

DAFTAR PUSTAKA

- Afirosa, H. B., Suzery, M., Cahyono, B. 2024. Quantitative Analysis of Andrographolide in Sambiloto (*Andrographis paniculata*) Herbal Preparation Using UV-Vis, HPLC, and ¹H-NMR with Dibenzyl Ether as Internal Standard. *International Journal of Chemical and Biochemical Sciences*. 25(19): 765-772.
- Ajiboye, A. L., Nandi, U., Galli, M., Trivedi, V. 2021. Olanzapine-Loaded Nanostructured Lipid Carriers via High Shear Homogenization and Ultrasonication. *Scientia Pharmaceutica*. 89(2): 1-16.
- Ali, S. K., Makeen, H. A., Khuwaja, G., Alhazmi, H. A., Sharma, M., Koty, A., Mazahirul, I., Parveen, H., Mohammed, A., Mukhtar, S., Alam, M. F. 2023a. Assessment of the Phytochemical Profile, Antioxidant Capacity, and Hepatoprotective Effect of *Andrographis paniculata* Against CCl₄-Induced Liver Dysfunction in Wistar Albino Rats. *Medicina (Lithuania)*. 59(7): 1-16.
- Allameh, A., Niayesh-Mehr, R., Aliarab, A., Sebastiani, G., Pantopoulos, K. 2023. Oxidative Stress in Liver Pathophysiology and Disease. *Antioxidants*. 12(9): 1-23.
- Bardi, D. A., Halabi, M. F., Hassandarvish, P., Rouhollahi, E., Paydar, M., Moghadamtousi, S. Z., Al-Wajeeh, N. S., Ablat, A., Abdullah, N. A., Abdulla, M. A. 2014. *Andrographis paniculata* Leaf Extract Prevents Thioacetamide-Induced Liver Cirrhosis in Rats. *PLoS ONE*. 9(10): 1-13.
- Boron, W. F., Boulpaep, E. L. 2016. *Medical Physiology* (3rd Edition). Elsevier.
- Chen, H. W., Huang, Y. J., Yao, H. T., Lii, C. K. 2012. Induction of Nrf2-Dependent Antioxidation and Protection Against Carbon Tetrachloride-Induced Liver Damage by Andrographis Herba (Chuan Xin Lian) Ethanolic Extract. *Journal of Traditional and Complementary Medicine*. 2(3): 211-219.
- Das, S., Pradhan, G. K., Das, S., Nath, D., Das Saha, K. 2015. Enhanced Protective Activity of Nano-Formulated Andrographolide Against Arsenic-Induced Liver Damage. *Chemico-Biological Interactions*. 242(1): 281-289.
- European Medicines Agency. 2017. *Questions and Answers on Propylene Glycol Used as an Excipient in Medicinal Products for Human Use* (Vol. 44, Issue October). European Medicines Agency.
- Fathy, S. M., Mohammed, M. S. M. 2021. *Moringa oleifera* Lam. Leaf Extract Mitigates Carbon Tetrachloride-Mediated Hepatic Inflammation and Apoptosis via Targeting Oxidative Stress and Toll-Like Receptor 4/Nuclear Factor Kappa B Pathway in Mice. *Food Science and Human Wellness*. 10(3): 383-391.

- Gangavarapu, A., Tapia-Lopez, L. V., Sarkar, B., Pena-Zacarias, J., Badruddoza, A. Z. M., Nurunnabi, M. 2024. Lipid Nanoparticles for Enhancing Oral Bioavailability. *Nanoscale*. 16(39): 18319-18338.
- Gressler, S., Hipfinger, C., Part, F., Pavlicek, A., Zafiu, C., Giese, B. 2025. A Systematic Review of Nanocarriers Used in Medicine and Beyond—Definition and Categorization Framework. *Journal of Nanobiotechnology*. 23(1): 1-21.
- Hannan, A., Dash, R., Al, A., Sohag, M., Haque, N., White, A. R. 2020. Neuroprotection Against Oxidative Stress: Phytochemicals Targeting TrkB Signaling and the Nrf2-ARE Antioxidant System. *Frontiers in Molecular Neuroscience*. 13(7): 1-18.
- Hermansky, S. J., Neptun, D. A., Loughran, K. A., Leung, H. W. 1995. Effects of Polyethylene Glycol 400 (PEG 400) Following 13 Weeks of Gavage Treatment in Fischer-344 Rats. *Food and Chemical Toxicology*. 33(2): 139-149.
- Hu, J., Li, Y., Xie, X., Song, Y., Yan, W., Luo, Y., Jiang, Y. 2024. The Therapeutic Potential of Andrographolide in Cancer Treatment. *Biomedicine and Pharmacotherapy*. 180(7): 117438.
- Ighodaro, O. M., Akinloye, O. A. 2018. First-Line Defence Antioxidants—Superoxide Dismutase (SOD), Catalase (CAT), and Glutathione Peroxidase (GPX): Their Fundamental Role in the Entire Antioxidant Defence Grid. *Alexandria Journal of Medicine*. 54(4): 287-293.
- Jaiswal, P., Gidwani, B., Vyas, A. 2016. Nanostructured Lipid Carriers and Their Current Application in Targeted Drug Delivery. *Artificial Cells, Nanomedicine, and Biotechnology*. 44(1): 27-40.
- Jing, W., Xiaolan, C., Yu, C., Feng, Q., Haifeng, Y. 2022. Pharmacological Effects and Mechanisms of Tannic Acid. *Biomedicine and Pharmacotherapy*. 154(8): 113561.
- Johra, F. T., Hossain, S., Jain, P., Bristy, A. T., Emran, T., Ahmed, R., Sharker, S. M., Bepari, A. K., Reza, H. M. 2023. Amelioration of CCl₄-Induced Oxidative Stress and Hepatotoxicity by *Ganoderma lucidum* in Long Evans Rats. *Scientific Reports*. 13(1): 1-13.
- Kakizaki, M., Yamamoto, Y., Nakayama, S., Kameda, K., Nagashima, E., Ito, M. 2021. Human Hepatocyte-Derived Extracellular Vesicles Attenuate the Carbon Tetrachloride-Induced Acute Liver Injury in Mice. *Cell Death and Disease*. 12(7): 1-12.
- Koeppen, B. M., Stanton, B. A. 2024. *Berne & Levy Physiology* (8th Edition). Elsevier.
- Kumar, M., Kumar, S., Sharma, N. 2024. Hepatoprotective Effect of Glycyrrhetic Acid-Mediated Andrographolide Solid Lipid Nanoparticles Formulation from *Andrographis paniculata*, Against Carbon Tetrachloride (CCl₄)-

- Induced Hepatotoxicity. *African Journal of Biological Sciences*. 6(3): 3111-3130.
- Kumar, S., Singh, B., Bajpai, V. 2021. *Andrographis paniculata* (Burm.f.) Nees: Traditional Uses, Phytochemistry, Pharmacological Properties and Quality Control/Quality Assurance. *Journal of Ethnopharmacology*. 275: 114054.
- Kurniawan, D. W. 2022. *Targeting of Macrophages and Hepatic Stellate Cells for the Treatment of Liver Diseases*. University of Twente.
- Kurniawidjaja, L. M., Lestari, F., Tejamaya, M., Ramdhan, D. H. 2021. Konsep Dasar Toksikologi Industri. Fakultas Kesehatan Masyarakat Universitas Indonesia.
- Li, B., Jiang, T., Liu, H., Miao, Z., Fang, D., Zheng, L., Zhao, J. 2018. Andrographolide Protects Chondrocytes from Oxidative Stress Injury by Activation of the Keap1–Nrf2–ARE Signaling Pathway. *Journal of Cellular Physiology*. 234(1): 561-571.
- Li, H., Yan, L., Li, B., Wei, G., Ju, R. 2022. Inflammatory Factor Tumor Necrosis Factor- α (TNF- α) Activates P-Glycoprotein (P-gp) by Phosphorylating c-Jun and Thus Promotes Transportation in Placental Cells. *Translational Pediatrics*. 11(9): 1470-1481.
- Li, R., Yang, W., Yin, Y., Ma, X., Zhang, P., Tao, K. 2021. 4-OI Attenuates Carbon Tetrachloride-Induced Hepatic Injury via Regulating Oxidative Stress and the Inflammatory Response. *Frontiers in Pharmacology*. 12(May): 1-13.
- Liu, Y., Wen, P.-H., Zhang, X., Dai, Y., He, Q. 2018. Breviscapine Ameliorates CCl₄-Induced Liver Injury in Mice Through Inhibiting Inflammatory Apoptotic Response and ROS Generation. *International Journal of Molecular Medicine*. 42(1): 755-768.
- Livak, K. J., Schmittgen, T. D. 2001. Analysis of Relative Gene Expression Data Using Real-Time Quantitative PCR and the 2- $\Delta\Delta$ CT Method. *Methods*. 25(4): 402-408.
- Mall, J., Naseem, N., Haider, M. F., Rahman, M. A., Khan, S., Siddiqui, S. N. 2025. Nanostructured Lipid Carriers as a Drug Delivery System: A Comprehensive Review with Therapeutic Applications. *Intelligent Pharmacy*. 3(4): 243-255.
- Maris, B. R., Grama, A., Pop, T. L. 2025. Drug-Induced Liver Injury—Pharmacological Spectrum Among Children. *International Journal of Molecular Sciences*. 26(5): 1-27.
- Milani, P., Gagliardi, S., Cova, E., Cereda, C. 2011. SOD1 Transcriptional and Posttranscriptional Regulation and Its Potential Implications in ALS. *Neurology Research International*. 1(11): 1-9.
- Mouro, P. R., Povinelli, A. P. R., Leite, V. B. P., Chahine, J. 2020. Exploring Folding Aspects of Monomeric Superoxide Dismutase. *Journal of Physical Chemistry B*. 124(4): 650-661.

- Mura, P., Maestrelli, F., D'Ambrosio, M., Luceri, C., Cirri, M. 2021. Evaluation and Comparison of Solid Lipid Nanoparticles (SLNs) and Nanostructured Lipid Carriers (NLCs) as Vectors to Develop Hydrochlorothiazide Effective and Safe Pediatric Oral Liquid Formulations. *Pharmaceutics*. 13(4): 1-18.
- Mutiarahmi, C. N., Hartady, T., Lesmana, R. 2021. Use of Mice as Experimental Animals in Laboratories That Refer to the Principles of Animal Welfare: A Literature Review. *Indonesia Medicus Veterinus*. 10(1): 134-145.
- Nayak, C., Swain, R. P., Mohapatra, R., Panigrahi, C. 2025. Next-Generation Nanostructured Lipid Carriers: A Review of Latest Trends and Innovations. *Biomedical Materials & Devices*.
- Obeng, S., Welson, D., Tih, F., Sanjaya, A., Jasaputra, D. K., Gunadi, J. W., Yusuf, I. F. 2024. Antiinflammatory Effect of Andrographolide in Sambiloto Extract (*Andrographis paniculata*) on Ulcerative Colitis. *Keluwih: Jurnal Kesehatan dan Kedokteran*. 4(2): 88-100.
- Ohta, Y., Ohashi, K., Matura, T., Tokunaga, K., Kitagawa, A. 2008. Octacosanol Attenuates Disrupted Hepatic Reactive Oxygen Species Metabolism Associated with Acute Liver Injury Progression in Rats Intoxicated with Carbon Tetrachloride. *Journal of Clinical Biochemistry and Nutrition*. 42(3): 118-125.
- Osemwenkhae, O. P., Osaretin, P., Fisayo, D., Patrick, O. 2023. Hepato-Protective and Curative Activities of Leaf Extracts of *Andrographis paniculata* in Carbon Tetrachloride-Induced Damage in Experimental Male Rats. *African Scientist Journal*. 24(4): 484-490.
- Patibandla, C., van Aalten, L., Dinkova-Kostova, A. T., Honda, T., Cuadrado, A., Fernández-Ginés, R., McNeilly, A. D., Hayes, J. D., Cantley, J., Sutherland, C. 2024. Inhibition of Glycogen Synthase Kinase-3 Enhances NRF2 Protein Stability, Nuclear Localisation, and Target Gene Transcription in Pancreatic Beta Cells. *Redox Biology*. 71(!): 103117.
- Rahmat, D., Nafisa, S., Odilia, C. M. 2023. Application of Solid Lipid Nanoparticles Method in Black Sea Cucumber (*Holothuria atra*) Extract Peel-Off Gel Mask and Antioxidant Activity Tests. *Jurnal Ilmu Kefarmasian Indonesia*. 21(1): 131.
- Rodwell, V. W., Bender, D. A., Botham, K. M., Kennelly, P. J., Weil, P. A. 2018. *Harper's Illustrated Biochemistry* (31st ed.). EGC.
- Rosa, A. C., Corsi, D., Cavi, N., Bruni, N., Dosio, F. 2021. Superoxide Dismutase Administration: A Review of Proposed Human Uses. *Molecules*. 26(7): 1-40.
- Saleem, T., Abd El-Aziz, M., El-Baz, M., Okda, T., Abdel-Aziz, H. 2019. Galectin-3 in Repairing Damaged Mice Liver Induced by CCl₄: Role of Apoptosis and Oxidative Stress. *Bulletin of Egyptian Society for Physiological Sciences*. 31(1): 29-42.

- Salvi, V. R., Pawar, P. 2019. Nanostructured Lipid Carriers (NLC) System: A Novel Drug Targeting Carrier. *Journal of Drug Delivery Science and Technology*. 51(1): 255-267.
- Sanders, R., Mason, D. J., Foy, C. A., Huggett, J. F. 2014. Considerations for Accurate Gene Expression Measurement by Reverse Transcription Quantitative PCR When Analysing Clinical Samples. *Analytical and Bioanalytical Chemistry*. 406(26): 6471-6483.
- Songvut, P., Rangkadilok, N., Pholphana, N., Suriyo, T., Panomvana, D., Puranajoti, P., Akanimanee, J., Satayavivad, J. 2023. Comparative Pharmacokinetics and Safety Evaluation of High-Dosage Regimens of *Andrographis paniculata* Aqueous Extract After Single and Multiple Oral Administration in Healthy Participants. *Frontiers in Pharmacology*. 14(8): 1230401.
- Speisky, H., Shahidi, F., de Camargo, A. C., Fuentes, J. 2022. Revisiting the Oxidation of Flavonoids: Loss, Conservation or Enhancement of Their Antioxidant Properties. *Antioxidants*. 11(1): 1-28.
- Subramaniam, B., Siddik, Z. H., Nagoor, N. H. 2020. Optimization of Nanostructured Lipid Carriers: Understanding the Types, Designs, and Parameters in the Process of Formulations. *Journal of Nanoparticle Research*. 22(6): 1-29.
- Sun, Z., Lei, X. G. 2023. Evidence and Metabolic Implications for a New Non-Canonical Role of Cu-Zn Superoxide Dismutase. *International Journal of Molecular Sciences*. 24(4): 1-24.
- Susilo, R. J. K., Winarni, D., Husen, S. A., Hayaza, S., Wahyuningsih, S. P. A., Doong, R.-A., Darmanto, W. 2021. Hepatoprotective Effect of *Ganoderma applanatum* Crude Polysaccharides on Carbon Tetrachloride-Induced Early Liver Fibrosis in Mice. *Pharmacognosy Journal*. 13(6): 1428-1436.
- Szymonik-Lesiuk, S., Czechowska, G., Stryjecka-Zimmer, M., Słomka, M., Mądro, A., Celiński, K., Wielosz, M. 2003. Catalase, Superoxide Dismutase, and Glutathione Peroxidase Activities in Various Rat Tissues After Carbon Tetrachloride Intoxication. *Journal of Hepato-Biliary-Pancreatic Surgery*. 10(4): 309-315.
- Trist, B. G., Hilton, J. B., Hare, D. J., Crouch, P. J., Double, K. L. 2021. Superoxide Dismutase 1 in Health and Disease: How a Frontline Antioxidant Becomes Neurotoxic. *Angewandte Chemie*. 133(17): 9299-9330.
- Unsal, V., Cicek, M., Sabancilar, İ. 2021. Toxicity of Carbon Tetrachloride, Free Radicals and Role of Antioxidants. *Reviews on Environmental Health*. 36(2): 279-295.
- Viegas, C., Patrício, A. B., Prata, J. M., Nadhman, A., Chintamaneni, P. K., Fonte, P. 2023. Solid Lipid Nanoparticles vs. Nanostructured Lipid Carriers: A Comparative Review. *Pharmaceutics*. 15(6): 1593.

- Wang, J., Sun, H., Yang, H., Yang, R., Zhu, X., Guo, S., Huang, Y., Xu, Y., Li, C., Tu, J., Sun, C. 2024. Dissecting the Toxicological Profile of Polysorbate 80 (PS80): Comparative Analysis of Constituent Variability and Biological Impact Using a Zebrafish Model. *European Journal of Pharmaceutical Sciences*. 198(1): 106796.
- Wang, L., Xu, J., Liu, H., Li, J., Hao, H. 2019. PM2.5 Inhibits SOD1 Expression by Up-Regulating microRNA-206 and Promotes ROS Accumulation and Disease Progression in Asthmatic Mice. *International Immunopharmacology*. 76(September): 105871.
- Wang, R., Yang, Z., Zhang, J., Mu, J., Zhou, X., Zhao, X. 2019. Liver Injury Induced by Carbon Tetrachloride in Mice Is Prevented by the Antioxidant Capacity of Anji White Tea Polyphenols. *Antioxidants*. 8(3): 1-13.
- Warditiani, N. K., Widjaja, I. N. K., Gitarini, N. M. 2021. Penetapan Kadar Andrografolid dalam Isolat dari Sambiloto dengan KLT-Spektrofotodensitometri. *Jurnal Farmasi Udayana*. 3(1): 59-62.
- Yen, C. C., Liang, Y. K., Cheng, C. P., Hsu, M. C., Wu, Y. T. 2020. Oral Bioavailability Enhancement and Anti-Fatigue Assessment of the Andrographolide-Loaded Solid Dispersion. *International Journal of Molecular Sciences*. 21(7): 1-18.
- Zheng, M., Liu, Y., Zhang, G., Yang, Z., Xu, W., Chen, Q. 2023. The Applications and Mechanisms of Superoxide Dismutase in Medicine, Food, and Cosmetics. *Antioxidants*. 12(9): 1-20.