

## DAFTAR PUSTAKA

- Adnan, M., Siddiqui, A.J., Ashraf, S.A., Ashraf, M.S., Alomrani, S.O., Alreshidi, M., Tepe, B., Sachidanandan, M., Danciu, C., dan Patel, M., 2023. Saponin-Derived Silver Nanoparticles from *Phoenix dactylifera* (Ajwa Dates) Exhibit Broad-Spectrum Bioactivities Combating Bacterial Infections. *Antibiotics*. 12(9).  
<https://doi.org/10.3390/antibiotics12091415>.
- Ahmad, K., Asif, H.M., dan Afzal, T., 2023. Green Synthesis and characterization of silver nanoparticles through the Piper cubeba ethanolic extract and their enzyme inhibitory activities. *Frontiers in Chemistry*. 1(1), 1-9.
- Aktaruzzaman, M., Salam, S.M., dan Mostafa, M.G., 2024. Synthesis of Aluminum Oxide Nanoparticle Adsorbents from Waste Aluminum Foil and Assesses Their Efficiency in Removing Lead (II) Ions from Water. *Tropical Aquatic and Soil Pollution*. 4(2), 127-142.
- Alarfaj, N.A., Alabdulmonem, H.A., Al-Onazi, W.A., Al-Mohaimeed, A.M., dan El-Tohamy, M.F., 2023. Biogenic synthesis of ZnO and Al<sub>2</sub>O<sub>3</sub> nanoparticles using *Camellia sinensis* and *Origanum vulgare* L. leaves extract for spectroscopic estimation of ofloxacin and ciprofloxacin in commercial formulations. *PLOS ONE*. 18(10).  
<https://doi.org/10.1371/journal.pone.0286341>.
- Ansari, M.A., Khan, H.M., Khan, A.A., Cameotra, S.S., Saquib, Q., dan Musarrat, J., 2014. Interaction of Al<sub>2</sub>O<sub>3</sub> nanoparticles with *Escherichia coli* and their cell envelope biomolecules. *Journal of Applied Microbiology*. 116(4), 772–783.  
<https://doi.org/10.1111/jam.12423>.
- Ashraf, M.A., Peng, W., Zare, Y., dan Rhee, K.Y., 2018. Effects of Size and Aggregation/Agglomeration of Nanoparticles on the Interfacial/Interphase Properties and Tensile Strength of Polymer Nanocomposites. *Nanoscale Research Letters*. 13(1), 214.  
<https://doi.org/10.1186/s11671-018-2624-0>.
- Awwad, A.M., dan Salem, N.M., 2020. Green Synthesis and Characterization of Silver Nanoparticles by Carob Leaf Extract. *Journal of Materials Science: Materials in Electronics*. 21, 201–206.  
<https://doi.org/10.1007/s10854-009-9898-3>.



/N., dan Kustiawan, P.M., 2021. Identification of Secondary and Antibacterial Activity of Non Polar Fraction from *itama* Propolis. *Journal of Fundamental and Applied Science*. 2(1), 23–33.  
<https://doi.org/10.18196/jfaps.v2i1.12406>.

- Babiker, M.E.M., 2024. Eco-Environmentally Friendly Green Synthesis and Characterization of Aluminum Oxide Nanoparticles Using Leaf Extract of *Mentha pulegium*. International Journal of Chemical and Biochemical Sciences. 25(19).  
<https://doi.org/10.62877/114-IJCBS-24-25-19-114>.
- Baghdadi, A.M., Saddiq, A.A., Aissa, A., Algamal, Y., dan Khalil, N.M., 2022. Structural refinement and antimicrobial activity of aluminum oxide nanoparticles. Journal of the Ceramic Society of Japan. 130(3).  
<https://doi.org/10.2109/jcersj2.21140>.
- Bahloul, A., Mezni, A., Ksiksi, H., dan El Mir, L., 2018. Synthesis and Characterization of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Nanoparticles Using Sol–Gel Method for Photocatalytic Application. Journal of Materials Science: Materials in Electronics. 29, 4710–4720.  
<https://doi.org/10.1007/s10854-017-8365-8>.
- Banerjee, S., Gautam, R.K., Jaiswal, A., Chattopadhyaya, MC., dan Sharma, Y.C., 2015. Rapid scavenging of methylene blue dye from a liquid phase by adsorption on alumina nanoparticles. RSC advances. 5(19), 14425-14440.
- Banerjee, S., Dubey, S., Gautam, R.K., Chattopadhyaya, M.C., dan Sharma, Y.C., 2019. Adsorption characteristics of alumina nanoparticles for the removal of hazardous dye, Orange G from aqueous solutions. Arabian Journal of Chemistry. 12(8), 5339–5354.  
<https://doi.org/10.1016/j.arabjc.2016.12.016>.
- Bargah, R. K., 2015, Preliminary Test of Phytochemical Screening of Crude Ethanolic and Aqueous Extract of *Moringa pterygosperma* Gaertn. Journal of Pharmacognosy and Phytochemistry. 4(1): 7-9.
- Bdewi, S.F., Rashid, S., Alshammary, E., dan Hammad, R., 2023. Characterization of Alumina Nanoparticles Prepared Via Green Synthesis Method. Journal of University of Anbar for Pure Science. 17(2), 184–189.  
<https://doi.org/10.37652/juaps.2023.143632.1143>.
- Bekele, E.A., Korsas, H.A., dan Desalegn, Y.M., 2024. Electrolytic synthesis of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> nanoparticle from aluminum scrap for enhanced methylene blue adsorption: experimental and RSM modeling. Scientific Reports. 14(1).  
<https://doi.org/10.1038/s41598-024-67656-9>.
- Bibi, E., 2023. Synthesis and characterization of Al<sub>2</sub>O<sub>3</sub> nanoparticles from *um ammi*. Agronomy and Agricultural Science. 6(2), 1–5.  
<https://doi.org/10.24966/AAS-8292/100050>.
- dziguri, E.L., Sidorova, E.N., Vasiliev, A.A., Ozherelkov, D.Yu., Gromov, A.A., dan Nalivaiko, A.Yu., 2021. X-ray Fluorescence / Features of Micro-and Nanoscale Copper and Nickel Particle s. Nanomaterials. 11(9).  
<https://doi.org/10.3390/nano11092388>.



- Chugh, D., Viswamalya, V.S., dan Das, B., 2021. Green synthesis of silver nanoparticles with algae and the importance of capping agents in the process. *Journal of Genetic Engineering and Biotechnology*. 19(1), 126. <https://doi.org/10.1186/s43141-021-00228-w>
- Cokrowati, N., Yatin, N., Rahmadani, T.B.C., Rusman, Ahmad, Sukriadi, Pebriata, M.N., 2024. Seaweed Diversity at Batu Lawang Beach, Sengkol Village, Pujut District, Central Lombok Regency. *Jurnal Biologi Tropis*. 24(3), 692-701.
- Dehghanian, H., Farrash, S.M.H., dan Jafari, M., 2024. Effect of moisture absorption on the flexural strength of phenolic matrix composites reinforced with glass fibers and aluminum oxide nanoparticles. *Polymer Composites*. 45, 388–397. <https://doi.org/10.1002/pc.27784>
- Devi, M.G. dan Al Ghanbusi, B.G.B., 2024, Synthesis of aluminium oxide nanoparticles from waste aluminium foils for corrosion inhibition of mild steel pipe. *Indian Journal of Chemical Technology*. 31(2), 233-239.
- Dobrucka, R., dan Długaszewska, J., 2016. Biosynthesis and antibacterial activity of ZnO nanoparticles using *Trifolium pratense* flower extract. *Saudi Journal of Biological Sciences*. 23(4), 517–523. <https://doi.org/10.1016/j.sjbs.2015.05.016>
- El-Amir, A.A.M., Ewais, E.M.M., Abdel-Aziem, A.R., Ahmed, A., dan El-Anadouli, B.E.H., 2016. Nano-alumina powders/ceramics derived from aluminium foil waste at low temperature for various industrial applications. *Journal of Environmental Management*. 183, 121–125. <https://doi.org/10.1016/j.jenvman.2016.08.064>.
- Ferdinal, N., Jannaha, M., dan Afrizal, 2022. Analisis Senyawa Metabolit Sekunder dari Ekstrak Daun Mengkudu (*Morinda citrifolia* L.) serta Uji Aktivitas Antibakteri dan Antijamur. *Jurnal Kimia Unand*. 14(1), 1–10.
- Gautam, S.S., dan Dwivedi, S., 2020. In Vitro Evaluation of Antimicrobial Activity of Fractions of *Delonix Regia* Leaf Extracts. *European Journal of Molecular and Clinical Medicine*. 7(11).
- Gharbi, A.H., Laouini, S.E., Hemmami, H., Bouafia, A., Gherbi, M.T., Ben Amor, I., Hasan, G.G., Abdullah, M.M.S., Trzepieciński, T., dan Abdullah, J.A.A., 2024. Eco-Friendly Synthesis of Al<sub>2</sub>O<sub>3</sub> Nanoparticles: Comprehensive Characterization Properties, Mechanics, and Photocatalytic Dye Adsorption. *Coatings*. 14(7), 848. <https://doi.org/10.3390/coatings14070848>.
- Inezhadi, M., Ghominejad, M. and Tehrani, F.S., 2023. High surface area  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> nanoparticles synthesized by facile and low-temperature method. *Scientific Reports*. 13(1).



- Ghotekar, S., 2019. Plant extract mediated biosynthesis of  $\text{Al}_2\text{O}_3$  nanoparticles- a review on plant parts involved, characterization and applications. *Nanochem Res.* 4(2), 163-169.
- Ghulam, N.A., Abbas, M.N., dan Sachit, D.E., 2020. Preparation of synthetic alumina from aluminium foil waste and investigation of its performance in the removal of RG-19 dye from its aqueous solution. *Indian Chemical Engineer.* 62(3), 301-313.
- Giri, I.M.D.S., Wardani, I.G.A.A.K., dan Suena, N.M.D.S., 2021. Peran Metabolit Sekunder Tumbuhan dalam Pembentukan Kolagen pada Kulit Tikus yang Mengalami Luka Bakar. *Integrasi Obat Tradisional.* 1(1).
- Gudkov, S.V., Burmistrov, D.E., Smirnova, V.V., Semenova, A.A., dan Lisitsyn, A.B., 2022. A Mini Review of Antibacterial Properties of  $\text{Al}_2\text{O}_3$  Nanoparticles. *Nanomaterials.* 12(15).  
<https://doi.org/10.3390/nano12152635>.
- Hafizah, I., Akib, N.I., dan Fajrianto, M., 2015. Uji Aktivitas Antibakteri Ekstrak Metanol Rumput Laut (*Euclima sp*) pada berbagai Tingkat Konsentrasi terhadap Pertumbuhan Bakteri *Escherichia coli* dan *Staphylococcus aureus*. *Medula: Jurnal Ilmiah Fakultas Kedokteran Universitas Halu Oleo.* 1(2).
- Hakuta, Y., Nagai, N., Suzuki, Y.H., Kodaira, T., Bando, K.K., Takashima, H., dan Mizukami, F., 2013. Preparation of  $\alpha$ -alumina nanoparticles with various shapes via hydrothermal phase transformation under supercritical water conditions. *IOP Conference Series: Materials Science and Engineering.* 47(1).
- Hassanpour, P., Panahi, Y., Ebrahimi-Kalan, A., Akbarzadeh, A., Davaran, S., Nasibova, A.N., Khalilov, R., dan Kavetsky, T., 2018. Biomedical applications of aluminium oxide nanoparticles. *Micro & Nano Letters.* 9(13), 1227-1231.
- Hassen, Y.E., Gedda, G., Assen, A.H., Kabtamu, D.M., dan Girma, W.M., 2023. Dodonaea angustifolia Extract-Assisted Green Synthesis of the  $\text{Cu}_2\text{O}/\text{Al}_2\text{O}_3$  Nanocomposite for Adsorption of Cd(II) from Water. *ACS Omega.* 8(19), 17209–17219.  
<https://doi.org/10.1021/acsomega.3c01609>.
- Hidayati, J., Karlina, I., Ningsih, D., Wijaya, A., dan Bahry, M., 2023. Bioactive and Antioxidant Activity of Tropical Red Algae *Gracilaria sp.* Island, Indonesia. *IOP Conference Series: Earth and al Science.* 1148(1).  
<https://doi.org/10.1088/1755-1315/1148/1/012004>.
- ..., P., Win, W., Sumittra, C., Suparoek, H., dan Toochinda, P.,  
ation of High Surface Area and Pore Volume  $\gamma$ - $\text{Al}_2\text{O}_3$  and Ce-



Doped Al<sub>2</sub>O<sub>3</sub> for Catalyst Support. The Pure and Applied Chemistry International Conference 2020. 3, 145–150.

Ikhioya, I.L. dan Nkele, A.C., 2024. Green synthesis and characterization of aluminum oxide nanoparticle using neem leaf extract (*Azadirachta indica*), Hybrid Advances. 5.

Insani, A.N., Hafiludin, Chandra, A.B., 2022. Pemanfaatan Ekstrak *Gracilaria* Sp. dari Perairan Pamekasan Sebagai Antioksidan. Juvenil. 1(3), 16-25.

Istiqomah, D.I., Kirom, M.R., dan Syarif, D.G., 2016. Sintesis Al<sub>2</sub>O<sub>3</sub> Nanopartikel dari Bahan Biji Bauksit untuk Aplikasi Pada Model Radiator. e-Proceeding of Engineering. 2(3), 2108-2155.

Jemal, K., Sandeep, B.V., dan Pola, S., 2017. Synthesis, characterization, and evaluation of the antibacterial activity of *Allophylus serratus* leaf and leaf derived callus extracts mediated silver nanoparticles. Journal of Nanomaterials.  
<https://doi.org/10.1155/2017/4213275>

Jo, J.M., Park, J.Y., Kim, D., Koh, S.W., dan Kang, Y.C., 2010. Synthesis and characterization of aluminum oxide submicro-rings. Bulletin of the Korean Chemical Society. 31(6), 1776–1778.  
<https://doi.org/10.5012/bkcs.2010.31.6.1776>

Judenta, K.M., Ratnawulan, R., dan Syarif, G, 2017, Synthesis and Characterization of Al<sub>2</sub>O<sub>3</sub> Nanoparticles using Sol Gel Method by Chelating Extracts of Starfruit (*Averrhoa bilimbi*) for Nanofluid Applications, PILLAR OF PHYSICS. 10(1).

Kapekci, R.A., Ilce, B.Y., dan Kanmazalp, S.D., 2021. Studies in Natural Products Chemistry. Elsevier, Amsterdam.

Karthikeyan, N., Karthik, R., Chen, S.-M., dan Karupiah, C., 2019. Facile Synthesis of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Nanoparticles by Precipitation Method and Their Application Towards Enhanced Electrochemical Sensing of Toxic Nitrite Ions. Journal of Alloys and Compounds. 770, 247–256.

Kingslin, A., Ammasaikutty, V., Devaraj, S.S., dan Kandasamy, K., 2023. Algae Mediated Green Fabrication of Silver Nanoparticles *Sargassum prismaticum*. Fascicula Biologie. 1, 28–38.

Koopi, H. dan Buazar, F., 2018. A novel one-pot biosynthesis of pure alpha iron oxide nanoparticles using the macroalgae *Sargassum ilicifolium*: the approach. Ceramics International. 44(8), 8940-8945.

Kawali, F., dan Jayanto, I. 2019. Uji aktivitas antibakteri ekstrak lengkuas putih (*Alpinia galanga* (L.) Willd) terhadap *Pseudomonas aeruginosa*. Pharmacon. 8(4), 781-790.



- Latarissa, I. R. 2017. Review Artikel: Aplikasi Teknologi Nanopartikel pada Sediaan Kosmetik. *Farmaka*. 4, 115.
- Li, J., Wang, X., Wang, L., Hao, Y., Huang, Y., Zhang, Y., Sun, X., dan Liu, X., 2006. Preparation of alumina membrane from aluminium chloride. *Journal of Membrane Science*. 275(1–2), 6–11.  
<https://doi.org/10.1016/j.memsci.2005.08.011>.
- Mahdi, W.K., Flayyih, A.O., dan Musa, F.H., 2024. Green Synthesis, Characterization, and Applications of Aluminum Oxide Nanoparticles Using Aqueous Extract of *Clove*. *Jurnal Kimia Valensi*. 10(2), 277–289.  
<https://doi.org/10.15408/jkv.v10i2.40403>.
- Mahinroosta, M., dan Allahverdi, A., 2018. Production of nanostructured  $\gamma$ -alumina from aluminum foundry tailing for catalytic applications. *International Nano Letters*. 8(4), 255–261.  
<https://doi.org/10.1007/s40089-018-0247-1>.
- Manogar, P., Morvinyabesh, J.E., Ramesh, P., Jeyaleela, G.D., Amalan, V., Ajarem, J.S., Amalan, V., Ajarem, J.S., Allam, A.A., Khim, J.S., dan Vijayakumar, N., 2022. Biosynthesis and antimicrobial activity of aluminium oxide nanoparticles using *Lyngbya majuscula* extract. *Materials Letters*. 311.
- Manyasree, D., Kiranmayi, P., dan Kumar, R.R.V.S.S.N., 2018. Synthesis, Characterization and Antibacterial Activity of Aluminium Oxide Nanoparticles. *International Journal of Pharmacy and Pharmaceutical Sciences*. 1(10), 32-35.  
<http://dx.doi.org/10.22159/ijpps.2018v10i1.20636>
- Marlina, Yanto, Triyatna, F., Lestari, E., Sarmini, E., Mujamilah, Awaludin, R., Yulizar, Y., 2023. Green synthesis of alumina nanoparticle using *Hibiscus rosa-sinensis* leaf extract as a candidate for molybdenum-99 adsorbent. *Applied Radiation and Isotopes*. 193.
- Marslin, G., Siram, K., Maqbool, Q., Selvakesavan, R.K., Kruszka, D., Kachlicki, P., dan Franklin, G., 2018. Secondary Metabolites in the Green Synthesis of Metallic Nanoparticles. *Materials*. 11(6).  
<https://doi.org/10.3390/ma11060940>.
- Martín M.I., Gómez, L.S., Milosevic, O., dan Rabanal, M.E., 2010. Nanostructured alumina particles synthesized by the Spray Pyrolysis method: microstructural and morphological analyses. *Ceramics International*. 36(2), 767-772.



Bitew, L.T., 2021. Green synthesis of silver nanoparticles using *Yssoinica* (Bruce) J.F. Gmel plant leaf extract and their anti-oxidant activities. *Heliyon*. 7(11).  
[j/10.1016/j.heliyon.2021.e08459](https://doi.org/10.1016/j.heliyon.2021.e08459)

- Moroda, M.D., Deressa, T.L., Tiwikrama, A.H., dan Chala, T.F., 2025. Green synthesis of copper oxide nanoparticles using *Rosmarinus officinalis* leaf extract and evaluation of its antimicrobial activity. *Next Materials*. 7. <https://doi.org/10.1016/j.nxmte.2024.100337>
- Morozova, L.V., Khamova, T.V., dan Polyakova, I.G., 2020. Effect of Precursors on the Preparation and Texture of Mesoporous  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> Powders. *Inorganic Materials*. 56(4), 353–359. <https://doi.org/10.1134/S0020168520030139>.
- Mui, J., Ngo, J., dan Kim, B., 2016. Aggregation and Colloidal Stability of Commercially Available Al<sub>2</sub>O<sub>3</sub> Nanoparticles in Aqueous Environments. *Nanomaterials*. 90(6), 1-15.
- Murata, T., Yamaguchi, K., dan Yanagishita, T., 2024. Antimicrobial Activity of Anodic Porous Alumina with Controlled Surface Structures. *Langmuir*. 40(32), 17118–17123. <https://doi.org/10.1021/acs.langmuir.4c02202>.
- Murphy, A., Galon, R., Jaiswal, A.K., dan Jaiswal, S., 2020. An investigation on effect of capping agent on silver nanoparticles antibacterial activity. *Journal of Food Chemistry & Nanotechnology*. 6(4), 189–196. <https://doi.org/10.17756/jfcn.2020-0101>.
- Mushore, J., dan Matuvhunye, M., 2013. Antibacterial properties of *Mangifera indica* on *Staphylococcus aureus*. *African Journal of Clinical and Experimental Microbiology*. 14(2), 62–74. <https://doi.org/10.4314/ajcem.v14i2.4>.
- Nadaroglu, H., Güngör, A.A., dan Ince, S., 2017. Synthesis of nanoparticles by green synthesis method. *International Journal of Innovative Research and Reviews*. 1(1), 6-9.
- Nduni, M.N., Osanom A.M., dan Chaka, B., 2021. Synthesis and characterization of aluminium oxide nanoparticles from waste aluminium foil and potential application in aluminium-ion cell. *Cleaner Engineering and Technology*. 3.
- Otelo, V.A., Sant'Ana, A.C., D.L.A. de Faria., dan C.M. S. Menezes., 2011. Molecular modelling and UV-Vis spectroscopic studies on the mechanism of action of reversed choloquine (RCQ). *Bioorganic & Medicinal Chemistry Letters*. 21, 250-254.
- Prasanth, P.A., Praveendra, R.S., Hari Krishna, R., Ananda, S., Bhagya, N.P., Na, B.M., Lingaraju, K., dan Raja Naika, H., 2015. Synthesis, zions, antibacterial and photoluminescence studies of solution lderived  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> nanoparticles. *Journal of Asian Ceramic* 3), 345-351.
- gheri-Mohagheghi, M.M., 2013. Comparison of Urea and Citric
- king Agents and Annealing Temperature Effect on the Structural



Properties of  $\gamma$ - and  $\alpha$ -Alumina Nanoparticles Synthesized by Sol-Gel Method. *Advances in Materials Science and Engineering*. 1.

- Rodríguez, M., Sifontes, Á.B., Méndez, F.J., Díaz, Y., Cañizales, E., dan Brito, J.L., 2013. Template synthesis and characterization of mesoporous  $\gamma$ - $\text{Al}_2\text{O}_3$  hollow nanorods using *Stevia rebaudiana* leaf aqueous extract. *Ceramics International*. 39(4), 4499–4506.  
<https://doi.org/10.1016/j.ceramint.2012.11.044>.
- Saepudin, S., 2024. Skrining Fitokimia dari Tiga Tanaman Famili *Asteraceae* dengan Berbagai Pereaksi Kimia. *Parapemikir: Jurnal Ilmiah Farmasi*. 13(3), 333–347.  
<https://doi.org/10.30591/pjif.v13i3.7069>.
- Saleh, A.K., Shaban, A.S., Diab, M.A., Debarnot, D., dan Elzaref, A.S., 2023. Green synthesis and characterization of aluminum oxide nanoparticles using *Phoenix dactylifera* seed extract along with antimicrobial activity, phytotoxicity, and cytological effects on *Vicia faba* seeds. *Biomass Conversion and Biorefinery*. 14(24), 31859-31875.
- Sangor, F.I.M.S. dan Al-Ghouti, M.A., 2023, Waste-to-value: Synthesis of nano-aluminum oxide (nano- $\gamma$ - $\text{Al}_2\text{O}_3$ ) from waste aluminum foils for efficient adsorption of methylene blue dye, *Case Studies in Chemical and Environmental Engineering*. 8.
- Saputra, I.S., Saputro, A.H., Adliani, N., Rahmi, D., Sudirman, S., dan Nopiandi, Y., 2021. Eco-friendly synthesis of gold nanoparticles through *Gracilaria* sp seaweed extract for foam height stability in liquid hand soap formulations. *J. Pure App. Chem. Res.* 10(3), 193-202.
- Sari, R.N., Nurhasni, Y.M., dan Yaqin, M.A., 2017. Sintesis nanopartikel ZnO ekstrak *Sargassum* sp. dan karakteristik produknya. *Jurnal Pengolahan Hasil Perikanan Indonesia*. 20(2), 238-254.
- Senge, Y.S., Mustafa, I., dan Safitri, A., 2024. Phytochemical Screening and Antibacterial Activity of Ethanolic Extracts from *Delonix regia* Against Laboratory Strains of Diarrheal Bacteria. *JKPK (Jurnal Kimia dan Pendidikan Kimia)*. 9(1), 50.  
<https://doi.org/10.20961/jkpk.v9i1.85375>.
- Shakeel, A., Noor, J.J., Jan, U., Gul, A., Handoo, Z., dan Ashraf, N., 2025. Saponins, the Unexplored Secondary Metabolites in Plant Defense: Opportunities in Pest Management. *Plants*. 14(6), 861.  
<https://doi.org/10.3390/plants14060861>.
- N., Nidhi, dan Neelam, 2019. Optical properties of aluminium particles synthesized by leaf extract of *Ocimum sanctum*. *Journal of Science and Technology*. 5(4), 817–819.  
<https://doi.org/10.30799/jnst.273.19050419>.



- Siddiqui, T., Zia, M.K., Muaz, M., Ahsan, H., dan Khan F.H., 2023. Synthesis and Characterization Of Silver Nanoparticles (AgNPs) Using Chemico-Physical Methods. *Indonesian Journal of Chemical Analysis*, 6(2), 124-132.
- Sitanggang, K.W., Suarya, P., Simpen, I.N., dan Putra, I.M.W.A., 2017. Pengaruh pH dan Konsentrasi Terhadap Enkapsulasi Metformin HCl pada Monmorillonit Teraktivasi Asam Sitrat. *Jurnal Media Sains*, 1(2), 37-44.
- Soamole, H.H., Sanger, G., Harikedua, S.D., Dotulong, V., Mewengkang, H., dan Montolalu, R., 2018. Kandungan fitokimia ekstrak etanol rumput laut segar (*Turbinaria* sp., *Gracilaria* sp., dan *Halimeda macroloba*). *Jurnal Media Teknologi Hasil Perikanan*. 6(3), 94-98.
- Sumari, S., Prakasa, Y.F., Asrori, M.R., dan Baharintasari, D.R., 2020. Analisis Kandungan Mineral Pasir Pantai Bajul Mati Kabupaten Malang Menggunakan XRF dan XRD. *Fullerene Journal of Chemistry*. 5(2), 58. <https://doi.org/10.37033/fjc.v5i2.154>.
- Susanto, N.S., Prasetyaningsih, A., dan Madyaningrana, K., 2021. Potency of Local *Gracilaria* sp. Extract as an Antibacterial against Skin Disease Pathogen. *Scholars Academic Journal of Biosciences*. 9(8), 215–222. <https://doi.org/10.36347/sajb.2021.v09i08.006>.
- Sutapa, I.W., 2017. Peran Senyawa Metabolit Sekunder Tanaman pada Bioaktivitas Rumput Laut. *Jurnal Kelautan dan Perikanan Terapan*. 1(1), 36–47. <https://doi.org/10.15578/jkpt.v1i1.6500>.
- Swamy, M.K., Sudipta, K.M., Jayanta, K.M., Balasubramanya, S., dan Anuradha, M., 2015. The Green Synthesis, Characterization, and Evaluation of the Biological Activities of Silver Nanoparticles Synthesized from *Leptadenia reticulata* Leaf Extract. *Applied Nanoscience*. 5(1), 73–81. <https://doi.org/10.1007/s13204-014-0293-6>.
- Syahputra, R.A., Wulandari, P., dan Purwanti, A., 2017. Skrining Fitokimia dan Aktivitas Antibakteri Ekstrak Etanol Daun Sirsak (*Annona muricata* L.) terhadap Bakteri *Staphylococcus aureus*. *Jurnal Kimia Riset*. 2(2), 142. <https://doi.org/10.20473/jkr.v2i2.6535>.
- Talari, A.C.S., Martinez, M.A.G., Movasaghi, Z., Rehman, S., Rehman, I., 2017. Advances in Fourier Transform Infrared (FTIR) Spectroscopy of Biological Tissues. *Applied Spectroscopy Reviews*. 52(5), 456–506. <https://doi.org/10.1080/05704928.2016.1230863>.



ningtyas, G., dan Wehantouw, F., 2022. Uji Aktivitas Antibakteri etanol Daun *Solanum torvum* terhadap Pertumbuhan *Staphylococcus aureus*. *Pharmacon*. 11(2), 429–436. <https://doi.org/10.35799/pha.11.2022.40666>.

astri, W.O., dan Ridwan, B.A., 2025. Skrining fitokimia dan uji antibakteri fraksi n-heksan, etil asetat dan air pada daun keji beling

(*Strobilanthes crisper*) terhadap bakteri *Staphylococcus epidermidis* dan *Pseudomonas aeruginosa*. Jurnal Pharmacia Mandala Waluya. 4(2), 82–93. <https://doi.org/10.54883/jpmw.v4i2.232>

Yuliana, R., Jonuarti, R., Jhora, F.U., dan Hidayat, R., 2024. Pengaruh ukuran partikel ZnO terhadap struktur dan sifat elektronik nanokomposit ZnO/graphene oxide sebagai kandidat katalis solar cell. Jurnal Fisika dan Pembelajarannya (PHYDAGOGIC). 7(1), 2024–2654. <http://ojs.unsulbar.ac.id/index.php/phy>

Ziva, A.Z., Suryana, Y.K., Kurniadianti, Y.S., Ragadhita, R., Nandiyanto, A.B.D., dan Kurniawan, T., 2021. Recent Progress on the Production of Aluminum Oxide ( $\text{Al}_2\text{O}_3$ ) Nanoparticles: A Review, Mechanical Engineering for Society and Industry. 2(1), 54-77.

