Variation of *Melastoma malabathricum* in Inland and Archipelago Regions: A Rapid and Easy-to-Use Tool for Field Metabolomics Studies. *Journal of Natural Products*, **85**: 292–300.

UNIVERSITAS
GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Meena, K. K., Sorty, A. M., Bitla, U. M., Choudhary, K., Gupta, P., Pareek, A., Singh, D. P., Prabha, R., Sahu, P. K., Gupta, V. K., Singh, H. B., Krishanani, K. K., & Minhas, P. S. (2017). Abiotic Stress Responses and Microbe-Mediated Mitigation in Plants: The Omics Strategies. Frontiers in Plant Science, 8, 172–172. https://doi.org/10.3389/fpls.2017.00172

Messai, H., Farman, M., Sarraj-Laabidi, A., Hammami-Semmar, A., dan Semmar, N., 2016. Chemometrics Methods for Specificity, Authenticity and Traceability Analysis of Olive Oils: Principles, Classifications and Applications. *Foods*, **5**: 77.

Misra, D., Dutta, W., Jha, G., & Ray, P. (2023). Interactions and Regulatory Functions of Phenolics in Soil-Plant-Climate Nexus. Agronomy, 13(2), 280–280. https://doi.org/10.3390/agronomy13020280

Mulaudzi, N., Anokwuru, C.P., Tankeu, S.Y., Combrinck, S., Chen, W., Vermaak, I., dkk., 2021. Phytochemical Profiling and Quality Control of Terminalia sericea Burch. ex DC. Using HPTLC Metabolomics. *Molecules*, **26**: 432.

Mundim, F. M., & Pringle, E. G. (2018). Whole-Plant Metabolic Allocation Under Water Stress. Frontiers in Plant Science, 9. https://doi.org/10.3389/fpls.2018.00852

Nagababu, P., & Rao, V. (2015). Pharmacological potential of Ipomeapes-caprae(L.) R. Br. whole plant extracts. Der Pharmacia Sinica, 6(2): 52-60

Nilam, R., Jyoti, P., & Sumitra, C. (2018). Pharmacognostic and phytochemical studies of *Ipomoea pes-caprae*, an halophyte from Gujarat. Journal of Pharmacognosy and Phytochemistry, 7, 11-18.

Noviana, E., Indrayanto, G., & Rohman, A. (2022). Advances in Fingerprint Analysis for Standardization and Quality Control of Herbal Medicines. Frontiers in Pharmacology, 13. https://doi.org/10.3389/fphar.2022.853023

Oktavianawati, I., Santoso, M., & Fatmawati, S. (2023). Metabolite profiling of Borneo's Gonystylus bancanus through comprehensive extraction from various polarity of solvents. Scientific Reports, 13(1). https://doi.org/10.1038/s41598-023-41494-7

Ornelas, A., Zacharias-Millward, N., Menter, D. G., Davis, J. S., Lichtenberger, L., Hawke, D., Hawk, E., Vilar, E., Bhattacharya, P., & Millward, S. (2017). Beyond COX-1: The Effects of Aspirin on Platelet Biology and Potential Mechanisms Chemoprevention. Cancer of Metastasis Reviews; 36; 289–303. https://doi: 10.1007/s10555 017-9675-z.

Padilla-González, G. F., Diazgranados, M., & Costa, F. B. D. (2017). Biogeography shaped the metabolome of the genus Espeletia: a phytochemical perspective on an Andean adaptive radiation. Scientific Reports, 7(1). https://doi.org/10.1038/s41598-017-09431-7

Pandhare, R.B., Kulkarni, R.N., Deshmukh, V.K., Mohite, P.B., dan Pawar, A.R., 2021. High-performance thin layer chromatography: A powerful analytical technique in pharmaceutical drug discovery. *Journal of Pharmaceutical and Biological Sciences*, **9**: 7–14.

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Pardede, A., & Wardhani, R. R. A. A. K. (2025). ANALISIS SENYAWA METABOLIT SEKUNDER DARI BATANG, DAUN DAN AKAR TUMBUHAN KELAKAI (Stenochlaena palustris). Dalton Jurnal Pendidikan Kimia Dan Ilmu Kimia, 8(3), 200–200. https://doi.org/10.31602/dl.v8i3.20898

Park, Y., Kong, T., Roede, J., Jones, D., & Lee, K. (2019). A biplot correlation range for group-wise metabolite selection in mass spectrometry. BioData Mining, 12. https://doi.org/10.1186/s13040-019-0191-2

Petit, J., Gulisano, A., Dechesne, A., & Trindade, L. M. (2019). Phenotypic Variation of Cell Wall Composition and Stem Morphology in Hemp (Cannabis sativa L.): Optimization of Methods. Frontiers in Plant Science, 10. https://doi.org/10.3389/fpls.2019.00959

Piccini, C., Cai, G., Dias, M. C., Romi, M., Longo, R., & Cantini, C. (2020). UV-B Radiation Affects Photosynthesis-Related Processes of Two Italian Olea europaea (L.) Varieties Differently. Plants, 9(12), 1712–1712. https://doi.org/10.3390/plants9121712

Plášková, A., & Mlček, J. (2023). New insights of the application of water or ethanol-water plant extract rich in active compounds in food [Review of New insights of the application of water or ethanol-water plant extract rich in active compounds in food]. Frontiers in Nutrition, 10. Frontiers Media. https://doi.org/10.3389/fnut.2023.1118761

Pongprayoon, U., Bohlin, L., Soonthornsaratune, P., dan Wasuwat, S., 1991. Antiinflammatory activity of *Ipomoea pes-caprae* (L.) R. Br. *Phytotherapy Research*, **5**: 63–66.

Pratoko, D. K. (2018). Total Phenolic and Flavonoid Content, and Antioxidant Capacity of Red Ginger (Zingiber officinale var. Rubrum) Ethanolic Extract and Fraction. Al-Kimia, 6(2). https://doi.org/10.24252/al-kimia.v6i2.6316

Price, E. J., Bhattacharjee, R., Lopez-Montes, A., & Fraser, P. D. (2017). Metabolite profiling of yam (Dioscorea spp.) accessions for use in crop improvement programmes. Metabolomics, 13(11). https://doi.org/10.1007/s11306-017-1279-7

Puah, P. Y., Lee, D. J. H., Mak, K. H., Ang, H. J., Chen, H., Moh, P. Y., Fong, S. Y., & Ling, Y. S. (2019). Extractable impurities from fluoropolymer-based membrane filters – interference in high-throughput, untargeted analysis. RSC Advances, 9(55), 31918–31927. https://doi.org/10.1039/c9ra06198c

Putri, R.R.R.F., Evi Umayah Ulfa, dan Rini Riyanti, 2014. Uji_Aktivitas_Antiplatelet_Ekstrak_Etano. *e-Jurnal Pustaka Kesehatan*, **2**: 111–114.

Rabeh, K., Hnini, M., & Oubohssaine, M. (2025). A comprehensive review of transcription factor-mediated regulation of secondary metabolites in plants under environmental stress. Stress Biology, 5(1). https://doi.org/10.1007/s44154-024-00201-w

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
Lalu Husnul Hidayat, Dr.rer.nat. apt. Yosi Bayu Murti, S.Si., M.Si.; Dr. apt. Nunung Yuniarti, S.F., M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Rafi, M., Rismayani, W., Sugiarti, R. M., Syafitri, U. D., Wahyuni, W. T., & Rohaeti, E. (2021). FTIR-based fingerprinting combined with chemometrics for discrimination of Sonchus arvensis leaves extracts of various extracting solvents and the correlation with its antioxidant activity. INDONESIAN JOURNAL OF PHARMACY, 132–140. https://doi.org/10.22146/ijp.755

Rafi, M., Rismayani, W., Sugiarti, R. M., Syafitri, U. D., Wahyuni, W. T., & Rohaeti, E. (2021). FTIR-based fingerprinting combined with chemometrics for discrimination of Sonchus arvensis leaves extracts of various extracting solvents and the correlation with its antioxidant activity. INDONESIAN JOURNAL OF PHARMACY, 132–140. https://doi.org/10.22146/ijp.755

Ramesh, A., Sundarraj, P., & Balamani, D. (2018). Determination of bioactive compounds from the hexane extract of *Ipomoea pes-caprae* (L) R. Br by GC-MS analysis. IJAR, 7(1), 139-149

Ramesh, A., Sundarraj, P., Department of Chemistry, Chikkanna Government Arts College, Tirupur., Balamani, J., dan Department of Chemistry, Chikkanna Government Arts College, Tirupur., 2019. Phytochemical Evaluation of Leaf And Stem of *Ipomoea pes-caprae* (L) R. Br. *International Journal of Advanced Research*, **7**: 139–149.

Rodrigues, A. M., Miguel, C. M. G., Chaves, I., & António, C. (2019). Mass spectrometry-based forest tree metabolomics [Review of Mass spectrometry-based forest tree metabolomics]. Mass Spectrometry Reviews, 40(2), 126–157. Wiley. https://doi.org/10.1002/mas.21603

Rogers, Grice, I.D., dan Griffiths, L.R., 2000. Inhibition of platelet aggregation and 5-HT release by extracts of Australian plants used traditionally as headache treatments. *European Journal of Pharmaceutical Sciences*, **9**: 355–363.

Rumbaut, R. E. (2010). Platelet-Vessel Wall Interactions In Hemostasis and Thrombosis. Integrated Systems Physiology From Molecule to Function; 2; 1-75. doi: 10.4199/C00007ED1V01Y201002ISP004.

Rutkowska, M., Owczarek-Januszkiewicz, A., Magiera, A., Gieleta, M., & Olszewska, M. (2023). Chemometrics-Driven Variability Evaluation of Phenolic Composition, Antioxidant Capacity, and α-Glucosidase Inhibition of Sorbus aucuparia L. Fruits from Poland: Identification of Variability Markers for Plant Material Valorization. Antioxidants, 12. https://doi.org/10.3390/antiox12111967

Saengkhae, C., Uawongyart, N., Osiri, S., Srisook, K., & Tangwattanachuleeporn, M. (2021). Antioxidant and Anti-inflammatory Activities of Different Solvent Extracts from *Ipomoea pes-caprae* (L.) R. Br. in Lipopolysaccharide Stimulated RAW 264.7 Macrophages. Trends in Sciences. https://doi.org/10.48048/tis.2021.1404

Safutra, E. dan Zuriat, Z., 2018. Kajian Potensi Bioaktif Kangkung Laut (Ipomea Pescaprae) Asal Pesisir Aceh Barat Sebagai Inhibitor Tirosinase dan Antioksidan. *Jurnal Akuakultura*, **2**: 79–85.

UNIVERSITAS
GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
Lalu Husnul Hidayat, Dr.rer.nat. apt. Yosi Bayu Murti, S.Si., M.Si.; Dr. apt. Nunung Yuniarti, S.F., M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Salimi, Y. K., Tulie, W. Z. R., Bialangi, N., & Ischak, N. I. (2024). Identifikasi Senyawa Metabolit Sekunder Ekstrak Metanol Batang Katang-katang (Ipomoea Pes-Caprae) dan Uji Aktivitas Antioksidan. Jambura Journal of Chemistry, 6(1), 38–45. https://doi.org/10.37905/jambchem.v6i1.17493

Salomé-Abarca, L.F., Van Den Hondel, C.A.M.J.J., Erol, Ö., Klinkhamer, P.G.L., Kim, H.K., dan Choi, Y.H., 2021. HPTLC-Based Chemical Profiling: An Approach to Monitor Plant Metabolic Expansion Caused by Fungal Endophytes. *Metabolites*, **11**: 174.

Sang, Y., Alami, M. M., Si, H., Shu, S., Feng, S., Mei, Z., & Wang, X. (2024). Variation in Columbin Content in Rhizome of different Tinospora sagittata Varieties. Research Square (Research Square). https://doi.org/10.21203/rs.3.rs-5479630/v1.

Sasadara, M. M. V., & Wiranata, I. G. (2022). Pengaruh Pelarut dan Metode Ekstraksi terhadap Kandungan Metabolit Sekunder dan Nilai IC50 Ekstrak Umbi Bit (Beta vulgaris L.). Usadha, 2(1), 7–13. https://doi.org/10.36733/usadha.v2i1.5277.

Schenke, D., Utami, H. P., Zhou, Z., Gallegos, M., & Cai, D. (2018). Suppression of UV-B stress induced flavonoids by biotic stress: Is there reciprocal crosstalk? Plant Physiology and Biochemistry, 134, 53–63. https://doi.org/10.1016/j.plaphy.2018.06.026.

Schneider, G. F., Salazar, D., Hildreth, S. B., Helm, R. F., & Whitehead, S. R. (2021). Comparative Metabolomics of Fruits and Leaves in a Hyperdiverse Lineage Suggests Fruits Are a Key Incubator of Phytochemical Diversification. Frontiers in Plant Science, 12. https://doi.org/10.3389/fpls.2021.693739.

Sembiring, B., Suhirman, S., Winarti, C., Haris, H., Siregar, T., Maryana, E., Harimurti, N., Manoi, F., & Agustinisari, I. (2025). Physical and Chemical Properties of Rat Taro Simplicia From Various Drying Methods. The Scientific World Journal, 2025. https://doi.org/10.1155/tswj/6239186

Shofi, Muh., Suwitasari, F., & Istiqomah, N. (2020). Aktivitas Antioksidan Ekstrak Etanol Kamboja Jepang (Adenium obesum) dan Kamboja Putih (Plumeria acuminata). AL-Kauniyah Jurnal Biologi, 13(2), 167–178. https://doi.org/10.15408/kauniyah.v13i1.12631.

Shukla, R., Singh, P.K., dan Upadhyay, S., 2023. A Comprehensive Review of High-Performance Thin Layer Chromatography (HPTLC). *International Journal of Pharmacy and Pharmaceutical Research*, **27**: 398–410.

Singh, U., Almahasheer, H., Emwas, A. H., & Jaremko, M. (2025). Untargeted metabolic profiling of Zygophyllum Coccineum plant near the Red Sea for phytochemical investigation by GC-MS, LC-MS, and NMR. Journal of Saudi Chemical Society, 29(1). https://doi.org/10.1007/s44442-025-00003-3.

Stainer, A. R., Sasikumar, P., Bye, A. P., Unsworth, A. J., Holbrook, L., Tindall, M. J., Lovegrove, J. A., & Gibbins, J. M. (2019). The Metabolites of the Dietary Flavonoid Quercetin Possess Potent Antithrombotic Activity, and

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Interact with Aspirin to Enhance Antiplatelet Effects. TH Open, 3(3). https://doi.org/10.1055/s-0039-1694028.

Stéphane, F. F. Y., Jules, B. K. J., Batiha, G. E., Ali, I., & Bruno, L. N. (2021). Extraction of Bioactive Compounds from Medicinal Plants and Herbs. In IntechOpen eBooks. IntechOpen. https://doi.org/10.5772/intechopen.98602

Sutomo, S., Lestari, H., Arnida, A., & Sriyono, A. (2019). Simplicia and Extracts Standardization from Jualing Leaves (Micromelum minutum Wight & Arn.) from South Kalimantan. Borneo Journal of Pharmacy. https://doi.org/10.33084/bjop.v2i2.898.

Tamang, H. K., Stringham, E. N., & Tourdot, B. E. (2023). Platelet Functional Testing Via High-Throughput Microtiter Plate-Based Assays. Current Protocols, 3(2). https://doi.org/10.1002/cpz1.668

Tangkudung G, David S, dan Ferrdy P.W, 2021. Rasionalisasi Penggunaan Antiplatelet pada Prosedur Neurointervensi Vaskular. *Jurnal Sinaps*, **4**: 1–11.

Tawfike, A., Tate, R. J., Abbott, G., Young, L., Viegelmann, C., Schumacher, M., Diederich, M., & Edrada-Ebel, R. (2017). Metabolomic Tools to Assess the Chemistry and Bioactivity of Endophytic Aspergillus Strain. Chemistry & Biodiversity, 14(10). https://doi.org/10.1002/cbdv.201700040.

Thamapan, K., Loahakunjit, N., Kerdchoechuen, O., Vongsawasdi, P., & Mingvanish, W. (2020). Phytochemical Evaluation and Qualitative Analysis as Sweetness Potentially of Selected Thai Plants. Chiang Mai University Journal of Natural Sciences, 19(3). https://doi.org/10.12982/cmujns.2020.0021.

Tosunoğlu, Z., & Saygi, H. (2018). Analysis of Long and Short Terms Fishery Landings of Köyceğiz Lagoon (Turkey). Turkish Journal of Fisheries and Aquatic Sciences, 19(3). https://doi.org/10.4194/1303-2712-v19_3_03

Virk, H.U.H., Escobar, J., Rodriguez, M., Bates, E.R., Khalid, U., Jneid, H., dkk., 2023. Dual Antiplatelet Therapy: A Concise Review for Clinicians. *Life*, **13**: 1–15.

Vončina, D.B., 2009. Chemometrics in Analytical Chemistry. *Nova Biotechnologica*, **9**: 211–216.

Wibowo, R.H., Nabella, I., Fitri, S., Rahmawati, S., Hermansyah, O., Masrijal, C.D.P., dkk., 2024. Antibacterial Activity of Ethanol Extracts from Leaves and Flowers of Katang-katang *Ipomoea pes-caprae* (L) R.Br Against Pseudomonas aeruginosa. *Jurnal Pembelajaran dan Biologi Nukleus*, **10**: 85–95.

Wijayanti, L., Suryani, S., dan Wibowo, R., 2022. Uji Aktivitas Antiplatelet Bromelain Secara In Vitro Menggunakan Spektrofotometer UV-Vis. *Indonesian Journal of Laboratory*, **5**: 70.

Windarsih, A., Rohman, A. R. A., Bakar, N. K. A., & Erwanto, Y. (2023). Metabolomics Approach Using Lc-Orbitrap High Resolution Mass Spectrometry and Chemometrics for Authentication of Beef Meats from

UNIVERSITAS GADJAH MADA
Analisis Metabolomik Pengaruh Lokasi Tumbuh dan Bagian Tumbuhan Katang-katang (Ipomoea Pes-caprae (L.) R.Br) di Kabupaten Lombok Utara Terhadap Profil Metabolit dan Aktivitas Antiplatelet
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Different Origins in Indonesia. Sains Malaysiana, 52(10), 2869–2887. https://doi.org/10.17576/jsm-2023-5210-11

Wu, D., Yu, D., Zhang, Y., Dong, J., Li, D., & Wang, D. (2018). Metabolite Profiles, Bioactivity, and HPLC Fingerprint of Different Varieties of Eucommia ulmoides Oliv.: Towards the Utilization of Medicinal and Commercial Chinese Endemic Tree. Molecules : A Journal of Synthetic Chemistry and Natural Product Chemistry, 23. https://doi.org/10.3390/molecules23081898

Wu, W., Shi, J., Jin, J.-Q., Liu, Z., Yuan, Y., Chen, Z., Zhang, S., Dai, W., & Lin, Z. (2023). Comprehensive metabolic analyses provide new insights into primary and secondary metabolites in different tissues of Jianghua Kucha tea (Camellia sinensis var. assamica cv. Jianghua). Frontiers in Nutrition, 10. https://doi.org/10.3389/fnut.2023.1181135

Xiao, P., Pfaff, S., Zhao, W., Debnath, D., Vojvodin, C. S., Liu, C., Cosgrove, D. J., & Wang, T. (2025). Emergence of lignin-carbohydrate interactions during plant stem maturation visualized by solid-state NMR. Nature Communications, 16(1). https://doi.org/10.1038/s41467-025-63512-0

Xu, W., Cheng, Y., Guo, Y., Yao, W., dan Qian, H., 2022. Effects of geographical location and environmental factors on metabolite content and immune activity of Echinacea purpurea in China based on metabolomics analysis. *Industrial Crops and Products*, **189**: 1–14.

Yavaş, İ., Ünay, A., Ali, S., & Abbas, Z. (2020). UV-B Radiations and Secondary Metabolites. Turkish Journal of Agriculture - Food Science and Technology, 8(1), 147–157. https://doi.org/10.24925/turjaf.v8i1.147-157.2878

Yuan, M., Zhong, W., Wang, Y., Liu, Y., Song, J., Guo, Y., Zeng, B., Guo, Y., & Guo, L. (2024). Therapeutic effects and molecular mechanisms of natural products in thrombosis. Phytotherapy Research, 38, 2128 - 2153. https://doi.org/10.1002/ptr.8151

Yuliana, N. D., Sugiharto, M. A., Lioe, H. N., GOTO, M., & Ishikawa, Y. (2018). NMR metabolomics revealed metabolites and bioactivity variation in Torbangun leaves Plectranthus amboinicus L. with different origins. Indonesian Journal of Biotechnology, 23(2), 91–91. https://doi.org/10.22146/ijbiotech.38659

Zaragozá, C., Álvarez-Mon, M. Á., Zaragozá, F. T., & Villaescusa, L. (2022). Flavonoids: Antiplatelet Effect as Inhibitors of COX-1. Molecules, 27(3), 1146–1146. https://doi.org/10.3390/molecules27031146

Zaragozá, C., Álvarez-Mon, M., Zaragozá, F., & Villaescusa, L. (2022). Flavonoids: Antiplatelet Effect as Inhibitors of COX-1. Molecules, 27. https://doi.org/10.3390/molecules27031146

Zaragozá, C., Álvarez-Mon, M., Zaragozá, F., & Villaescusa, L. (2022). Flavonoids: Antiplatelet Effect as Inhibitors of COX-1. Molecules, 27. https://doi.org/10.3390/molecules27031146

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Zhan, X., Chen, Z., Chen, R., & Shen, C. (2022). Environmental and Genetic Factors Involved in Plant Protection-Associated Secondary Metabolite Biosynthesis Pathways. Frontiers in Plant Science, 13, 877304–877304. https://doi.org/10.3389/fpls.2022.877304

Zhang, C., Wang, H., Lyu, C.-G., Wang, Y., Sun, J., Zhang, Y., Xiang, Z., Guo, X., Wang, Y., Qin, M., Wang, S., & Guo, L. (2023). Authenticating the geographic origins of Atractylodes lancea rhizome chemotypes in China through metabolite marker identification. Frontiers in Plant Science, 14. https://doi.org/10.3389/fpls.2023.1237800

Zhang, S., Zhang, L., Zou, H., Lin, Q., Zheng, Y., Yang, D., & Wang, Y. (2021). Effects of Light on Secondary Metabolite Biosynthesis in Medicinal Plants. Frontiers in Plant Science, 12, 781236–781236. https://doi.org/10.3389/fpls.2021.781236

Zhang, W., Zeng, Y., Meng, J., Ye, C., Li, Y., Liu, C., & Wang, J. (2023). Integration of high-throughput omics technologies in medicinal plant research: The new era of natural drug discovery [Review of Integration of high-throughput omics technologies in medicinal plant research: The new era of natural drug discovery]. Frontiers in Plant Science, 14. Frontiers Media. https://doi.org/10.3389/fpls.2023.1073848

Zhao, X., Chen, M., Li, Z., Zhao, Y., Yang, H., Zha, L., Yu, C., Wu, Y., & Song, X. (2020). The Response of Volvariella volvacea to Low-Temperature Stress Based on Metabonomics. Frontiers in Microbiology, 11. https://doi.org/10.3389/fmicb.2020.01787

Zhou, Y., Zhang, D., Tan, P., Xian, B., Jiang, H., Wu, Q., Huang, X., Zhang, P., Xiao, X., & Pei, J. (2022). Mechanism of platelet activation and potential therapeutic effects of natural drugs.. Phytomedicine : international journal of phytotherapy and phytopharmacology, 108, 154463. https://doi.org/10.1016/j.phymed.2022.154463.

Ziemińska, K., Westoby, M., & Wright, I. J. (2015). Broad Anatomical Variation within a Narrow Wood Density Range—A Study of Twig Wood across 69 Australian Angiosperms. PLoS ONE, 10(4). https://doi.org/10.1371/journal.pone.0124892.

Zlatić, N., Jakovljević, D., dan Stanković, M., 2019. Temporal, Plant Part, and Interpopulation Variability of Secondary Metabolites and Antioxidant Activity of Inula helenium L. *Plants*, **8**: 179.