

DAFTAR PUSTAKA

- Abdullah, M. H., Riyanto, O. A. W., & Wulan, D. P. I. B. S. (2021). Optimization of Esterification and Transesterification Process for Biodiesel Production from Used Cooking Oil. *Journal of Research and Technology*, 7(2), 207–216.
- Aditama, N. Y., & Ryvalda, D. S. (2024). Pra-Desain Pabrik Surfaktan Methyl Ester Sulfonate (MES) dari Waste Cooking Oil (WCO). *Jurnal Teknik ITS*, 13(1), F7–F12.
- Agustiarini, V., & Wijaya, D. P. (2022). Uji Aktivitas Antioksidan Ekstrak Etanol-Air (1:1) Bunga Rosella (*Hibiscus sabdariffa* L.) dengan Metode DPPH (1,1-difenil-2-pikrilhidrazil). *Jurnal Penelitian Sains*, 24(1), 29–32.
- Ahmed, M., Abdullah, A., Patle, D. S., Shahadat, M., Ahmad, Z., Athar, M., Aslam, M., & Vo, D. V. N. (2022). Feedstocks, Catalysts, Process Variables and Techniques for Biodiesel Production by One-pot Extraction-Transesterification: A Review. *Environmental Chemistry Letters*, 20(1), 335–378.
- Aisyah, M. P. (2020). Perbandingan Aktivitas Antioksidan Terhadap Biji Bunga Matahari (*Helianthus annuus* L.) dengan Tumbuhan Lainnya. *Journal of Research and Education Chemistry*, 2(2), 85.
- Alfauziah, T. Q. (2019). Mengenal Kosmetik Pembersih Wajah Micellar Water dan Perkembangannya. *Universitas Padjajaran*, 3(5), 94–97.
- Al-Rasyid, H., & Nasir, R. (2020). Kinetika Reaksi Transesterifikasi Minyak Biji Ketapang (*Terminalia catappa* L) pada Proses Produksi Metil Ester. *Jurnal Pijar MIPA*, 15(1), 77–87.
- Amida, N. R. (2022). *Efektivitas Surfaktan Anionik terhadap Stabilitas dan Daya Bersih Sediaan Micellar Water*. Institut Pertanian Bogor.
- Amin, A., Wunas, J., & Merina Anin. (2015). Uji Aktivitas Antioksidan Ekstrak Etanol Klika Faloak (*Sterculia quadrifida* R.Br) dengan Metode DPPH (2,2-diphenyl-1-picrylhydrazyl). *Jurnal Fitofarmaka Indonesia*, 2(2), 111.
- Anderson, L. A., & Franz, A. K. (2012). Supporting Information Real-time Monitoring of Transesterification by ¹HNMR Spectroscopy: Catalyst Comparison and Improved Calculation for Biodiesel Conversion. *Energy & Fuels*, 26(10), 6404–6410.
- Andrini, N. (2023). Studi Literatur Karakteristik dan Perawatan Kulit untuk Orang Asia. *Pandu Husada*, 4(3), 14–23.
- Anusta, A. B., Puspita, A. C. D., Bakri, N. F., Appa, F. E., Dewi, K., & Gunawan, E. (2024). Antioxidant Activity Test of Outstretched Bark Extract

- (*Camptosperma brevipetiolatum* Volkens) using The DPPH Method. *International Journal of Pharmaceutical and Bio-Medical Science*, 04(08), 663–668.
- Apriliyani, S. A., Martono, Y., Riyanto, C. A., Mutmainah, M., & Kusmita, K. (2018). Validation of UV-VIS Spectrophotometric Methods for Determination of Inulin Levels from Lesser Yam (*Dioscorea esculenta* L.). *Jurnal Kimia Sains dan Aplikasi*, 21(4), 161–165.
- Ardiansyah, A., Made, A. A., Anggreni, D., & Wartini, N. M. (2023). Karakteristik Face Mist dengan Perlakuan Formulasi Kombinasi Ekstrak Kulit Nanas (*Ananas comosus* (L.) Merr) dan Bunga Telang (*Clitoria ternatea* L.). *Jurnal Rekayasa Dan Manajemen Agroindustri*, 11(4), 608–620.
- Arifuddin, H., Dwi Wahyuni, R., Arifuddin, H., Nur, A. F., & Arifuddin, A. (2024). Validity, Reliability, and Factor Analysis of Organoleptic Tests of Dangke Deppamil as an Alternative Treatment of Nutrition Problems in Pregnant Women in Indonesia. *Journal of Education and Health Promotion*, 13(1), 1–7.
- Asih, D. J., Kadek Warditiani, N., & Gede, I. W. S. (2022). Review Artikel: Aktivitas Antioksidan Ekstrak Amla (*Phyllanthus emblica/Embolica officinalis*). *Humantech: Jurnal Ilmiah Multidisplin Indonesia*, 1(6), 674–687.
- Badmus, S. O., Amusa, H. K., Oyehan, T. A., & Saleh, T. A. (2022). Environmental Risks and Toxicity of Surfactants: Overview of Analysis, Assessment, and Remediation Techniques. *Environmental Science and Pollution Research*, 44(28), 62085–62104.
- Badriyah, L., Aminatul Farihah, D., & Farmasi Kusuma Husada Purwokerto, A. (2022). Analisis Ekstraksi Kulit Bawang Merah (*Allium cepa* L.) Menggunakan Metode Maserasi. *Jurnal Sintesis*, 2022(1), 30–37.
- Baliyan, S., Mukherjee, R., Priyadarshini, A., Vibhuti, A., Gupta, A., Pandey, R. P., & Chang, C. M. (2022). Determination of Antioxidants by DPPH Radical Scavenging Activity and Quantitative Phytochemical Analysis of *Ficus religiosa*. *Molecules*, 27(4), 1–19.
- Bastian, F., Suryani, A., & Sunarti, T. C. (2012). Peningkatan Kecerahan pada Proses Sintesis Surfaktan Nonionik Alkil Poliglikosida (Apg) Berbasis Tapioka dan Dodekanol. *Reaktor*, 14(2), 143–150.
- Belhaj, A. F., Elraies, K. A., Mahmood, S. M., Zulkifli, N. N., Akbari, S., & Hussien, O. S. E. (2020). The Effect of Surfactant Concentration, Salinity, Temperature, and pH on Surfactant Adsorption for Chemical Enhanced Oil Recovery: A Review. *Journal of Petroleum Exploration and Production Technology*, 10(1), 125–137.

- Bose, A., Burman, D. R., Sikdar, B., & Patra, P. (2021). Nanomicelles: Types, Properties and Applications in Drug Delivery. *IET Nanobiotechnology*, 15(1), 19–27.
- Briyanto, Arneli, & Suseno, A. (2010). Detergensi Natrium Dodesilbenzen Sulfonat dengan Penambahan Natrium Tripolifosfat dan Variasi pH. *Jurnal Kimia Sains dan Aplikasi*, 13(1), 8–11.
- Bubpawan, P., Boonphong, S., Sriwattanawarunyoo, C., & Udeye, V. (2015). Characterization of The Essential Oil and Fatty Oil from Makhwaen Fruit (*Zanthoxylum rhetsa* (Roxb.) DC). *NU. International Journal of Science*, 12(1), 1–10.
- Cercado, A. P. I., Ballesteros, F. C., & Capareda, S. C. (2018). Biodiesel from Three Microalgae Transesterification Processes Using Different Homogenous Catalysts. *International Journal of Technology*, 9(4), 645–651.
- Chalim, A., Ari Wibowo, A., Sonya Suryandari, A., Muhajir Syarifuddin, M., & Tohir, M. (2017). Studi Kinetika Reaksi Metanolisis Pembuatan Metil Ester Sulfonat (MES) Menggunakan Reaktor Batch Berpengaduk. *Jurnal Teknik Kimia dan Lingkungan*, 1(1), 28–34.
- Chasani, M., Fitriaji, R. B., & Purwati. (2013). Fraksinasi Ekstrak Metanol Kulit Batang Ketapang (*Terminalia catappa* Linn.) dan Uji Toksisitasnya dengan Metode BSLT (Brine Shrimp Lethality Test). *Molekul*, 8(1), 89–100.
- Chasani, M., Nursalim, V. H., Widyaningsih, S., Budiasih, I. N., & Kurniawan, W. A. (2014). Sintesis, Pemurnian dan Karakterisasi Metil Ester Sulfonat (Mes) sebagai Bahan Inti Deterjen dari Minyak Biji Nyamplung (*Calophyllum inophyllum* L). *Molekul*, 9(1), 63–72.
- Chen, Y. F., Yang, C. H., Chang, M. S., Ciou, Y. P., & Huang, Y. C. (2010). Foam Properties and Detergent Abilities of The Saponins from *Camellia oleifera*. *International Journal of Molecular Sciences*, 11(11), 4417–4425.
- Damayanti, A., & Endah, A. F. (2012). Pemungutan Minyak Atsiri Mawar (Rose Oil) dengan Metode Maserasi. *Jurnal Bahan Alam Terbarukan*, 1(2), 1-8.
- Darusman, F., Wulandari, I. F., & Dewi, M. L. (2023). Kajian Tingkat Iritasi Surfaktan Berdasarkan Nilai Zein pada Sediaan Body Wash. *Majalah Farmasetika*, 8(2), 148-163.
- De Jesus, M. D. P. M., De Melo, L. N., Da Silva, J. P. V., Crispim, A. C., Figueiredo, I. M., Bortoluzzi, J. H., & Meneghetti, S. M. P. (2015). Evaluation of Proton Nuclear Magnetic Resonance Spectroscopy for Determining The Yield of Fatty Acid Ethyl Esters Obtained by Transesterification. *Energy and Fuels*, 29(11), 7343–7349.

- Debora, A., & Eka, M. (2023). Characteristic Test of Transesterification Results from Ketapang Seed Extract (*Terminalia catappa* Linn) Against The Effect of Time Variation with KOH Catalyst. *Jurnal Chemurgy*, 7(2), 80–88.
- Deli, N. A., & Wahyuni, S. (2023). Pengaruh Rasio Mol Metil Ester : NaHSO_3 pada Proses Sulfonasi Minyak Jelantah terhadap Kualitas Metil Ester Sulfonat. *Jurnal Sains dan Ilmu Terapan*, 6(1), 2621–2766.
- Dhanasatya, L., Lesmana, D., Elkiyat, W., Fathoni, A., & Mayasti, N. K. I. (2021). Karakterisasi Kandungan Kimia dan Organoleptik Produk Kukis dari Tepung Komposit Berbasis Mocaf dan Tepung Sorgum. *Jurnal Riset Teknologi Industri*, 15(1), 23–33.
- Doloking, H., Tahar, N., Mukhriani, & Surya Ningsi. (2022). Flavonoids: A Review on Extraction, Identification, Quantification, and Antioxidant Activity. *Ad-Dawaa' Journal of Pharmaceutical Sciences*, 5(1), 1-26.
- Draelos, Z. D. (2018). The Science Behind Skin Care: Cleansers. *Journal of Cosmetic Dermatology*, 17(1), 8–14.
- Duma, A. K. W., Augiselvya, N., Yusuf, R. M., Sunandar, K., & Joelianingsih. (2018). Kajian Pengaruh Konsentrasi Katalis dan Konsentrasi Metanol pada Sintesis Metil Ester Sulfonat. *Technopex-2018*, 370–377.
- Dwi, D. E., Fassa, F. A. R., & Zukhriyah. (2022). Penggunaan Metanol Sisa Reaksi sebagai Reaktan pada Proses Transesterifikasi Minyak Kelapa Sawit Menjadi Biodiesel. *Jurnal Teknologi*, 14(2), 155–162.
- Dzakwan, M. (2020). Formulasi Micellar Based Water Ekstrak Bunga Telang. *Jurnal Ilmiah Farmasi*, 9(2), 61–67.
- Eevera, T., Rajendran, K., & Saradha, S. (2009). Biodiesel Production Process Optimization and Characterization to Assess The Suitability of The Product for Varied Environmental Conditions. *Renewable Energy*, 34(3), 762–765.
- Efavi, J. K., Kanboghah, D., Apalangya, V., Nyankson, E., Tiburu, E. K., Dodoo-Arhin, D., Onwona-Agyeman, B., & Yaya, A. (2018). The Effect of NaOH Catalyst Concentration and Extraction Time on The Yield and Properties of *Citrullus vulgaris* Seed Oil as a Potential Biodiesel Feed Sock. *South African Journal of Chemical Engineering*, 25, 98–102.
- Eka, A. P., Bulu, A. T. I., Sawal, R. A. H., & Pitarisa, A. P. (2024). Perbandingan Kadar Total Flavonoid Ekstrak Daun Ketapang (*Terminalia catappa* L) Berdasarkan Kekeringan Simplisia dengan Metode Spektrofotometri UV-Vis. *Jurnal Farmasi & Sains Indonesia*, 7(1), 203–209.

- Encinar, J. M., Pardal, A., & Sánchez, N. (2015). An Improvement to The Transesterification Process by The Use of Co-Solvents to Produce Biodiesel. *Fuel*, 166, 51–58.
- Enda, K. Y., Audina, M., & Alawiyah, T. (2023). Formulasi dan Uji Aktivitas Antioksidan Sediaan Serum Ekstrak Bunga Telang (*Clitoria ternatea* L.) sebagai Anti Aging. *Innovative: Journal of Social Science Research*, 3(6), 8301–8313.
- Fakhruzy, Kasim, A., Asben, A., & Anwar, A. (2020). Review: Optimalisasi Metode Maserasi untuk Ekstraksi Tanin Rendemen Tinggi. *Menara Ilmu*, XIV(02), 38–41.
- Farouk, S. M., Tayeb, A. M., Abdel-Hamid, S. M. S., & Osman, R. M. (2024). Recent Advances in Transesterification for Sustainable Biodiesel Production, Challenges, and Prospects: A Comprehensive Review. *Environmental Science and Pollution Research*, 31(9), 12722–12747.
- Fatmawati, I. S., Haeruddin, & Ode Mulyana, W. (2023). Uji Aktivitas Antioksidan Ekstrak Etil Asetat Daun Belimbing Wuluh (*Aveerrhoa bilimbi* L.) dengan Metode DPPH. *Jurnal Kimia dan Pendidikan Kimia*, 12(1), 41–49.
- Fatwami, E. F., & Royani, S. (2023). Skrining Fitokimia dan Uji Antioksidan Ekstrak Daun Cabai Rawit (*Capsicum frutescens* L.). *Journal Syifa Sciences and Clinical Research*, 5(2), 253–260.
- Feng, X., Shang, J., Gu, Z., Luo, X., Chen, Y., & Liu, Y. (2024). Lactic Acid Chemical Peeling in Skin Disorders. *Clinical, Cosmetic and Investigational Dermatology*, 17, 901–909.
- Fiume, M. M., Bergfeld, W. F., Belsito, D. V., Hill, R. A., Klaassen, C. D., Liebler, D. C., Marks, J. G., Shank, R. C., Slaga, T. J., Snyder, P. W., Gill, L. J., & Heldreth, B. (2019). Safety Assessment of Monosaccharides, Disaccharides, and Related Ingredients as Used in Cosmetics. *International Journal of Toxicology*, 38(1), 5S–38S.
- Ghozali, I. (2018). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 25*.
- Goodwin, R. D. (1987). Methanol Thermodynamic Properties from 176 to 673 K at Pressures to 700 Bar. *Journal of Physical and Chemical Reference Data*, 16(4), 799–892.
- Gulcin, İ., & Alwasel, S. H. (2023). DPPH Radical Scavenging Assay. In *Processes*, 11(8), 1–30, Multidisciplinary Digital Publishing Institute (MDPI).
- Haerani, A., Chaerunisa, A. Y., & Subarnas, A. (2018). Artikel Tinjauan: Antioksidan untuk Kulit. *Farmaka*, 16(2), 135–151.

- Hardianti, Kasmungin, S., Pramadika, H., Suryati, E., Rinanto Suhadi, T., & Yulianti, Y. (2019). *Pengaruh Salinitas Optimum terhadap Surfaktan pada Lapangan X*. 1–6.
- Hariani, P. L., Riyanti, F., & Fadilah, A. (2016). The Influence of Reaction Time to The Characteristic of Methyl Ester Sulfonate from Ketapang Seed Oil. *Indonesia Journal of Article Fundamental and Applied Chemistry*, 1(1), 14–18.
- Hidajat, D., Febry Gilang Tilana, & I Gusti Bagus Surya Ari Kusuma. (2023). Dampak Polusi Udara terhadap Kesehatan Kulit. *Unram Medical Journal*, 12(4), 371–378.
- Hidayati, S., Sapta Zuidar, D. A., & Yanto, D. F. (2009). Optimation Condition for Methylester Sulphonate (MES) Processing from *Jatropha* Oil (*Jatropha curcas* L.) and its Effect on The Interfacial Tension by Using Response Surface Methodology. *Jurnal Teknologi Industri dan Hasil Pertanian*, 14(2), 160–172.
- Hikmah, F., & Hardiany, N. S. (2021). Peran Reactive Oxygen Species (ROS) dalam Sel Punca Kanker. *Jurnal Kedokteran Yarsi*, 29(3), 120–134.
- Hoang, H. T., Moon, J. Y., & Lee, Y. C. (2021). Natural Antioxidants from Plant Extracts in Skincare Cosmetics: Recent Applications, Challenges and Perspectives. *Cosmetics*, 8(4), 1–24.
- Hovda, K. D. (1996). *United States Patent and Trademark*.
- Hutami, D. P. (2024). *Sintesis dan Karakterisasi Surfaktan Minyak Biji Ketapang Serta Aplikasinya dalam Formulasi Lotion*. Universitas Jenderal Soedirman.
- Ilimu, E., Alimuddin, Hadanu, R., & Nurfianti. (2023). Identifikasi Struktur Komponen Senyawa Kimia Kulit Batang Ketapang (*Terminalia catappa* L.). *Jurnal Ilmiah Kanderang Tingang*, 14(2), 458–468.
- Iman, N., Rahman, A., & Nurhaeni. (2016). Sintesis Surfaktan Metil Ester Sulfonat (MES) dari Metil Laurat. *Kovalen*, 2(2), 54–66.
- Indera, R. K., Mina, E., & Rosa, P. H. (2017). Stabilisasi Tanah Lempung dengan Menggunakan Pasir Laut dan Pengaruhnya Terhadap Nilai Cbr (California Bearing Ratio) (Studi Kasus : Jalan Desa Mangkualam Kecamatan Cimanggu-Kab. Pandeglang). *Jurnal Fondasi*, 6(2), 24-33.
- Ismail, I. A., Riga, R., Suryani, O., Insani, M., Pernadi, N. L., & Febriyanti, A. (2022). Analisis Spektrum ¹H-NMR: Penjelasan Sederhana. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 6(12), 336–342.
- ISO13320. (2020). *International Standar Particle size analysis — Laser Diffraction Methods*.

- Issariyakul, T., & Dalai, A. K. (2014). Biodiesel from Vegetable Oils. *Renewable and Sustainable Energy Reviews*, 31, 446–471.
- Jabbari, H. (2018). Production of Methyl Ester Biofuel from Sunflower Oil via Transesterification Reaction. *Asian Journal of Nanoscience and Materials*, 1(2), 52–55.
- Jain, C., Khatana, S., & Vijayvergia, R. (2019). Bioactivity of Secondary Metabolites of Various Plants: A Review. *Article in International Journal of Pharmaceutical Sciences and Research*, 10(2), 494–504.
- Jin, Y., Tian, S., Guo, J., Ren, X., Li, X., & Gao, S. (2016). Synthesis, Characterization and Exploratory Application of Anionic Surfactant Fatty Acid Methyl Ester Sulfonate from Waste Cooking Oil. *Journal of Surfactants and Detergents*, 19(3), 467–475.
- Kamble, V., & Gaikwad, N. (2019). Fluorescence Analysis, Phytochemical, and Antioxidant Activities in Leaves and Stem of *Embelia ribes* Burm. F. *Asian Journal of Pharmaceutical and Clinical Research*, 12(4), 225–229.
- Kannadasan, Dr. M., Bichala, P. K., Agrawal, A., & Singh, S. (2020). A Review: Nano Particle Drug Delivery System. *International Journal of Pharmaceutical Sciences and Medicine*, 5(12), 46–58.
- Kasirajan, R. (2021). Biodiesel Production by Two Step Process from an Energy Source of *Chrysophyllum albidum* Oil Using Homogeneous Catalyst. *South African Journal of Chemical Engineering*, 37, 161–166.
- Kazia, A., Runtuwene, M. R. J., & Wewengkang, D. S. (2017). Uji Fitokimia dan Aktivitas Antioksidan dari Ekstrak Metanol Bunga Soyogik (*Saurauia bracteosa* DC.). *Pharmakon Jurnal Ilmiah Farmasi-UNSRAT*, 6(1), 53–61.
- Khadijah, D., Fitri Nugraha, D., & Syamsu, E. (2023). Uji Sedatif Fraksi Etil Asetat Daun Ketapang (*Terminalia catappa* L.) terhadap Mencit. *Sains Medisina*, 1(3), 136–141.
- Klatatiana, A. I. S., Widodo, W. G., & Kusmartono, B. (2016). Pengaruh Penggunaan Bahan Alternatif Metil Ester dari Minyak Jelantah pada Sintesis Metil Ester Sulfonat (MES) sebagai Oil Well Stimulation Agent (Owsa). *Jurnal Inovasi Proses*, 1(1), 8-17.
- Kopustinskiene, D. M., Jakstas, V., Savickas, A., & Bernatoniene, J. (2020). Flavonoids as Anticancer Agents. *Nutrients*, 12(2), 1–5.
- Korponyai, C., Szél, E., Behány, Z., Varga, E., Mohos, G., Dura, Á., Dikstein, S., Kemény, L., & Erős, G. (2017). Effects of Locally Applied Glycerol and Xylitol on The Hydration, Barrier Function and Morphological Parameters of The Skin. *Acta Dermato-Venereologica*, 97(2), 182–187.

- Kumar, N., & Goel, N. (2019). Phenolic Acids: Natural Versatile Molecules with Promising Therapeutic Applications. *Biotechnology Reports*, 24, 1–10.
- Kusumaningrum, S. D. (2021). Kajian Pustaka dalam Penentuan Tipe dan Permasalahan Kulit Wajah. *Jurnal SNATi*, 1(1), 17–21.
- Li, L., Zeng, Y., Chen, M., & Liu, G. (2022). Application of Nanomicelles in Enhancing Bioavailability and Biological Efficacy of Bioactive Nutrients. *Polymers*, 14(16), 1–19.
- Linangsari, T., Sandri, D., Lestari, E., & Noorhidayah. (2022). Evaluasi Sensori Snack Bar Talipuk dengan Penambahan Tepung Pisang Kepok (*Musa paradisiaca* Forma Typica) pada Panelis Anak-anak dan Dewasa. *Jurnal Agroindustri Halal*, 8(2), 213–221.
- Lisdiani, Susanto, D., & Manurung, H. (2022). Phytochemical Screening and Antioxidant Activity of Methanol Extract of *Dillenia excelsa* Leaf. *Biodiversitas*, 23(7), 3827–3835.
- Lopez-Ojeda, W. ; M. A. A. M. Oakley., Pandey, A., Alhaji, M., & Oakley, A. M. (2022). *Anatomy, Skin (Integument)*. StatPearls Publishing.
- Lovita, A. (2016). *Isolasi dan Uji Aktivitas Antioksidan Ekstrak Metanol Daging Buah Ketapang (Terminalia catappa L)*. STIFAR Riau.
- Lukaszewska, Z. N., & Bujak, T. (2018). Saponins as Natural Raw Materials for Increasing The Safety of Bodywash Cosmetic Use. *Journal of Surfactants and Detergents*, 21(6), 767–776.
- Mailuhu, M., Runtuwene, M. R. J., & Koleangan, H. S. J. (2017). Skrining Fitokimia dan Aktivitas Antioksidan Ekstrak Metanol Kulit Batang Soyogik (*Saurauia bracteosa* DC). *Chemistry Progress*, 10(1), 1–6.
- Mandari, V., & Devarai, S. K. (2022). Biodiesel Production Using Homogeneous, Heterogeneous, and Enzyme Catalysts via Transesterification and Esterification Reactions: a Critical Review. *Bioenergy Research*, 15(2), 935–961.
- Mar'atush, S. S., Yoga, N. aditya, Saphira, E. E. E., & Maghfiroh, S. (2023). Konsep Uji Asumsi Klasik pada Regresi Linier Berganda. *Jurnal Riset Akuntansi Soedirman (JRAS)*, 2(2), 102–110.
- Martien, R., K Irianto, I. D., Farida, V., & Purwita Sari, D. (2012). Perkembangan Teknologi Nanopartikel sebagai Sistem Penghantaran Obat Technology Developments Nanoparticles as Drug Delivery Systems. *Majalah Farmaseutik*, 8(1), 133–144.

- Maryam, S., Praningsih, E., Kusuma, A. T., Studi, P., & Farmasi, S. (2022). Analysis of UV Protection Activity of Ethanol Extract of Pandan Wangi Leaves (*Pandanus amaryllifolius* Roxb.) Based on Sun Protection Factor Value. *As-Syifaa Jurnal Farmasi*, 14(1), 2085–4714.
- Maurad, Z. A., Maurad, Z. A., Abdullah, L. C., Anuar, M. S., Shah, N. N. A. K., & Idris, Z. (2020). Preparation, Characterization, Morphological and Particle Properties of Crystallized Palm-Based Methyl Ester Sulphonates (MES) Powder. *Molecules*, 25(11), 1-15.
- Mayang Sari, F., Nur Hadiati, R., & Perinduri Sihotang, W. (2023). Pearson Correlation Analysis of Total Population and Number of Motorized Vehicles in Jambi Province. *Multi Proximity: Jurnal Statistika Universitas Jambi*, 2(1), 39–44.
- Mayarlis, & Chatri, M. (2024). Potensi Ketapang (*Terminalia catappa* L.) sebagai Tanaman Obat. *Jurnal Pendidikan Tambusai*, 8(2), 18504–18509.
- McGowan, M. A., Scheman, A., & Jacob, S. E. (2018). Propylene Glycol in Contact Dermatitis: A Systematic Review. *Dermatitis*, 29(1), 6–12.
- Meriatna, Suryati, & Evana. (2016). Kajian Pengaruh Konsentrasi Natrium Hidrosulfit (NaHSO_3) dan Temperatur dalam Pembuatan Surfaktan Metil Ester Sulfonat(MES) dari Crude Palm Oil (CPO) dengan Metode Sulfonasi. *Jurnal Teknologi Kimia Unimal*, 5(1), 45–56.
- Mohammadi, M., Zambare, V., Malek, L., Gottardo, C., Suntres, Z., & Christopher, L. (2020). Lichenochemicals: Extraction, Purification, Characterization, and Application as Potential Anticancer Agents. In *Expert Opinion on Drug Discovery*, 15(5), 575-501. Taylor and Francis Ltd.
- Mujdalipah, S., Hambali, E., Suryani, A., & Zulchaidir, E. (2012). Effects of Temperature and Sulfonation Time on Methyl Ester Sulfonic Acid (MESA) Production Process Using Single Tube Falling Film Reactor (STFR). *Agritech*, 32(3), 275–283.
- Murniati, Handayani, S. S., Suhendra, D., Gunawan, E. R., & Ramdani, N. (2023). Sintesis Metil Ester Sulfonat Berbasis Minyak Biji Kelor (*Moringa oliofera* L.) pada Variasi Waktu dan Suhu Sulfonasi. *Jurnal Sains Dan Teknologi*, 12(2), 466–473.
- Musrini, E., & Muin, A. (2020). Pertumbuhan Tanaman Ketapang (*Terminalia catappa* L) dengan Penambahan Pupuk Organik dan Npk pada Tailing Di Persemaian. *Jurnal Hutan Lestari*, 8(1), 198–210.
- Mutia, W. Y., Natasya, D. K., Claudia, J., Noval, & Rakhman, H. A. (2022). Characterization and Formulation of Nanoparticles Extract of Bundung Plant

- (*Actinoscirpus grossus*) with Variations in Concentration of Chitosan and Na-TPP Bases Using The Ionic Gelation Method. *Jurnal Surya Medika*, 8(3), 25–29.
- Nagtode, V. S., Cardoza, C., Yasin, H. K. A., Mali, S. N., Tambe, S. M., Roy, P., Singh, K., Goel, A., Amin, P. D., Thorat, B. R., Cruz, J. N., & Pratap, A. P. (2023). Green Surfactants (Biosurfactants): A Petroleum-Free Substitute for Sustainability—Comparison, Applications, Market, and Future Prospects. In *ACS Omega*, 8(13), 11674-11699. American Chemical Society.
- Ngibad, K., & Lestari, L. P. (2020). Aktivitas Antioksidan dan Kandungan Fenolik Total Daun Zodia (*Evodia suaveolens*). *Alchemy Jurnal Penelitian Kimia*, 16(1), 94–109.
- Ningrum, L. W. (2021). Sebaran Jenis Tanaman *Terminalia catappa* L. Beserta Potensi Benihnya di Kebun Raya Purwodadi. *Prosiding Biologi Achieving The Sustainable Development Goals*, 196–203.
- Nissy, A., Dhara, T. J., Sinala, S., Ratnah, S., Farmasi, J., & Makassar, K. (2023). Formulasi Sabun Padat Transparan dengan Sari Daging Buah Naga Merah (*Hylocereus polyrhizus*) Sebagai Antioksidan. *Majalah Farmasi Dan Farmakologi*, 27(1), 27–31.
- Noor, M., Malahayati, S., & Nastiti, K. (2023). Formulasi dan Uji Stabilitas Sediaan Toner Wajah Ekstrak Buah Pare (*Momordica charantia* L) sebagai Anti Jerawat dengan Variasi Surfaktan. *Jurnal Riset Kefarmasian Indonesia*, 5(1), 133–145.
- Nugroho, A., & Buchori, L. (2019). Sintesa Metil Ester Sulfonat dari Minyak Jarak Pagar (*Jathropa curcas* Oil) dan Aplikasinya pada Proses Enhanced Oil Recovery (EOR). *METANA*, 15(1), 19–24.
- Nurhayati, R. (2023). Antihyperglycemic Activity Test of Extract, Methanol Fraction and N-Heksan Fraction of Ketapang Leaf (*Terminalia catappa*) in Alloxan-Induced White Rats. *Jurnal Wiyata: Penelitian Sains dan Kesehatan*, 10(1), 35-45.
- Nurjanah, N., Aini, Q., Adzkia, A., Rustana, R., Citra Carolline, S., Maulida Agustine, S., Bayu, A., & Nandiyanto, D. (2022). A Review: Nanoparticles NiFe₂O₄ Synthesis and its Application as Hyperthermia Agents in Biomedicine. *Indonesian Journal of Chemical Science*, 11(2), 103–113.
- Nurliana, L., Kadidae, L. O., Sunarti, S., & Musta, R. (2021). Characterization of Methyl Ester Sulfonate (MES) from Mahagony (*Swietenia macrophylla* King) with Variations in H₂SO₄ Concentration and Sulfonation Duration. *Alchemy Jurnal Penelitian Kimia*, 17(2), 192-201.

- Nurrohim, S., Harjanti, R., & Purnamasari, N. A. D. (2022). Formulasi dan Evaluasi Serum Anti-Aging Hesperetin dalam Sistem NLC (Nanostructured Lipid Carriers) dengan Metode Emulsifikasi-Sonikasi. *Media Farmasi Indonesia*, 17(1), 25–35.
- Oyeleye, S. I., Adebayo, A. A., Ogunsuyi, O. B., Dada, F. A., & Oboh, G. (2018). Phenolic Profile and Enzyme Inhibitory Activities of Almond (*Terminalia catappa*) leaf and Stem bark. *International Journal of Food Properties*, 20, S2810–S2821.
- Pasanda, O. S., Indriati, S., Amri, Ma'aruf, A. A., & Tholhah Syahid Al Hayah, M. (2022). Uji Aktivitas Antioksidan dan Kadar Polifenol Daun Ketapang (*Terminalia catappa* L.). *Prosiding 6th Seminar Nasional Penelitian & Pengabdian Kepada Masyarakat*.
- Pemberton, M. A., & Kimber, I. (2023). Propylene Glycol, Skin Sensitisation and Allergic Contact Dermatitis: A Scientific and Regulatory Conundrum. *Regulatory Toxicology and Pharmacology*, 138(105341), 1–7.
- Prasetyowati, A. L., Prasetya, A. T., Wardani, S., Kimia, J., Matematika, F., Ilmu, D., & Alam, P. (2018). Indonesian Journal of Chemical Science Sintesis Nanopartikel Perak dengan Bioreduktor Ekstrak Daun Belimbing Wuluh (*Averrhoa Bilimbi* L.) sebagai Antibakteri. *Indonesian Journal of Chemical Science*, 7(2), 160–166.
- Pratiwi, H., Okzelia, S. D., & Afiah, M. (2024). Formulation of Micellar Based Water from Piper crocatum Leaves Extract Using Various Concentrations of Poloxamer 188. *Jurnal Farmasi Galenika (Galenika Journal of Pharmacy) (e-Journal)*, 10(2), 214–233.
- Proksch, E. (2018). pH in Nature, Humans and Skin. *Journal of Dermatology*, 45(9), 1044–1052.
- Purnamasari M, V., Nurlina, & Anwar, A. S. (2023). Formulasi dan Evaluasi Masker Hyrogel Ekstrak Etanol Pegagan (*Centella asiatica* (L). Urb) sebagai Antiaging dengan Variasi Basis Carbopol dan HPMC. *Journal of Pharmaceutical and Health Research*, 4(2), 285–296.
- Putra, R. A., Ismayanti, R., Agam, D., & Kalista, D. (2015). Sintesis Metil Ester Sulfonat Melalui Sulfonasi Metil Ester Minyak Kedelai untuk Aplikasi Chemical Flooding. *Jurnal Sains Materi Indonesia*, 19(2), 77–82.
- Putranto, A. F. (2021). Efektifitas Antifungi Ekstrak Daun Ketapang (*Terminalia catappa* L.) terhadap *Saprolegnia* sp. Secara In Vitro. Universitas Atma Jaya Yogyakarta.

- Putri, L. K. (2019). *Formulasi Micellar Based Water Minyak Biji Wortel (Carrot Seed Oil) dengan Variasi Konsentrasi Tween 80 sebagai Surfaktan*. Universitas Setia Budi.
- Rachmadani, A. D., Nurlaila, S. R., & Harismah, K. (2022). Formulasi dan Uji Stabilitas Sediaan Pembersih Wajah (Cleansing Oil) Berbahan Dasar Minyak Jarak (*Ricinus communis*). *Journal Farmasi Klinik Dan Sains*, 2(1), 104–118.
- Radhikaa, C. (2020). Important Facts About Surfactants & its Properties. *Malaya Journal of Matematik*, S(2), 1233–1235.
- Rahma Fitri, D., Syafei, D., & Purnama Sari, C. (2021). Karakteristik Nanopartikel Ekstrak Etanol 70% Daun Jarak Pagar (*Jatropha curcas* L.) dengan Metode Gelasi Ionik. *Jurnal Farmasi Higea*, 13(1), 1.
- Rai, S., Acharya-Siwakoti, E., Kafle, A., Devkota, H. P., & Bhattarai, A. (2021). Plant-Derived Saponins: A Review of Their Surfactant Properties and Applications. *Sci*, 3(4), 1–19.
- Ravensca, I., Saleh, C., & Daniel, D. (2017). Pembuatan Surfaktan Berbahan Dasar Minyak Biji Ketapang (*Terminalia catappa*) dengan Trietanolamina. *Jurnal Atomik*, 2, 183–189.
- Repita, R., & Vauzia. (2021). Morphological Characteristics of Ketapang (*Terminalia cattapa* L.) Leaves at the Location of The Andalas University Forest and Indarung Highway Padang city. *Prosiding SEMNAS BIO*, 1568–1572.
- Rezablina, M., Zamhari, M., & Zikri, A. (2023). Proses Transesterifikasi Biodiesel Menggunakan Katalis Sodium Methoxide dan Katalis Berbasis Karbon Aktif dari Tempurung Kelapa yang Diimpregnasi NaOH. *Jurnal Serambi Engineering*, VIII(4), 7033–7039.
- Ridwan. (2023). Identification and Phytochemical Testing of Traditional Medicinal Plants of The North Buton Community. *Jurnal Sains dan Pendidikan Biologi*, 2(1), 94–102.
- Riyadi, P. H., Susanto, E., Anggo, A. D., Arifin, M. H., & Rizki, L. (2023). Effect of Methanol Solvent Concentration on The Extraction of Bioactive Compounds Using Ultrasonic-Assisted Extraction (UAE) from *Spirulina platensis*. *Food Research*, 7(3), 59–66.
- Senduk, T. W., Montolalu, L. A. D. Y., & Dotulong, V. (2020). The Rendement of Boiled Water Extract of Mature Leaves of Mangrove (*Sonneratia alba*). *Jurnal Perikanan dan Kelautan Tropis*, 11(1), 9–15.
- Shi, L., Zhao, W., Yang, Z., Subbiah, V., & Suleria, H. A. R. (2022). Extraction and Characterization of Phenolic Compounds and Their Potential Antioxidant

- Activities. In *Environmental Science and Pollution Research*, 29(54), 81112-81129. Springer Science and Business Media Deutschland GmbH.
- Sinaulan, C. D., & Hantara, A. (2021). Model Klasifikasi Permasalahan Kulit Wajah Menggunakan Metode Support Vector Machine. *Jurnal Pendidikan dan Kewirausahaan*, 9(1), 297–308.
- Siwayanan, P., Ban, Z. H., Zhang, X., & Parthiban, A. (2021). α -Sulfo Fatty Methyl Ester Sulfonate: A Review on Chemistry, Processing Technologies, Performance, and Applications in Laundry Detergents. In *Journal of Surfactants and Detergents*, 24(3), 285-399. John Wiley and Sons Inc.
- Skadiņa, D., Nokalna, I., & Balcere, A. (2024). Assessment of Micellar Water pH and Product Claims. *Dermato*, 4(3), 79–85.
- Soy, R. C., Kipkemboi, P. K., & Rop, K. (2020). Synthesis, Characterization, and Evaluation of Solution Properties of Sesame Fatty Methyl Ester Sulfonate Surfactant. *ACS Omega*, 5(44), 28643–28655.
- Subaryanti, Sabat Dwi Meianti, D., & Trijuliamos Manalu, R. (2022). Potensi Antimikroba Ekstrak Etanol Daun Gatal (*Urticastrum decumanum* (Roxb.) Kuntze) terhadap Pertumbuhan *Staphylococcus aureus* dan *Candida albicans*. *Sainstech Farma: Jurnal Ilmu Kefarmasian*, 15(2), 93–102.
- Sugiyono. (2013). *Metode Penelitian Kuantitatif Kualitatif dan R&D* (13th ed.). Alfabeta .
- Susilowati, & Sari, I. N. (2020). Perbandingan Kadar Flavonoid Total Seduhan Daun Benalu Cengkeh (*Dendrophthoe petandra* L.) pada Bahan Segar dan Kering. *Journal of Pharmacy*, 9(2), 33–40.
- Syamsu, K., Suryani, A., Hambali, E., Bunasor, T. K., & Andhika, A. (2007). Kajian Ketahanan Surfaktan Metil Ester Sulfonat (MES) Sebagai Oil Well Stimulation Agent terhadap Aktivitas Bakteri di Lingkungan Minyak Bumi. *Jurna Teknologi*, 3(1), 1–11.
- Taurina, W., Sari, R., Cindy Hafinur, U., & Wahdaningsih, S. (2017). Optimization of Stirring Speed and Stirring Time Toward Nanoparticle Size of Chitosan-Siam Citrus Peel (*Citrus nobilis* L.var Microcarpa) 70% Ethanol Extract. *Traditional Medicine Journal*, 22(1), 16-20.
- Thangjam, N. M., Taijong, J., & Kumar, A. (2020). Phytochemical and Pharmacological Activities of Methanol Extract of *Artemisia vulgaris* L. Leaves. *Clinical Phytoscience*, 6(1), 1–8.
- Trejo-Zárraga, F., Hernández-Loyo, F. de J., Chavarría-Hernández, J. C., & Sotelo-Boyás, R. (2018). Kinetics of Transesterification Processes for Biodiesel Production. In *Biofuels - State of Development*.

- Truong, D. H., Nguyen, D. H., Ta, N. T. A., Bui, A. V., Do, T. H., & Nguyen, H. C. (2019). Evaluation of The Use of Different Solvents for Phytochemical Constituents, Antioxidants, and in Vitro Anti-Inflammatory Activities of *Severinia Buxifolia*. *Journal of Food Quality*, 2019, 1–9.
- Ulfa, S. N. S., & Samik, S. (2022). Artikel Review: Pemanfaatan Katalis Zeoli Alam Teraktivasi dalam Sintesis Biodiesel dengan Metode Esterifikasi dan Transesterifikasi. *UNESA Journal of Chemistry*, 3, 165–181.
- Wardhani, I. Y., Ramadani, A. H., Famelia, V., & Widyaningrum, F. (2023). The Effect of Extraction Method on Total Flavonoid Content of *Ageratum conyzoides* Ethanol Extract. *Journal of Biology Education*, 6, 136–148.
- Wenhao, Z. (2021). Influence of Temperature and Concentration on Viscosity of Complex Fluids. *Journal of Physics: Conference Series*, 1965(1), 1–6.
- Widyaningsih, W. (2010). Uji Aktivitas Antioksidan Ekstrak Etanol Daun Dewa (*Gynura procumbens*) dengan Metode Dpph (1,1-difenil-2-pikrilhidrazil). *Prosiding Seminar Nasional Kosmetika Alami*, 109.
- Widyaswari, S. G., Metusalach, Kasmianti, & Amir, N. (2024). Bioactive Compounds and DPPH Antioxidant Activity of Underutilized Macroalgae (*Sargassum spp.*) from Coastal Water of Makassar, Indonesia. *Biodiversitas*, 25(1), 162–168.
- Wira, D. W., Eka Meylita Bangun, D., Harnesa Putri, S., & Mardawati, E. (2019). Pengaruh Ekstrak Etanol Daun Ketapang Badak (*Ficus lyrata* Warb) terhadap Aktivitas Antibakteri dan Karakteristik Hand Sanitizer yang Dihasilkan. *Jurnal Industri Pertanian*, 1(2), 38–5.
- Wusono, C. N., Hendrawati, T. Y., Ismiyati, Nugrahani, R. A., & Hajir, S. (2023). Pengaruh Penambahan Aloe vera Glycolyc Extract pada Produk Kosmetik Micellar Water. *Prosiding Seminar Nasional Penelitian LPPM UMJ*, 1–10.
- Yang, L., Takase, M., Zhang, M., Zhao, T., & Wu, X. (2014). Potential Non-edible Oil Feedstock for Biodiesel Production in Africa: A Survey. *Renewable and Sustainable Energy Reviews*, 38, 461–477.
- Yavrukova, V. I., Danov, K. D., Slavova, T. G., Stanimirova, R. D., Wei Ung, Y., Tong Kim Suan, A., Xu, H., & Petkov, J. T. (2024). Enhanced Solubility of Methyl Ester Sulfonates Below Their Krafft Points in Mixed Micellar Solutions. *Journal of Colloid and Interface Science*, 660, 896–906.
- Yericho, M., Audina, M., & Rizali, M. (2023). Formulasi dan Uji Stabilitas Fisik Micellar Water Ekstrak Etanol Daun Pegagan (*Centella asiatica*). *Jurnal Inovasi Kesehatan Adaptif*, 5(4), 184.

- Yu, Z., Zhan, J., Wang, H., Zheng, H., Xie, J., & Wang, X. (2020). Analysis of Influencing Factors on Viscosity of Agar Solution for Capsules. *Journal of Physics: Conference Series*, 1653(1), 1–9.
- Yuliyanti, M., Husada, V. M. S., Fahrudi, H. A. A., & Setyowati, W. A. E. (2019). Quality and Detergency Optimization, Liquid Detergent Preparation, Mahogany Seed Extract (*Swietenia mahagoni*). *JKPK (Jurnal Kimia dan Pendidikan Kimia)*, 4(2), 65–76.
- Yusharyahya, S. N. (2021). Mekanisme Penuaan Kulit sebagai Dasar Pencegahan dan Pengobatan Kulit Menua. *EJournal Kedokteran Indonesia*, 9(2), 150-159.
- Zahro, E. N. (2023). *Formulasi dan Uji Sifat Fisik Sediaan Face Toner dari Ekstrak Bunga Telang (Clitoria ternatea L.) dengan Variasi Humektan : Propilen Glikol dan Gliserin*. Semarang: Sekolah Tinggi Ilmu Farmasi Nusaputera
- Zeb, A. (2020). Concept, Mechanism, and Applications of Phenolic Antioxidants in Foods. *Journal of Food Biochemistry*, 44(9), 1–22.
- Zehiroglu, C., & Sarikaya, S. B. O. (2019). The Importance of Antioxidants and Place in Today's Scientific and Technological Studies. *Journal of Food Science and Technology*, 56(11), 4757–4774.
- Zhang, Q. W., Lin, L. G., & Ye, W. C. (2018). Techniques for Extraction and Isolation of Natural Products: A Comprehensive Review. *Chinese Medicine*, 13(1), 1–26.