UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
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DAFTAR PUSTAKA

Abubakar, A.R. dan Haque, M., 2020. Preparation of Medicinal Plants: Basic Extraction and Fractionation Procedures for Experimental Purposes. *Journal of Pharmacy & Bioallied Sciences*, **12**: 1–10.

Agustina, N., Hutauruk, T.J.W., Sulistyaningrum, N., Yudhanto, S.M., Liza, N., Kusumaningrum, L., dkk., 2022. Diversity of the Medicinal Plant in Homegarden of Local Communities in the Coastal Area of Prigi Bay, Trenggalek, East Java, Indonesia. *Biodiversitas Journal of Biological Diversity*, **23**: .

Ajayi, A., Solomon, U., Benneth, B.-A., dan Adzu, B., 2017. Toxicity and Protective Effect of Phenolic-Enriched Ethylacetate Fraction of Ocimum gratissimum (Linn.) Leaf against Acute Inflammation and Oxidative Stress in Rats. *Drug Development Research*, **78**: 135–145.

Al-Otaibi, M.M.D., Alotaibi, E.G.H., Al.Masoud, B.M.A., Al-Wadaei, A.S.S., Almutairi, A.Q.K., dan Alotaibi, M.B.M., 2023. Diclofenac: An Update on Its Mechanism of Action and Safety Profile. *Journal of Population Therapeutics & Clinical Pharmacology*, **3**: 830–3.

Altman, R., Bosch, B., Brune, K., Patrignani, P., dan Young, C., 2015. Advances in NSAID Development: Evolution of Diclofenac Products Using Pharmaceutical Technology. *Drugs*, **75**: 859–877.

Amdekar, S., Roy, P., Singh, V., Kumar, A., Singh, R., dan Sharma, P., 2012. Anti-Inflammatory Activity of *Lactobacillus* on Carrageenan-Induced Paw Edema in Male Wistar Rats. *International Journal of Inflammation*, **2012**: 1–6.

Asefa, M., Teshome, N., dan Degu, A., 2022. Anti-Inflammatory and Analgesic Activity of Methanolic Root Extract of Verbascum sinaiticum Benth. *Journal of Inflammation Research*, **15**: 6381–6392.

Ashraf, S., Ashraf, M.Z., Miao, B., dan Zhao, X., 2025. Optimizing Extraction Methods for Bioactive Polysaccharides from Rosa rugosa and Rosa damascena. *Foods*, **14**: 3211.

Ayoub, S.S., 2021. Paracetamol (acetaminophen): A familiar drug with an unexplained mechanism of action. *Temperature*, **8**: 351–371.

Badan Pengawas Obat dan Makanan, 2012. *Acuan Sediaan Herbal*, 7th ed. Direktorat Obat Asli Indonesia, Jakarta.

Badan Pengawas Obat dan Makanan, 2021. Pedoman Uji Farmakodinamik Praklinik Obat Tradisional Nomor 18 Tahun 2021.

Badan Pengawas Obat dan Makanan, 2023. Peraturan Badan Pengawas Obat dan Makanan Nomor 29 Tahun 2023 Tentang Persyaratan Keamanan dan Mutu Obat Bahan Alam.

Bagdas, D., Muldoon, P.P., AlSharari, S., Carroll, F.I., Negus, S.S., dan Damaj, M.I., 2016. Expression and pharmacological modulation of visceral pain-induced conditioned place aversion in mice. *Neuropharmacology*, **102**: 236–243.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
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Bi, Y., Chen, H., Su, J., Cao, X., Bian, X., dan Wang, K., 2011. Visceral hyperalgesia induced by forebrain-specific suppression of native Kv7/KCNQ/M-current in mice. *Molecular Pain*, **7**: 84.

Bouyahya, A., Guaouguaou, F.-E., El Omari, N., El Menyiy, N., Balahbib, A., El-Shazly, M., dkk., 2022. Anti-inflammatory and analgesic properties of Moroccan medicinal plants: Phytochemistry, in vitro and in vivo investigations, mechanism insights, clinical evidences and perspectives. *Journal of Pharmaceutical Analysis*, **12**: 35–57.

Brunton, L. dan Knollmann, B., 2022. *Goodman and Gilman's The Pharmacological Basis of Therapeutics, 14th Edition*, 14th edition. ed. McGraw Hill / Medical, New York.

Candra, L.M.M., Andayani, Y., dan Wirasisya, D.G., 2021. Pengaruh Metode Ekstraksi Terhadap Kandungan Fenolik Total dan Flavonoid Total Pada Ekstrak Etanol Buncis (Phaseolus vulgaris L.). *Jurnal Pijar Mipa*, **16**: 397–405.

Canuto, H.M.P., Afonso, M.R.A., dan Costa, J.M.C. da, 2014. Hygroscopic Behavior of Freeze-Dried Papaya Pulp Powder with Maltodextrin. *Acta Scientiarum*, **36**: 179–185.

Cao, B., Xu, Q., Shi, Y., Zhao, R., Li, H., Zheng, J., dkk., 2024. Pathology of pain and its implications for therapeutic interventions. *Signal Transduction and Targeted Therapy*, **9**: 155.

Carmona-Hernandez, J.C., Taborda-Ocampo, G., dan González-Correa, C.H., 2021. Folin-Ciocalteu Reaction Alternatives for Higher Polyphenol Quantitation in Colombian Passion Fruits. *International Journal of Food Science*, **2021**: 1–10.

Carmona-Ribeiro, A.M., Barros, A.N., dan Gouvinhas, I., 2025. *Exploring Natural Phenolic Compounds - Recent Progress and Practical Applications: Recent Progress and Practical Applications*. IntechOpen.

Castillo, L., Baltodano, E., Ramrez, N., Vargas, R., dan Hanley, G., 2020. Design of Experiments Assessment for the Determination of Moisture Content in Five Herbal Raw Materials Contained in Tea Products. *Borneo Journal of Pharmacy*, **3**: 22–35.

Chatzitzika, C., Gatt, R., Valdramidis, V., dan Mizzi, L., 2020. HPLC Analysis of Phenolic Compounds and Flavonoids with Overlapping Peaks. *Food technology and biotechnology*, **58**: 12–19.

Chen, L., Deng, H., Cui, H., Fang, J., Zuo, Z., Deng, J., dkk., 2018. Inflammatory responses and inflammation-associated diseases in organs. *Oncotarget*, **9**: 7204–7218.

Chen, T.V., Lam, D.N.X., Khai, H.D., Duc, D.P.N., Nga, N.T., Hien, N.T.T., dkk., 2024. Micromorphology, physicochemical parameters, and phytochemical screening of Chloranthus flavus D.T. Liu & G. Chen (syn. C. nervosus Collett & Hemsl.) from Vietnam. *Biodiversitas Journal of Biological Diversity*, **25**: .

Chiu, L.-C., Wang, J.-Y., Lin, C.-H., Hsu, C.-H., Lin, L.-C., dan Fu, S.-L., 2021. Diterpenoid Compounds Isolated from Chloranthus oldhamii Solms Exert

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Anti-Inflammatory Effects by Inhibiting the IKK/NF-κB Pathway. *Molecules*, **26**: 6540.

Christenhusz, M.J.M., Fay, M.F., dan Chase, M.W., 2017. *Plants of the World: An Illustrated Encyclopedia of Vascular Plants*. University of Chicago Press.

Craig, A.P., Fields, C., Liang, N., Kitts, D., dan Erickson, A., 2016. Performance review of a fast HPLC-UV method for the quantification of chlorogenic acids in green coffee bean extracts. *Talanta*, **154**: 481–485.

Dai, G., Li, B., Xu, Y., Li, Z., Mo, F., dan Wei, C., 2021. Synergistic interaction between matrine and paracetamol in the acetic acid writhing test in mice. *European Journal of Pharmacology*, **895**: 173869.

Dania, I.A., Novziransyah, N., Pangestuti, D., Akbar, S., Sari Ayu, M., Lubis, A.R.B., dkk., 2025. Mitigating Anxiety Symptoms: Potential of Phenol Compounds in Organic Red Ginger from Simalungun Regency. *Indonesian Food Science and Technology Journal*, **8**: 201–207.

Daram, P., Jitta, S.R., Shreedhara, C.S., Misra, C.S., Gourishetti, K., dan Lobo, R., 2021. Investigation of anti-inflammatory and anti-arthritic potentials of *Terminalia catappa* bark using *in vitro* assays and carrageenan-induced inflammation, complete Freund's adjuvant induced arthritis model in rats. *South African Journal of Botany*, **141**: 313–321.

Deyulita, S., Ilmi, H., Nisa, H.K., Tumewu, L., Widyawaruyanti, A., dan Hafid, A.F., 2022. Anti-inflammatory Activity of Water Extract of Luvunga sarmentosa (BI.) Kurz Stem in the Animal Models. *Borneo Journal of Pharmacy*, **5**: 56–62.

Diniatik, D., 2015. Penentuan Kadar Flavonoid Total Ekstrak Etanolik Daun Kepel (Stelechocarpus burahol (Bl.) Hook F. & Th.) dengan Metode Spektrofotometri. *Kartika : Jurnal Ilmiah Farmasi*, **3**: 1–5.

Dip, G., Aggarwal, P., dan Kaur, S., 2025. Morphological, phytochemical, techno-functional characterization and antimicrobial potential of Bauhinia variegata L. flower and bud powder for various food applications. *Journal of Food Measurement and Characterization*, **19**: 1992–2006.

Do, Q.D., Angkawijaya, A.E., Tran-Nguyen, P.L., Huynh, L.H., Soetaredjo, F.E., Ismadji, S., dkk., 2014. Effect of extraction solvent on total phenol content, total flavonoid content, and antioxidant activity of Limnophila aromatica. *Journal of Food and Drug Analysis*, **22**: 296–302.

Dominguez-López, I., Pérez, M., dan Lamuela-Raventós, R.M., 2024. Total (poly)phenol analysis by the Folin-Ciocalteu assay as an anti-inflammatory biomarker in biological samples. *Critical Reviews in Food Science and Nutrition*, **64**: 10048–10054.

Doyle, M.R., Sulima, A., Rice, K.C., dan Collins, G.T., 2021. Interactions between reinforcement history and drug-primed reinstatement: studies with MDPV and mixtures of MDPV and caffeine. *Addiction biology*, **26**: e12904.

Fan, Y.-Y., Zhang, X.-R., Zheng, C.-Y., Li, Y., dan Yue, J.-M., 2024. Eleven highly oxygenated and anti-inflammatory guaian-8,12-olides from *Hedyosmum orientale*. *Tetrahedron*, **152**: 133841.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Febriyanti, R., Susilawati, Y., Tjitraresmi, A., dan Muhaimin, M., 2025. Traditional medicinal knowledge and use of Ubar Kampung among local healers in Tatar Sunda, West Java, Indonesia. *Asian Journal of Ethnobiology*, **8**: 202.

Fehrenbacher, J.C., Vasko, M.R., dan Duarte, D.B., 2012. Models of Inflammation: Carrageenan- or Complete Freund's Adjuvant-Induced Edema and Hypersensitivity in the Rat. *Current protocols in pharmacology / editorial board, S.J. Enna (editor-in-chief) ... [et al.]*, **0 5**: Unit5.4.

Fitria, R., 2025. 'Uji Aktivitas Analgesik Ekstrak Air Chloranthus erectus (Buch.-Ham.) dengan Metode Geliat pada Mencit Galur Swiss-Webster', . Universitas Gadjah Mada.

Franco, F.M. (Editor), 2021. Chloranthus elatior Link, dalam: *Ethnobotany of the Mountain Regions of Southeast Asia*, *Ethnobotany of Mountain Regions*. Springer, Cham.

Freo, U., 2022. Paracetamol for Multimodal Analgesia. *Pain Management*, **12**: 737–750.

Freo, U., Ruocco, C., Valerio, A., Scagnol, I., dan Nisoli, E., 2021. Paracetamol: A Review of Guideline Recommendations. *Journal of Clinical Medicine*, **10**: 3420.

Galenko-Yaroshevsky, P.A., Shelemekh, O.V., Popkov, V.L., Zadorozhniy, A.V., Nektarevskaya, I.B., Bunyatyan, N.D., dkk., 2024. Study of the anti-inflammatory, analgesic, ulcerogenic and anti-ulcerogenic activity of N-isopropenylimidazole zinc complex derivative. *Research Results in Pharmacology*, **10**: 23–43.

Gawade, S.P., 2012. Acetic Acid Induced Painful Endogenous Infliction in Writhing Test on Mice. *Journal of Pharmacology and Pharmacotherapeutics*, **3**: 348.

Gemta, A.B. dan Gholap, A., 2009. Characterization and Determination of Chlorogenic Acid (CGA) in Coffee Beans by UV-Vis Spectroscopy. *African Journal of Pure and Applied Chemistry*, **3**: 234–240.

George, A., Chinnappan, S., Chintamaneni, M., Kotak C, V., Choudhary, Y., Kueper, T., dkk., 2014. Anti-inflammatory effects of Polygonum minus (Huds) extract (Lineminus^{TM}) in in-vitro enzyme assays and carrageenan induced paw edema. *BMC complementary and alternative medicine*, **14**: 355.

Ghafouri, S., Safaeian, R., Ghanbarian, G., Lautenschläger, T., dan Ghafouri, E., 2025. Medicinal plants used by local communities in southern Fars Province, Iran. *Scientific Reports*, **15**: 5742.

González-Toxqui, C., González-Ángeles, Á., López-Avitia, R., dan González-Balvaneda, D., 2020. Drying Habanero Pepper (Capsicum chinense) by Modified Freeze Drying Process. *Foods*, **9**: 437.

Gou, K.-J., Zeng, R., Dong, Y., Hu, Q.-Q., Hu, H.-W.-Y., Maffucci, K.G., dkk., 2017. Anti-inflammatory and Analgesic Effects of Polygonum orientale L. Extracts. *Frontiers in Pharmacology*, **8**: 562.

Guimarães, R., Barros, L., Dueñas, M., Calhelha, R.C., Carvalho, A.M., Santos-Buelga, C., dkk., 2013. Infusion and decoction of wild German chamomile: Bioactivity and characterization of organic acids and phenolic compounds. *Food Chemistry*, **136**: 947–954.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Gul, H.I., Suleyman, H., dan Gul, M., 2009. Evaluation of the anti-inflammatory activity of N, N′-bis(3-dimethylamino-1-phenyl-propylidene)hydrazine dihydrochloride. *Pharmaceutical Biology*, **47**: 968–972.

Gupta, M.K., Ghuge, A., Parab, M., Al-Refaei, Y., Khandare, A., Dand, N., dkk., 2022. A comparative review on High-Performance Liquid Chromatography (HPLC), Ultra Performance Liquid Chromatography (UPLC) & High-Performance Thin Layer Chromatography (HPTLC) with current updates. *Current Issues in Pharmacy and Medical Sciences*, **35**: 224–228.

Handayani, A., 2015. *Pemanfaatan Tumbuhan Berkhasiat Obat Oleh Masyarakat Sekitar Cagar Alam Gunung Simpang, Jawa Barat*.

Hasan, N., Ariffin, S., Azzeme, A.M., Hasbullah, N.I., Nawahwi, M.Z., dan Bin Zemry, I.H., 2023. Preliminary phytochemical screening of medicinal herb, SAMBAU PAYA (Chloranthus erectus). *International Conference for Young Chemists*, **88**: 6–9.

Hassimotto, N.M.A., Moreira, V., Nascimento, N.G.D., Souto, P.C.M.D.C., Teixeira, C., dan Lajolo, F.M., 2013. Inhibition of Carrageenan-Induced Acute Inflammation in Mice by Oral Administration of Anthocyanin Mixture from Wild Mulberry and Cyanidin-3-Glucoside. *BioMed Research International*, **2013**: 1–10.

Hijazi, M.A., El-Mallah, A., Aboul-Ela, M., dan Ellakany, A., 2017. Evaluation of Analgesic Activity of Papaver libanoticum Extract in Mice: Involvement of Opioids Receptors. *Evidence-based Complementary and Alternative Medicine : eCAM*, **2017**: 8935085.

Hlatshwayo, S., Thembane, N., Krishna, S.B.N., Gqaleni, N., dan Ngcobo, M., 2025. Extraction and Processing of Bioactive Phytoconstituents from Widely Used South African Medicinal Plants for the Preparation of Effective Traditional Herbal Medicine Products: A Narrative Review. *Plants*, **14**: 206.

Hoan, K.R., Tan, 2013. *Obat-Obat Penting Edisi Ke Enam*. Elex Media Komputindo.

Huang, W., Chen, F., Bian, Y., Ning, T., Chen, Z., Shuang, P., dkk., 2022. Three pairs of sesquiterpene enantiomers from Chloranthus multistachys pei. *Natural Product Research*, **36**: 5255–5262.

Ilmi, H., Pamungkas, I.R., Tumewu, L., Hafid, A.F., dan Widyawaruyanti, A., 2021. Analgesic and Antipyretic Activities of Ethyl Acetate Fraction Tablet of Andrographis paniculata in Animal Models. *Evidence-Based Complementary and Alternative Medicine*, **2021**: 8848797.

Jackson, S., Jamieson, M., Johnston, A., dan Shepherd, A., 1987. The analysis of dose-response curves-a practical approach. *British Journal of Clinical Pharmacology*, **23**: 199–205.

Jeeno, P., Yadoung, S., Yana, P., dan Hongsibsong, S., 2023. Phytochemical Profiling and Antioxidant Capacity of Traditional Plants, Northern Thailand. *Plants*, **12**: 3956.

Johnson, Q., Borsheski, R.R., dan Reeves-Viets, J.L., 2013. A Review of Management of Acute Pain. *Missouri Medicine*, **110**: 74–79.

Jug, U., Glavnik, V., Kranjc, E., dan Vovk, I., 2018. High-performance thin-layer chromatography and high-performance thin-layer chromatography–mass

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

spectrometry methods for the analysis of phenolic acids. *JPC - Journal of Planar Chromatography - Modern TLC*, **31**: 13–22.

Katha, U.T.A. dan Begum, Y., 2021. A Review Study on Phytochemistry, Pharmacological Properties & Traditional Uses of Chloranthus Elatior. *World Journal of Pharmaceutical and Life Sciences*, **7**: 1–6.

Kementerian Kesehatan Republik Indonesia, 2011. *Pedoman Budidaya, Panen Dan Pascapanen Tanaman Obat*. Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional Tawangmangu, Jakarta.

Kementerian Kesehatan Republik Indonesia, 2017. *Farmakope Herbal Indonesia*, II. ed. Kementerian Kesehatan Republik Indonesia.

Kong, H.-Z., 2001. Comparative morphology of leaf epidermis in the Chloranthaceae. *Botanical Journal of the Linnean Society*, **136**: 279–294.

Krakowska-Sieprawska, A., Kiełbasa, A., Rafińska, K., Ligor, M., dan Buszewski, B., 2022. Modern Methods of Pre-Treatment of Plant Material for the Extraction of Bioactive Compounds. *Molecules (Basel, Switzerland)*, **27**: 730.

Krivokolysko, D.S., Dotsenko, V.V., Bibik, E.Yu., Samokish, A.A., Venidiktova, Y.S., Frolov, K.A., dkk., 2022. New Hybrid Molecules Based on Sulfur-Containing Nicotinonitriles: Synthesis, Analgesic Activity in Acetic Acid-Induced Writhing Test, and Molecular Docking Studies. *Russian Journal of Bioorganic Chemistry*, **48**: 628–635.

Kumatia, E.K., Antwi, S., Brew-Daniels, H., Appiah, A.A., dan Ocloo, A., 2019. In vivo Comparative Anti-Inflammatory and Analgesic Activities of Root Bark, Stem and Leaf Extracts of Capparis erythrocarpus (Capparaceae). *Pharmacognosy Journal*, **11**: 515–520.

Lanteri-Minet, M. dan Pegahi, R., 2025. Paracetamol and Caffeine Combination in Pain Management: A Narrative Review. *Pain Research and Management*, **2025**: 9166828.

Li, M., Cheng, R., Chen, Y., Lao, F., dan Wu, J., 2025. Hygroscopicity and quality stability of freeze-dried restructured jujube influenced by the addition of biopolymer-rich chickpea and quinoa. *Food Research International*, **220**: 117126.

Li, X., Shen, J., Jiang, Y., Shen, T., You, L., Sun, X., dkk., 2016. Anti-Inflammatory Effects of Chloranthalactone B in LPS-Stimulated RAW264.7 Cells. *International Journal of Molecular Sciences*, **17**: 1938.

Li, Z., Wang, L., Cong, Yue, Guo, L., Lin, X., Yu, Z., dkk., 2017. Flucrypyrim, a novel uterine relaxant, has antinociceptive and anti-inflammatory effects in vivo. *Scientific Reports*, **7**: 42040.

Liu, S. dan Kelliher, L., 2022. Physiology of pain—a narrative review on the pain pathway and its application in the pain management. *Digestive Medicine Research*, **5**: 1–10.

Liu, W., Cui, X., Zhong, Y., Ma, R., Liu, B., dan Xia, Y., 2023a. Phenolic metabolites as therapeutic in inflammation and neoplasms: Molecular pathways explaining their efficacy. *Pharmacological Research*, **193**: 106812.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
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Liu, W., Cui, X., Zhong, Y., Ma, R., Liu, B., dan Xia, Y., 2023b. Phenolic metabolites as therapeutic in inflammation and neoplasms: Molecular pathways explaining their efficacy. *Pharmacological Research*, **193**: 106812.

Liu, Y., Li, Y., Huang, S., Zhang, H., Deng, C., Song, X., dkk., 2022. A comprehensive review of its phytochemistry, pharmacology, and uses. *Arabian Journal of Chemistry*, **15**: 104260.

Mahardani, O.T. dan Yuanita, L., 2021. Efek Metode Pengolahan dan Penyimpanan Terhadap Kadar Senyawa Fenolik dan Aktivitas Antioksidan. *Unesa Journal of Chemistry*, **10**: 64–78.

Mahyuni, R., Mansur, M., Rahayu, M., Rugayah, R., Rustiami, H., Susan, D., dkk., 2020. *Checklist Flora of Lombok*.

Mansouri, M.T., Hemmati, A.A., Naghizadeh, B., Mard, S.A., Rezaie, A., dan Ghorbanzadeh, B., 2015. A study of the mechanisms underlying the anti-inflammatory effect of ellagic acid in carrageenan-induced paw edema in rats. *Indian Journal of Pharmacology*, **47**: 292–298.

Mazaleuskaya, L.L., Sangkuhl, K., Thorn, C.F., FitzGerald, G.A., Altman, R.B., dan Klein, T.E., 2015. PharmGKB summary: Pathways of acetaminophen metabolism at the therapeutic versus toxic doses. *Pharmacogenetics and genomics*, **25**: 416–426.

Mehrotra, A., Shanbhag, R., Chamallamudi, M.R., Singh, V.P., dan Mudgal, J., 2011. Ameliorative effect of caffeic acid against inflammatory pain in rodents. *European Journal of Pharmacology*, **666**: 80–86.

Ngamkhae, N., Monthakantirat, O., Chulikhit, Y., Boonyarat, C., Maneenet, J., Khamphukdee, C., dkk., 2022. Optimization of extraction method for Kleeb Bua Daeng formula and comparison between ultrasound-assisted and microwave-assisted extraction. *Journal of Applied Research on Medicinal and Aromatic Plants*, **28**: 100369.

Nguyen, V., Taine, E.G., Meng, D., Cui, T., dan Tan, W., 2024. Chlorogenic Acid: A Systematic Review on the Biological Functions, Mechanistic Actions, and Therapeutic Potentials. *Nutrients*, **16**: 924.

Nuranti, G., Ratnasari, J., Indrawan, I., dan Kauthsar, R.M.N., //10. Acute Oral Toxicity of Chloranthus erectus Methanol Extract in Mice. *Iranian Journal of Toxicology*, 0–0.

Nurhanifah, D. dan Sari, R.T., 2022. *Manajemen Nyeri Nonfarmakologi*. UrbanGreen Central Media.

Nurman, S., Yulia, R., Irmayanti, I., Noor, E., dan Candra Sunarti, T., 2021. Optimizing Anti-inflammatory Activities of Arabica Coffee Ground (Coffea arabica L.) Nanoparticle Gel. *Jundishapur Journal of Natural Pharmaceutical Products*, **16**: .

Owusu, G. dan Ofori-Amoah, J., 2017. Anti-inflammatory and Analgesic Effects of an Aqueous Extract of Lannea acida Stem Bark. *British Journal of Pharmaceutical Research*, **16**: 1–8.

Patel, M., Wahezi, S., Mavrocordatos, P., dan Abd-Elsayed, A., 2025. The Effects and Mechanisms of Phytochemicals on Pain Management and Analgesic. *Nutrients*, **17**: 633.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Patil, K.R., Mahajan, U.B., Unger, B.S., Goyal, S.N., Belemkar, S., Surana, S.J., dkk., 2019. Animal Models of Inflammation for Screening of Anti-inflammatory Drugs: Implications for the Discovery and Development of Phytopharmaceuticals. *International Journal of Molecular Sciences*, **20**: 4367.

Pauzi, A.N., Muhammad, N., Abdullah, N., dan Kamal, N., 2022. Current authentication methods of herbs and herbal products: a systematicreview. *Food Research*, **6**: 455–465.

Pearson, J.L., Lee, S., Suresh, H., Low, M., Nang, M., Singh, S., dkk., 2014. The Liquid Chromatographic Determination of Chlorogenic and Caffeic Acids in Xu Duan (Dipsacus asperoides) Raw Herb. *International Scholarly Research Notices*, **2014**: 968314.

Pérez, M., Dominguez-López, I., dan Lamuela-Raventós, R.M., 2023a. The Chemistry Behind the Folin–Ciocalteu Method for the Estimation of (Poly)phenol Content in Food: Total Phenolic Intake in a Mediterranean Dietary Pattern. *Journal of Agricultural and Food Chemistry*, **71**: 17543–17553.

Pérez, M., Dominguez-López, I., dan Lamuela-Raventós, R.M., 2023b. The Chemistry Behind the Folin–Ciocalteu Method for the Estimation of (Poly)phenol Content in Food: Total Phenolic Intake in a Mediterranean Dietary Pattern. *Journal of Agricultural and Food Chemistry*, **71**: 17543–17553.

Pinela, J., Barros, L., Dueñas, M., Carvalho, A.M., Santos-Buelga, C., dan Ferreira, I.C.F.R., 2012. Antioxidant Activity, Ascorbic Acid, Phenolic Compounds and Sugars of Wild and Commercial Tuberaria lignosa samples: Effects of Drying and Oral Preparation Methods. *Food Chemistry*, **135**: 1028–1035.

Prastanti, R.F. dan Haryoto, 2024. Aktivitas Antioksidan dan Sitotoksik Ekstrak Etanol Daun Karas Tulang (Chloranthus erectus) Terhadap Sel Hela. *Jurnal Insan Farmasi Indonesia*, **7**: 410–420.

Qorib, M.F., 2022. Dinamika Ekspresi Cox1 dan Cox2 Sebagai Landasan Tatalaksana Nyeri dan Inflamasi. *Jurnal Kedokteran*, **11**: 1233–1239.

Qu, Z.-W., Liu, T.-T., Qiu, C.-Y., Li, J.-D., dan Hu, W.-P., 2014. Inhibition of acid-sensing ion channels by chlorogenic acid in rat dorsal root ganglion neurons. *Neuroscience Letters*, **567**: 35–39.

Quattrocchi, U., 2012. *CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology*. CRC Press, Boca Raton.

Quattrocchi, U., 2016. *CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology (5 Volume Set)*. CRC Press.

Raja, K.S., Taip, F.S., Azmi, M.M.Z., dan Shishir, M.R.I., 2019. Effect of pre-treatment and different drying methods on the physicochemical properties of *Carica papaya* L. leaf powder. *Journal of the Saudi Society of Agricultural Sciences*, **18**: 150–156.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Rajavell, R., Sivakumar, T., dan Jagadeeswaran, M., 2009. Evaluation of analgesic and anti-inflammatory activities of Oscillatoria willei in experimental animal models. *Journal of Medicinal Plants Research*, **3**: .

Ram, A.H., Sriwastava, N., Makhija, I., dan Shreedhara, C., 2012. Anti-inflammatory activity of Ajmodadi Churna extract against acute inflammation in rats. *Journal of Ayurveda and Integrative Medicine*, **3**: 33.

Ramli, M.E.S., Tarmizi, N.M., Kamaruddin, N.A., dan Kamaruzzaman, M.A., 2025. Lepisanthes alata Attenuates Carrageenan-Induced Inflammation and Pain in Rats: A Phytochemical-Based Approach. *Pharmaceuticals*, **18**: 1142.

Raposo, F., Borja, R., dan Gutiérrez-González, J.A., 2024. A comprehensive and critical review of the unstandardized Folin-Ciocalteu assay to determine the total content of polyphenols: The conundrum of the experimental factors and method validation. *Talanta*, **272**: 125771.

Rehatta, N.M., Hanindito, E., dan Tantri, A.R., 2019. *Anestesiologi Dan Terapi Intensif : Buku Teks Katiperdatin*. PT. Gramedia Pustaka Utama, Jakarta.

Rianto, T., Asnawi, A., Basit, A., Suparmo, Megawati, D., dan Faisal, M., 2015. Database Keanekaragaman Hayati Taman Nasional Gunung Rinjani.

Ribeiro, D., Proença, C., Varela, C., Janela, J., Tavares da Silva, E.J., Fernandes, E., dkk., 2019. New phenolic cinnamic acid derivatives as selective COX-2 inhibitors. Design, synthesis, biological activity and structure-activity relationships. *Bioorganic Chemistry*, **91**: 103179.

Rojas-Lema, S., Torres-Giner, S., Quiles-Carrillo, L., Gomez-Caturla, J., Garcia-Garcia, D., dan Balart, R., 2020. On the Use of Phenolic Compounds Present in Citrus Fruits and Grapes as Natural Antioxidants for Thermo-Compressed Bio-Based High-Density Polyethylene Films. *Antioxidants*, **10**: 14.

Rouzer, C.A. dan Marnett, L.J., 2020. Structural and Chemical Biology of the Interaction of Cyclooxygenase with Substrates and Non-Steroidal Anti-Inflammatory Drugs. *Chemical Reviews*, **120**: 7592–7641.

Sahlan, M., Devina, A., Pratami, D.K., Situmorang, H., Farida, S., Munim, A., dkk., 2019. Anti-inflammatory activity of Tetragronula species from Indonesia. *Saudi Journal of Biological Sciences*, **26**: 1531–1538.

Sánchez-Rangel, J.C., Benavides, J., Heredia, J.B., Cisneros-Zevallos, L., dan Jacobo-Velázquez, D.A., 2013. The Folin–Ciocalteu assay revisited: improvement of its specificity for total phenolic content determination. *Analytical Methods*, **5**: 5990.

Saohin, W., Boonchoong, P., Lamlikitkuakoon, S., Jamnoiprom, I., dan Mungdee, W., 2007. Effects of drying temperature and residual moisture content of Fa-Tha-Li (Andrographis paniculata (Burm.f.) Nees) crude powder for capsule preparation. *The Thai Journal of Pharmaceutical Sciences*, **31**: 28–35.

Sarker, S.D. dan Nahar, L., 2015. Applications of High Performance Liquid Chromatography in the Analysis of Herbal Products, dalam: *Evidence-Based Validation of Herbal Medicine*. Elsevier, hal. 405–425.

Shahidi, F. dan Hossain, A., 2023. Importance of Insoluble-Bound Phenolics to the Antioxidant Potential Is Dictated by Source Material. *Antioxidants*, **12**: 203.

Shan, Q., Lu, J., Zheng, Y., Li, J., Zhou, Z., Hu, B., dkk., 2009. Purple sweet potato color ameliorates cognition deficits and attenuates oxidative damage and

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

inflammation in aging mouse brain induced by d-galactose. *Journal of Biomedicine & Biotechnology*, **2009**: 564737.

Shanaida, M., Golembiovska, O., Hudz, N., dan Wieczorek, P.P., 2018. Phenolic compounds of herbal infusions obtained from some species of the *Lamiaceae* family. *Current Issues in Pharmacy and Medical Sciences*, **31**: 194–199.

Shatavisa, M., 2025. Paracetamol Hypersensitivity: Clinical Implications and Management Approaches. *MRIMS Journal of Health Sciences*, **20**: 1–10.

Shi, J., Qiu, Q., Lu, X., Zhen, D., Liu, X., Gu, B., dkk., 2023. Spectrum-Effect Relationship between HPLC Fingerprint and Anti-Inflammatory and Analgesic Activities of Chloranthus fortunei (A. Gray) Solms-Laub. *Journal of Analytical Methods in Chemistry*, **2023**: 1–13.

Silva, F.R.F., Dore, C.M.P.G., Marques, C.T., Nascimento, M.S., Benevides, N.M.B., Rocha, H.A.O., dkk., 2010. Anticoagulant activity, paw edema and pleurisy induced carrageenan: Action of major types of commercial carrageenans. *Carbohydrate Polymers*, **79**: 26–33.

Singh, N. dan Yadav, S.S., 2022. A review on health benefits of phenolics derived from dietary spices. *Current Research in Food Science*, **5**: 1508–1523.

Smith, H.S., 2009. Potential analgesic mechanisms of acetaminophen. *Pain Physician*, **12**: 269–280.

Sridhar, N., Lakshmi, D.S., dan Goverdhan, P., 2015. Effect of ethanolic extracts of Justicia neesii Ramam. against experimental models of pain and pyrexia. *Indian Journal of Pharmacology*, **47**: 177–180.

Steeds, C.E., 2016. The anatomy and physiology of pain. *Surgery (Oxford)*, , Perioperative Management **34**: 55–59.

Stump, P.R.N.A.G. dan Dalben, G. da S., 2012. Mechanisms and clinical management of pain. *Brazilian Oral Research*, **26**: 115–119.

Subash, P., Kumar, K.K.S., Rao, K.S., Khute, S., Subash, P., Kumar, K.K.S., dkk., 2025. Advanced Chromatography Analytical Methods for the Isolation and Identification of Natural Drug Molecules, dalam: *Advances in Analytical and Coordination Chemistry - Applications and Innovations*. IntechOpen.

Suh, M.G., Choi, H.-S., Cho, K., Park, S.S., Kim, W.J., Suh, H.J., dkk., 2020. Anti-inflammatory action of herbal medicine comprised of Scutellaria baicalensis and Chrysanthemum morifolium. *Bioscience, Biotechnology, and Biochemistry*, **84**: 1799–1809.

Sun, S., Du, Y., Li, S., Gao, B., Xia, R., Cao, W., dkk., 2021. Anti-inflammatory activity of different isolated sites of Chloranthus serratus in complete Freund's adjuvant-induced arthritic rats. *Experimental and Therapeutic Medicine*, **22**: 1–14.

Sun, S., Yu, Y., Jo, Y., Han, J.H., Xue, Y., Cho, M., dkk., 2025. Impact of extraction techniques on phytochemical composition and bioactivity of natural product mixtures. *Frontiers in Pharmacology*, **16**: .

Syahputri, J.A. dan Haryoto, H., 2024. Uji penghambatan enzim α-glukosidase ekstrak etanol daun karas tulang (Chlorantus erectus). *Journal of Pharmaceutical and Sciences*, 767–775.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Tag, H., Namsa, N.D., Das, A.K., Kalita, P., dan Mandal, S.C., 2009a. Evaluation of anti-inflammatory potential of Chloranthus erectus (Buch.-Ham.) Verd. leaf extract in rats. *Journal of Ethnopharmacology*, **126**: 371–374.

Tag, H., Namsa, N.D., Das, A.K., Kalita, P., dan Mandal, S.C., 2009b. Evaluation of Anti-Inflammatory Potential of Chloranthus erectus (Buch.-Ham.) Verd. Leaf Extract in Rats. *Journal of Ethnopharmacology*, **126**: 371–374.

Tag, H., Namsa, N.D., Mandal, M., Kalita, P., Das, A.K., dan Mandal, S.C., 2010a. Antipyretic and antibacterial activity of Chloranthus erectus (Buch.-Ham.) Verdcourt leaf extract: A popular folk medicine of Arunachal Pradesh. *Indian Journal of Pharmacology*, **42**: 273–276.

Tag, H., Namsa, N.D., Mandal, M., Kalita, P., Das, A.K., dan Mandal, S.C., 2010b. Antipyretic and antibacterial activity of Chloranthus erectus (Buch.-Ham.) Verdcourt leaf extract: A popular folk medicine of Arunachal Pradesh. *Indian Journal of Pharmacology*, **42**: 273.

Tandoh, A., Danquah, C.A., Benneh, C.K., Adongo, D.W., Boakye-Gyasi, E., dan Woode, E., 2022. Effect of Diclofenac and Andrographolide Combination on Carrageenan-Induced Paw Edema and Hyperalgesia in Rats. *Dose-Response*, **20**: 15593258221103846.

Tavares, I.M. de C., Sumere, B.R., Gómez-Alonso, S., Gomes, E., Hermosín-Gutiérrez, I., Da-Silva, R., dkk., 2020. Storage stability of the phenolic compounds, color and antioxidant activity of jambolan juice powder obtained by foam mat drying. *Food Research International*, **128**: 108750.

Termer, M., Carola, C., Salazar, A., Keck, C.M., Hemberger, J., dan von Hagen, J., 2021. Activity-Guided Characterization of COX-2 Inhibitory Compounds in Waltheria indica L. Extracts. *Molecules (Basel, Switzerland)*, **26**: 7240.

Tsai, Y.-C., Chen, S.-H., Lin, L.-C., dan Fu, S.-L., 2017. Anti-inflammatory Principles from Sarcandra glabra. *Journal of Agricultural and Food Chemistry*, **65**: 6497–6505.

Tsuchiya, H. dan Mizogami, M., 2025. Old and New Analgesic Acetaminophen: Pharmacological Mechanisms Compared with Non-Steroidal Anti-Inflammatory Drugs. *Future Pharmacology*, **5**: 40.

Upadhyay, R., Upadhyay, M.R., Singh, S.S., dan Mohapatra, S., 2025. Analgesic Effect of Diacerein in Rats: An Acetic Acid Writhing Model Study. *Journal of Contemporary Clinical Practice*, **11**: 941–945.

Van Elstraete, A.C. dan Sitbon, P., 2013. Median Effective Dose (ED50) of Paracetamol and Nefopam for Postoperative Pain: Isobolographic Analysis of Their Antinociceptive Interaction. *Minerva Anestesiologica*, **79**: 232–9.

Vogel, H.G., 2008. *Drug Discovery and Evaluation: Pharmacological Assays*, 3rd completely rev., updated, and enl. ed. ed, Springer reference. Springer, Berlin New York.

Wahyuningsih, S., Yunita, I., Sundari, U.Y., Pagalla, D.B., Kalalinggi, S.Y., Alpian, dkk., 2024. *Ekstraksi Bahan Alam*. CV. Gita Lentera Redaksi, Padang.

Waksmundzka-Hajnos, M. dan Sherma, J., 2010. *High Performance Liquid Chromatography in Phytochemical Analysis*. CRC Press.

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Whiteley, P.E. dan Dalrymple, S.A., 1998. Models of Inflammation: Carrageenan-Induced Paw Edema in the Rat. *Current Protocols in Pharmacology*, **00**: .

Wiart, C., 2006. *Medicinal Plants of The Asia-Pacific: Drugs for The Future?* World Scientific.

Wiart, C., 2020. *Medicinal Plants in Asia and Pacific for Parasitic Infections: Botany, Ethnopharmacology, Molecular Basis, and Future Prospect*. Academic press, an imprint of Elsevier, London.

Wicaksono, A., Yuniarti, N., dan Pramono, S., 2015. Analgesic Effect of Combination of Essential Oil Curcuma xanthorriza and Its Curcuminoids in Mice. *Traditional Medicine Journal*, **20**: 16–23.

Widiyastuti, Y., 2015. *Pedoman Budidaya, Panen Dan Pascapanen Tanaman Obat*. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan, Jakarta.

Widyarini, S., Sugiyono, S., Kristianingrum, Y.P., dan Sutrisno, B., 2023. Karagenin Sebagai Model Inflamasi pada Kulit Mencit: Gambaran Makroskopik dan Histopatologis. *Jurnal Sain Veteriner*, **41**: 88.

Winyard, P.G. dan Willoughby, D.A., 2003. *Inflammation Protocols*, Methods in Molecular Biology. Humana Press, Totowa, NJ.

Xie, J., Xiong, S., Li, Y., Xia, B., Li, M., Zhang, Z., dkk., 2024. Phenolic acids from medicinal and edible homologous plants: a potential anti-inflammatory agent for inflammatory diseases. *Frontiers in Immunology*, **15**: 1345002.

Xylia, P. dan Chrysargyris, A., 2025. Optimization of the Drying Temperature for High Quality Dried Melissa officinalis. *Applied Sciences*, **15**: 5136.

Yang, X., He, Y., Li, Z., Zhou, X., Mu, L., Wu, J., dkk., 2025. Sarcandra glabra (Thunb.) Nakai relieves pain behavior by inhibiting NaV1.7 channels. *Journal of Ethnopharmacology*, **350**: 120002.

Yimer, T., Birru, E.M., Adugna, M., Geta, M., dan Emiru, Y.K., 2020. Evaluation of Analgesic and Anti-Inflammatory Activities of 80% Methanol Root Extract of Echinops kebericho M. (Asteraceae). *Journal of Inflammation Research*, **13**: 647–658.

Yuwono, B., Suhartini, Wulandari, E.E., Amin, M.N., Budirahardjo, R., Setyorini, D., dkk., 2024. Evaluation of Analgesic Activity of Extract from Moringa Leaves (Moringa Oleifera Lamk) in Mice (Mus Musculus). *International Journal of Medical Science and Clinical Research Studies*, **4**: 1018–1022.

Yuzammi, Y. dan Mar'atus Solihah, S., 2016. *Koleksi Kebun Raya Banua: Tumbuhan Berpotensi Obat*.

Zahra, N.N., Muliasari, H., Andayani, Y., dan Sudarma, I.M., 2021. Analisis Kadar Fenolik Total dan Aktivitas Antiradikal Bebas Madu dan Propolis trigona sp. Asal Lombok Utara. *Analit : Analytical and Environmental Chemistry*, 74–82.

Zainal, T., Wahyudin, E., dan Rifai, Y., 2019. Penetapan Kurva Standar Senyawa Tetra Hidroxy Ethyl Disulphate (Thes) dalam Plasma Marmut (Cavia porcellus) Menggunakan KCKT. *Majalah Farmasi dan Farmakologi*, **22**: 90.

Zarranz-Ventura, J. dan Mali, J.O., 2020. Effectiveness of 190 µg Fluocinolone Acetonide and 700 µg Dexamethasone Intravitreal Implants in Diabetic

UNIVERSITAS
GADJAH MADA
Uji Aktivitas Antiinflamasi dan Analgesik Ekstrak Air Daun Chloranthus erectus In Vivo
Kurnia Solehah, Dr. apt. Nunung Yuniarti, M.Si.; Dr. apt. Andayana Puspitasari Gani, M.Si.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Macular Edema Using the Area-Under-the-Curve Method: The CONSTANT Analysis. *Clinical Ophthalmology*, **14**: 1697–1704.

Zemry, I.H., Hasan, N.A., Hasbullah, N.I., Nawahwi, M.Z., Azzeme, A.M., Ahmad, S.N.D., dkk., 2023. Antioxidant Potential of Chloranthus erectus (Chloranthaceae) from various solvents extract. *Journal of Experimental Biology and Agricultural Sciences*, **11**: 75–80.

Zhang, M., Liu, D., Fan, G., Wang, R., Lu, X., Gu, Y., dkk., 2016. Constituents from Chloranthaceae plants and their biological activities. *Heterocyclic Communications*, **22**: 175–220.

Zhang, W., Wu, M., Shen, C., Wang, Z., Zhou, X., Guo, R., dkk., 2024. A new long-acting analgesic formulation for postoperative pain management. *International Journal of Pharmaceutics*, **664**: 124599.

Zhang, X., Retyunskiy, V., Qiao, S., Zhao, Y., dan Tzeng, C.-M., 2022. Alloferon-1 ameliorates acute inflammatory responses in λ-carrageenan-induced paw edema in mice. *Scientific Reports*, **12**: 16689.

Zhang, Y.-H., Adamo, D., Liu, H., Wang, Q., Wu, W., Zheng, Y.-L., dkk., 2023. Editorial: Inflammatory pain: mechanisms, assessment, and intervention. *Frontiers in Molecular Neuroscience*, **16**: 1286215.

Zhao, Z., Liang, Z., dan Ping, G., 2011. Macroscopic identification of Chinese medicinal materials: Traditional experiences and modern understanding. *Journal of Ethnopharmacology*, **134**: 556–564.

Zinatul, H., Novi, M.R.M., dan Agung, P.K.A., 2022. *Dasar-Dasar Imunologi Dan Infeksi*. Syiah Kuala University Press, Aceh.

Zugazua-Ganado, M., Bordagaray, A., Ezenarro, J., Garcia-Arrona, R., Ostra, M., dan Vidal, M., 2024. Adaptation of the Folin-Ciocalteu and Fast Blue BB spectrophotometric methods to digital image analysis for the determination of total phenolic content: Reduction of reaction time, interferences and sample analysis. *LWT*, **193**: 115756.