

DAFTAR PUSTAKA

- Abbas, M., Harrache, Z., & Trari, M. (2020). Mass-transfer processes in the adsorption of crystal violet by activated carbon derived from pomegranate peels: Kinetics and thermodynamic studies. *Journal of Engineered Fibers and Fabrics*, 15, 1–11. <https://doi.org/10.1177/1558925020919847>
- Abdullah, A., & Mohammed, A. (2019). Scanning Electron Microscopy (SEM): A Review. *Proceedings of 2018 International Conference on Hydraulics and Pneumatics - HERVEX*, 77–85.
- Ahmad, A. R. D., Imam, S. S., & Hamza, M. F. (2025). Recent advances on the mitigation of crystal violet dye from aqueous media via adsorption. *Next Research*, 2(4), 100777. <https://doi.org/10.1016/j.nexres.2025.100777>
- Ahmad, R., & Ejaz, M. O. (2023). Efficient adsorption of crystal violet (CV) dye onto benign chitosan-modified L-cysteine/bentonite (CS-Cys/Bent) bionanocomposite: Synthesis, characterization and experimental studies. *Dyes and Pigments*, 216(March). <https://doi.org/10.1016/j.dyepig.2023.111305>
- Ahmad, T., & Danish, M. (2022). A review of avocado waste-derived adsorbents: Characterizations, adsorption characteristics, and surface mechanism. *Chemosphere*, 296, 134036. <https://doi.org/10.1016/j.chemosphere.2022.134036>
- Aiyesanmi, A. F., Adebayo, M. A., & Arowojobe, Y. (2020). Biosorption of Lead and Cadmium from Aqueous Solution in Single and Binary Systems Using Avocado Pear Exocarp: Effects of Competing Ions. *Analytical Letters*, 53(18), 2868–2885. <https://doi.org/10.1080/00032719.2020.1760294>
- AL-Shehri, H. S., Almudaifer, E., Alorabi, A. Q., Alanazi, H. S., Alkorbi, A. S., & Alharthi, F. A. (2021). Effective adsorption of crystal violet from aqueous solutions with effective adsorbent: equilibrium, mechanism studies and modeling analysis. *Environmental Pollutants and Bioavailability*, 33(1), 214–226. <https://doi.org/10.1080/26395940.2021.1960199>
- Aljeddani, G. S., Alghanmi, R. M., & Hamouda, R. A. (2023). Study on the Isotherms, Kinetics, and Thermodynamics of Adsorption of Crystal Violet Dye Using Ag-NPs-Loaded Cellulose Derived from Peanut-Husk Agro-Waste. *Polymers*, 15(22), 1–21. <https://doi.org/10.3390/polym15224394>
- Anuse, D. D., Patil, S. A., Chorumale, A. A., Kolekar, A. G., Bote, P. P., Walekar, L. S., & Pawar, S. P. (2025). Activated carbon from pencil peel waste for effective removal of cationic crystal violet dye from aqueous solutions. *Results in Chemistry*, 13, 1–10. <https://doi.org/10.1016/j.rechem.2024.101949>
- Azmi, N., Lock, S. S. M., Berghuis, N. T., Sarwono, A., Zahra, N. L., Rahman, A., Waqas, S., & Farooqi, A. S. (2024). Influence of synthesis approach and formulation on the physicochemical properties of chitin and chitosan from Black Soldier Fly. *Results in Engineering*, 23, 102401. <https://doi.org/10.1016/j.rineng.2024.102401>
- Banerjee, P., & Chakraborty, T. (2018). *International Reviews in Physical Chemistry Weak hydrogen bonds : insights from vibrational spectroscopic studies*. <https://doi.org/10.1080/0144235X.2018.1419731>
- Bazzo, A., Adebayo, M. A., Dias, S. L. P., Lima, E. C., Vaghetti, J. C. P., de Oliveira, E. R., Leite, A. J. B., & Pavan, F. A. (2016). Avocado seed powder:

- characterization and its application for crystal violet dye removal from aqueous solutions. *Desalination and Water Treatment*, 57(34), 15873–15888. <https://doi.org/10.1080/19443994.2015.1074621>
- Bergh, B., & Ellstrand, N. (1986). Taxonomy of the Avocado. *California Avocado Society Yearbook*, 70(January 1986), 135–146.
- Berthomieu, C., & Hienerwadel, R. (2009). Fourier transform infrared (FTIR) spectroscopy. *Photosynthesis Research*, 101(2–3), 157–170. <https://doi.org/10.1007/s11120-009-9439-x>
- Bezzer, M. A., Santelli, R. E., Oliveiraa, E. P., Villara, L. S., & Escaleiraa, L. A. (2008). Response surface methodology (RSM) as a tool for optimization in analytical chemistry. 76, 965–977. <https://doi.org/10.1016/j.talanta.2008.05.019>
- Bhatlu, M. L. D., Athira, P. S., Jayan, N., Barik, D., & Dennison, M. S. (2023). Preparation of Breadfruit Leaf Biochar for the Application of Congo Red Dye Removal from Aqueous Solution and Optimization of Factors by RSM-BBD. 2023.
- Bhaumik, M., Choi, H. J., Seopela, M. P., Mccrindle, R. I., & Maity, A. (2014). Highly Effective Removal of Toxic Cr(VI) from Wastewater Using Sulfuric Acid-Modified Avocado Seed. *Industrial & Engineering Chemistry Research*, 53(Vi), 1214–1224. <https://doi.org/10.1021/ie402627d>
- Cheruiyot, G. K., Wanyonyi, W. C., Kiplimo, J. J., & Maina, E. N. (2019). Adsorption of toxic crystal violet dye using coffee husks: Equilibrium, kinetics and thermodynamics study. *Scientific African*, 5, 1–11. <https://doi.org/10.1016/j.sciaf.2019.e00116>
- Chieng, C. W. S., Zaidi, N. A. H. M., Priyantha, N., Lu, Y., & Lim, L. B. L. (2021). Adsorption characteristics of sauropus androgynus and its base modified form toward cationic crystal violet dye. *Desalination and Water Treatment*, 210, 446–460. <https://doi.org/10.5004/dwt.2021.26576>
- Choirul, M., Nurhadi, M., Kusumawardani, R., Anisa, S., Yulian, S. A., Rahma, S. A., Akbar, M., Umar, A. H., Guo, Y., & Lai, S. Y. (2024). Carbon-derived Black Soldier Fly (BSF) Larvae for Adsorption of Methylene Blue Dye: Characterization, Kinetic and Thermodynamic Studies. *Malaysian Journal of Fundamental and Applied Sciences*, 20(1), 191–202. <https://doi.org/10.11113/mjfas.v20n1.3230>
- Dani Nandiyanto, A. B., Al Husaeni, D. N., Ragadhita, R., Fiandini, M., Al Husaeni, D. F., & Maryanti, R. (2023). Analysis of Adsorption Isotherm Characteristics For Removing Curcumin Dyes From Aqueous Solutions Using Avocado Seed Waste Carbon Microparticles Accompanied By Computational Calculations. *Journal of Engineering Science and Technology*, 18(1), 706–720.
- Dbik, A., & Khomri, M. El. (2022). Optimization of Methylene Blue Adsorption on Agricultural Solid Waste Using Box – Behnken Design (BBD) Combined with Response Surface Methodology (RSM) Modeling. 12(4), 4567–4583.
- Diana, Y., Carlos, M., & Edith, C. (2018). Effect of Maturity State of Avocado (Persea Americana Mill. cv. Hass) on Seed Characteristics. *Advance Journal of Food Science and Technology*, 16, 301–306. <https://doi.org/10.19026/ajfst.16.5971>
- Dos Anjos, M. J., Lopes, R. T., De Jesus, E. F. O., Assis, J. T., Cesareo, R., &

- Barradas, C. A. A. (2000). Quantitative analysis of metals in soil using X-ray fluorescence. *Spectrochimica Acta, Part B: Atomic Spectroscopy*, 55(7), 1189–1194. [https://doi.org/10.1016/S0584-8547\(00\)00165-8](https://doi.org/10.1016/S0584-8547(00)00165-8)
- El-Idreesy, T. T., Khoshala, O., Firouzi, A., & Elazab, H. A. (2021). Equilibrium and kinetic study on the biosorption of trypan blue from aqueous solutions using avocado seed powder. *Biointerface Research in Applied Chemistry*, 11(3), 11042–11053. <https://doi.org/10.33263/BRIAC113.1104211053>
- El-Shafie, A. S., Karamshahi, F., & El-Azazy, M. (2023). Turning waste avocado stones and montmorillonite into magnetite-supported nanocomposites for the depollution of methylene blue: adsorbent reusability and performance optimization. *Environmental Science and Pollution Research International*, 30(56), 118764–118781. <https://doi.org/10.1007/s11356-023-30538-0>
- Elouali, S., Ait Hamdan, Y., Belmajdoub, M., & Rhazi, M. (2024). Green chitosan extraction from *Hermetia illucens* breeding waste (prepupal cases): Characterization and bioadsorption activity. *International Journal of Biological Macromolecules*, 281, 136449. <https://doi.org/10.1016/j.ijbiomac.2024.136449>
- Enache, A. C., Samoila, P., Cojocaru, C., Apolzan, R., Predeanu, G., & Harabagiu, V. (2023). An Eco-Friendly Modification of a Walnut Shell Biosorbent for Increased Efficiency in Wastewater Treatment. *Sustainability (Switzerland)*, 15(3). <https://doi.org/10.3390/su15032704>
- Essoufy, M., El Ouahabi, I., Benkaddour, S., Najy, K., Bouden, S., Hiyane, H., Riadi, Y., Alossaimi, M. A., Lazar, S., Slimani, R., & El Hajjaji, S. (2024). Removal of basic yellow 28 and tartrazine dyes from water pollution using treated avocado seed: mechanisms, equilibrium, kinetics, and thermodynamics. *Green Chemistry Letters and Reviews*, 17(1). <https://doi.org/10.1080/17518253.2024.2357215>
- Fatima, S. S., Borhanz, A., Ayoub, M., & Ghani, N. A. (2023). *Modeling of CO2 Adsorption on Surface-Functionalized Rubber-Seed Shell Activated Carbon: Isotherm and Kinetic Analysis*.
- Gong, X. L., Lu, H. Q., Li, K., & Li, W. (2022). Effective adsorption of crystal violet dye on sugarcane bagasse–bentonite/sodium alginate composite aerogel: Characterisation, experiments, and advanced modelling. *Separation and Purification Technology*, 286(October 2021). <https://doi.org/10.1016/j.seppur.2022.120478>
- Gonzales-condori, E. G., Sc, D., Avalos-lópez, G., Gonzales-condori, J., Alvarez-gonzales, R., Tecnológica, U., Tacna, A., Gonzales-condori, E. G., Sc, D., Avalos-lópez, G., & Gonzales-condori, J. (2023). *Removal of a dye used in the textile industry using avocado seed Hass variety as a bio-adsorbent Remoción de un colorante de uso en la industria textil utilizando pepa de palta variedad Hass como bio- adsorbente*. c, 1–8.
- Haki, M. A., Imgharn, A., Aarab, N., Hsini, A., Essekri, A., Laab, M., El Jazouli, H., Elamine, M., Lakhmiri, R., & Albourine, A. (2022). Efficient removal of crystal violet dye from aqueous solutions using sodium hydroxidemodified avocado shells: Kinetics and isotherms modeling. *Water Science and Technology*, 85(1), 433–448. <https://doi.org/10.2166/wst.2021.451>
- Handayani, C., Ramadhani, P., Emriadi, E., Refilda, R., & Zein, R. (2026). Maggot-modified avocado peel as an innovative adsorbent for crystal violet dye

- wastewater treatment. *Journal of King Saud University - Science*, 38(4), 16982025. https://doi.org/10.25259/JKSUS_1698_2025
- Haq, H. A., Javed, T., Abid, M. A., Zafar, S., & Din, M. I. (2021). Adsorption of crystal violet dye from synthetic textile effluents by utilizing wheat bran (*Triticum aestivum*). *Desalination and Water Treatment*, 224, 395–406. <https://doi.org/10.5004/dwt.2021.27178>
- Hevira, L., Rahmi, A., Zein, R., Zilfa, Z., & Rahmayeni, R. (2020). The fast and of low-cost-adsorbent to the removal of cationic and anionic dye using chicken eggshell with its membrane. *Mediterranean Journal of Chemistry*, 10(3), 294–301. <https://doi.org/10.13171/mjc02003261271lh>
- Hevira, L., Zilfa, Rahmayeni, Ighalo, J. O., & Zein, R. (2020). Biosorption of indigo carmine from aqueous solution by *Terminalia Catappa* shell. *Journal of Environmental Chemical Engineering*, 8(5), 104290. <https://doi.org/10.1016/j.jece.2020.104290>
- Hidayah, E. N., Mohammad Alghaf Dienullah, R., Maulidifa, N. A., & Setiawan, W. (2025). Kinetic adsorption of Fe metal in aqueous solution using maggot shell. *Proceedings of the University of Electronic Science and Technology of China-International Conference on Science and Technology 2024*, 1454(1), 012032. <https://doi.org/10.1088/1755-1315/1454/1/012032>
- Homagai, P. L., Poudel, R., Poudel, S., & Bhattarai, A. (2022). Adsorption and removal of crystal violet dye from aqueous solution by modified rice husk. *Heliyon*, 8(4). <https://doi.org/10.1016/j.heliyon.2022.e09261>
- Kadhim, N. J., Mousa, S. A., Farhan, A. M., & Muhammed, E. A. (2020). A comparative study of the adsorption of crystal violet dye from aqueous solution on rice husk and charcoal. *Baghdad Science Journal*, 17(1), 295–304. [https://doi.org/10.21123/BSJ.2020.17.1\(SUPPL.\).0295](https://doi.org/10.21123/BSJ.2020.17.1(SUPPL.).0295)
- Kaur, S., Rani, S., & Mahajan, R. K. (2013). Adsorption of dye crystal violet onto surface-modified *Eichhornia crassipes*. 53, 19443994. <https://doi.org/10.1080/19443994.2013.859104>
- Khasawneh, O. F. S., Palaniandy, P., Palaniandy, P., Ahmadipour, M., Mohammadi, H., & Bin Hamdan, M. R. (2021). Removal of acetaminophen using Fe₂O₃-TiO₂nanocomposites by photocatalysis under simulated solar irradiation: Optimization study. *Journal of Environmental Chemical Engineering*, 9(1). <https://doi.org/10.1016/j.jece.2020.104921>
- Khosa, M. A., & Ullah, A. (2018). Mechanistic insight into protein supported biosorption complemented by kinetic and thermodynamics perspectives. *Advances in Colloid and Interface Science*, 2–14. <https://doi.org/10.1016/j.cis.2018.09.004>
- Kumar, A., Singh, R., Kumar Upadhyay Sanjay Kumar, S., & Charaya, M. U. (2021). Biosorption: the Removal of Toxic Dyes From Industrial Effluent Using Phytobiomass- a Review. *Plant Archives*, 21(Suppliment-1), 1320–1325. <https://doi.org/10.51470/plantarchives.2021.v21.s1.207>
- Kurniawan, K., & Rahmat, A. (2023). Determination of antioxidant activity, total phenolic, and total flavonoid contents from avocado seeds (*Persea americana*). *IOP Conference Series: Earth and Environmental Science*, 1201(1). <https://doi.org/10.1088/1755-1315/1201/1/012098>
- Lafi, R., ben Fradj, A., Hafiane, A., & Hameed, B. H. (2014). Coffee waste as potential adsorbent for the removal of basic dyes from aqueous solution.

- Korean Journal of Chemical Engineering*, 31(12), 2198–2206.
<https://doi.org/10.1007/s11814-014-0171-7>
- Laskar, N., & Kumar, U. (2017). Adsorption of Crystal Violet from Wastewater by Modified Bambusa Tulda. *Journal of Civil Engineering*, 22(8), 2755–2763.
<https://doi.org/10.1007/s12205-017-0473-5>
- Lim, L. B. L., Priyantha, N., Kamaludin, I. F., Mohamad Zaidi, N. A. H., & Samaraweera, A. P. G. M. V. (2021). Adsorption of crystal violet dye with cellulose derived from bitter gourd waste. *Desalination and Water Treatment*, 217, 431–441. <https://doi.org/10.5004/dwt.2021.26917>
- Listya, P., & Himmatul, K. (2022). *Black Soldier Fly (Hermetia illucens) as a Potential Agent of Organic Waste Bioconversion*. 39(2).
<https://doi.org/10.29037/ajstd.780>
- Liu, H., Zhang, J., Lu, M., Liang, L., Zhang, H., & Wei, J. (2020). Biosynthesis based membrane filtration coupled with iron nanoparticles reduction process in removal of dyes. *Chemical Engineering Journal*, 387(November 2019).
<https://doi.org/10.1016/j.cej.2020.124202>
- Liu, X., Chen, X., Wang, H., Yang, Q., Ur Rehman, K., Li, W., Cai, M., Li, Q., Mazza, L., Zhang, J., Yu, Z., & Zheng, L. (2017). Dynamic changes of nutrient composition throughout the entire life cycle of black soldier fly. *PLoS ONE*, 12(8), 1–21. <https://doi.org/10.1371/journal.pone.0182601>
- Loulidi, I., Boukhlifi, F., Ouchabi, M., Amar, A., Jabri, M., Kali, A., Chraïbi, S., Hadey, C., & Aziz, F. (2020). Adsorption of Crystal Violet onto an Agricultural Waste Residue: Kinetics, Isotherm, Thermodynamics, and Mechanism of Adsorption. *Scientific World Journal*, 2020.
<https://doi.org/10.1155/2020/5873521>
- Mabalane, K., Thabede, P. M., & Shooto, N. D. (2024). Removal of ibuprofen and paracetamol from water using a blend activated carbon from paper waste and avocado seeds. *Green Analytical Chemistry*, 10(August), 100135.
<https://doi.org/10.1016/j.greeac.2024.100135>
- Mahmoud, M. E., El-Said, G. F., Elnashar, A. A. S., & Ibrahim, G. A. A. (2024). Adsorptive capture of fluoride ion from water by Co/Fe-LDH@Avocado kernel seeds biochar@Carboxymethylcellulose nanobiosorbent: Optimization, error function and multivariate analysis. *Journal of Industrial and Engineering Chemistry*, 133(November 2023), 561–576.
<https://doi.org/10.1016/j.jiec.2023.12.034>
- Mahmoud, M. E., El-Said, G. F., Ibrahim, G. A. A., & Elnashar, A. A. S. (2022). Effective removal of hexavalent chromium from water by sustainable nano-scaled waste avocado seeds: adsorption isotherm, thermodynamics, kinetics, and error function. *Biomass Conversion and Biorefinery*, 0123456789.
<https://doi.org/10.1007/s13399-022-03619-2>
- Mcyotto, F., Wei, Q., Macharia, D. K., Huang, M., Shen, C., & Chow, C. W. K. (2021). Effect of dye structure on color removal efficiency by coagulation. *Chemical Engineering Journal*, 405(August 2020).
<https://doi.org/10.1016/j.cej.2020.126674>
- Mittal, A., Mittal, J., Malviya, A., Kaur, D., & Gupta, V. K. (2010). Adsorption of hazardous dye crystal violet from wastewater by waste materials. *Journal of Colloid and Interface Science*, 343(2), 463–473.
<https://doi.org/10.1016/j.jcis.2009.11.060>

- Miyah, Y., Lahrichi, A., Idrissi, M., Boujraf, S., Taouda, H., & Zerrouq, F. (2017). Assessment of adsorption kinetics for removal potential of Crystal Violet dye from aqueous solutions using Moroccan pyrophyllite. *Journal of the Association of Arab Universities for Basic and Applied Sciences*, 23, 20–28. <https://doi.org/10.1016/j.jaubas.2016.06.001>
- Mohammed, A. M. E., Kotb, A., Sanad, M. M. S., Abdel-Hakim, M., & Ahmed, A. S. A. (2024). Enhanced adsorption of carbon sphere by doping with titania nanotubes for crystal violet removal: isotherm, kinetics, and thermodynamic studies. *RSC Advances*, 14(43), 31332–31347. <https://doi.org/10.1039/d4ra04889j>
- Mosoarca, G., Vancea, C., Popa, S., & Boran, S. (2021). Bathurst burr (*Xanthium spinosum*) powder—a new natural effective adsorbent for crystal violet dye removal from synthetic wastewaters. *Materials*, 14(19). <https://doi.org/10.3390/ma14195861>
- Munagapati, V. S., Wen, H. Y., Vijaya, Y., Wen, J. C., Wen, J. H., Tian, Z., Reddy, G. M., & Raul Garcia, J. (2021). Removal of anionic (Acid Yellow 17 and Amaranth) dyes using aminated avocado (*Persea americana*) seed powder: adsorption/desorption, kinetics, isotherms, thermodynamics, and recycling studies. *International Journal of Phytoremediation*, 23(9), 911–923. <https://doi.org/10.1080/15226514.2020.1866491>
- Nguyen, L. H., Vu, H. P. N., Do, P. V., Kha, V. P., Van, N. T., Phan, V. T., Huynh, D. H., & Le, T. S. (2024). Enhanced adsorption of Cr(VI) pollutants using $\text{CaFe}_2\text{O}_4/\text{rGO}$ modified-biochar derived from mixture of black soldier flyer exuviae and durian peel. *Journal of Water Process Engineering*, 66(May), 106017. <https://doi.org/10.1016/j.jwpe.2024.106017>
- Oluwasina, O. O., Adelodun, A. A., Oluwasina, O. O., Duarte, H. A., & Olusegun, S. J. (2024). Experimental and computational studies of crystal violet removal from aqueous solution using sulfonated graphene oxide. *Scientific Reports*, 14(1), 1–13. <https://doi.org/10.1038/s41598-024-54499-7>
- Orozco, S., Montiel, E., Valencia, J. E., González, R. G., del Carmen Chávez Parga, M., Cortés, J. A., & Rivero, M. (2024). Effective RhB Dye Removal Using Sustainable Natural Bioadsorbents Synthesized from Avocado Seed and Skin. *Water, Air, and Soil Pollution*, 235(2), 1–26. <https://doi.org/10.1007/s11270-024-06952-6>
- Pang, X., Sellaoui, L., Franco, D., Dotto, G. L., Georgin, J., Bajahzar, A., Belmabrouk, H., Ben Lamine, A., Bonilla-Petriciolet, A., & Li, Z. (2019). Adsorption of crystal violet on biomasses from pecan nutshell, para chestnut husk, araucaria bark and palm cactus: Experimental study and theoretical modeling via monolayer and double layer statistical physics models. *Chemical Engineering Journal*, 378(June). <https://doi.org/10.1016/j.cej.2019.122101>
- Priyantha, N., Asheeba, A., Mei, C., & Lim, L. B. L. (2020). Enhancing adsorption of crystal violet dye through simple base modification of leaf adsorbent: isotherm, kinetics, and regeneration. *Desalination and Water Treatment*, 215, 194–208. <https://doi.org/10.5004/dwt.2021.26758>
- Purkayastha, D., & Sarkar, S. (2019). Physicochemical Structure Analysis of Chitin Extracted from Pupa Exuviae and Dead Imago of Wild Black Soldier Fly (*Hermetia illucens*). *Journal of Polymers and the Environment*, 0123456789. <https://doi.org/10.1007/s10924-019-01620-x>

- Putra, A., Fauzia, S., Deswati, Arief, S., & Zein, R. (2022). Preparation, characterization, and adsorption performance of activated rice straw as a bioadsorbent for Cr(VI) removal from aqueous solution using a batch method. *Desalination and Water Treatment*, 264(32), 121–132. <https://doi.org/10.5004/dwt.2022.28562>
- Putra, A., Fauzia, S., Deswati, D., Arief, S., & Zein, R. (2024). The potential of duck egg white as a modifier for activated rice straw to enhance Cr(VI) ions adsorption in an aqueous solution. *South African Journal of Chemical Engineering*, 48, 204–213. <https://doi.org/10.1016/j.sajce.2024.02.002>
- Rahmiana Zein, & -, R. M. (2023). The effect of contact time and biosorbent temperature on the adsorption of indigo carmine dyes in kapok husk biosorbent modified with snail meat and kinetic study. *ALOTROP*, 7(2), 92–99. <https://doi.org/10.33369/alo.v7i2.30804>
- Raji, Y., Nadi, A., Mechnou, I., Saadouni, M., Cherkaoui, O., & Zyade, S. (2023). High adsorption capacities of crystal violet dye by low-cost activated carbon prepared from Moroccan Moringa oleifera wastes: Characterization, adsorption and mechanism study. *Diamond and Related Materials*, 135, 109834. <https://doi.org/10.1016/j.diamond.2023.109834>
- Rani, S., & Chaudhary, S. (2022). Adsorption of methylene blue and crystal violet dye from waste water using Citrus limetta peel as an adsorbent. *Materials Today: Proceedings*, 60, 336–344. <https://doi.org/10.1016/j.matpr.2022.01.237>
- Reji, M., & Kumar, R. (2022). Response surface methodology (RSM): An overview to analyze multivariate data. In *Indian Journal of Microbiology Research* (Vol. 9, Issue 4, pp. 241–248). <https://doi.org/10.18231/j.ijmr.2022.042>
- Rezazadeh, M., Baghdadi, M., Mehrdadi, N., & Abdoli, M. A. (2021). Adsorption of crystal violet dye by agricultural rice bran waste: Isotherms, kinetics, modeling and influencing factors. *Environmental Engineering Research*, 26(3), 0–2. <https://doi.org/10.4491/eer.2020.128>
- Rivai, H., Putri, Y. T., & Rusdi, R. (2019). Qualitative and Quantitative Analysis of the Chemical Content of Hexane, Acetone, Ethanol and Water Extract from Avocado Seeds (*Persea americana* Mill.). *Scholars International Journal of Traditional and Complementary Medicine Abbreviated Key Title: Sch Int J Tradit Complement Med*, May, 24–31. <https://doi.org/10.21276/sijtc.2019.2.3.1>
- Saadatkhah, N., Carillo Garcia, A., Ackermann, S., Leclerc, P., Latifi, M., Samih, S., Patience, G. S., & Chaouki, J. (2020). Experimental methods in chemical engineering: Thermogravimetric analysis—TGA. *Canadian Journal of Chemical Engineering*, 98(1), 34–43. <https://doi.org/10.1002/cjce.23673>
- Sadoq, M., Atlas, H., Imame, S., Kali, A., Amar, A., Loulidi, I., Jabri, M., Sadoq, B. E., Ouchabi, M., Abdullah, P. S., & Boukhelifi, F. (2024). Elimination of crystal violet from aqueous solution by adsorption on naturel polysaccharide: Kinetic, isotherm, thermodynamic studies and mechanism analysis. *Arabian Journal of Chemistry*, 17(1), 105453. <https://doi.org/10.1016/j.arabjc.2023.105453>
- Saidi, M., Reguig, B. A., El Amine Monir, M., Althagafi, T. M., Fatmi, M., Remil, A., Zehhaf, A., & Ghebouli, M. A. (2025). Kinetics thermodynamics and adsorption study of raw treated diatomite as a sustainable adsorbent for crystal

- violet dye. *Scientific Reports*, 15(1), 1–18. <https://doi.org/10.1038/s41598-025-05787-3>
- Salah Omer, A., El Naeem, G. A., Abd-Elhamid, A. I., Farahat, O. O. M., El-Bardan, A. A., Soliman, H. M. A., & Nayl, A. A. (2022). Adsorption of crystal violet and methylene blue dyes using a cellulose-based adsorbent from sugarcane bagasse: characterization, kinetic and isotherm studies. *Journal of Materials Research and Technology*, 19, 3241–3254. <https://doi.org/10.1016/j.jmrt.2022.06.045>
- Selhami, B., Chham, A. iddin, Soubai, B., Ait said Ali, S., El foulani, A. A., Ait El bacha, K., Akouibaa, M., & Tahiri, M. (2024). Novel adsorbent based on Argan Spinosa leaves modified with citric acid for effective removal of crystal violet dye from textile effluents. *Results in Surfaces and Interfaces*, 17, 100354. <https://doi.org/10.1016/j.rsufi.2024.100354>
- Shabaan, O. A., Jahin, H. S., & Mohamed, G. G. (2020). Removal of anionic and cationic dyes from wastewater by adsorption using multiwall carbon nanotubes. *Arabian Journal of Chemistry*, 13(3), 4797–4810. <https://doi.org/10.1016/j.arabjc.2020.01.010>
- Shen, C., Pan, Y., Wu, D., Liu, Y., Ma, C., Li, F., Ma, H., & Zhang, Y. (2019). A crosslinking-induced precipitation process for the simultaneous removal of poly(vinyl alcohol) and reactive dye: The importance of covalent bond forming and magnesium coagulation. *Chemical Engineering Journal*, 374(March), 904–913. <https://doi.org/10.1016/j.cej.2019.05.203>
- Shoukat, S., Bhatti, H. N., Iqbal, M., & Noreen, S. (2017). Mango stone biocomposite preparation and application for crystal violet adsorption: A mechanistic study. *Microporous and Mesoporous Materials*, 239, 180–189. <https://doi.org/10.1016/j.micromeso.2016.10.004>
- Shrivastava, P., Dwivedi, M. K., Malviya, V., Jain, P., Yadav, A., & Jain, N. (2023). Adsorption of Crystal violet dye from aqueous solution by activated sewage treatment plant sludge. *Desalination and Water Treatment*, 283, 222–236. <https://doi.org/10.5004/dwt.2023.29210>
- Solih, F. A., Raman, A. A. A., & Buthiyappan, A. (2023). Prospects of green adsorbent produced from avocado seed via hydrothermal carbonization for treatment of dye wastewater. *Proceedings of 6th International Conference on Clean Energy and Technology*, 1281, 012019. <https://doi.org/10.1088/1755-1315/1281/1/012019>
- Sultana, S., Islam, K., Hasan, M. A., Khan, H. M. J., Khan, M. A. R., Deb, A., Al Raihan, M., & Rahman, M. W. (2022). Adsorption of crystal violet dye by coconut husk powder: Isotherm, kinetics and thermodynamics perspectives. *Environmental Nanotechnology, Monitoring and Management*, 17(May 2021). <https://doi.org/10.1016/j.enmm.2022.100651>
- Tahar, L. Ben, Mogharbel, R., Hameed, Y., Noubigh, A., Abualreish, M. J. A. A. E., Alanazi, A. H., & Hatshan, M. R. (2025). Enhanced removal of the crystal violet dye from aqueous medium using tripolyphosphate–functionalized Zn–substituted magnetite nanoparticles. *Results in Chemistry*, 14, 102152. <https://doi.org/10.1016/j.rechem.2025.102152>
- Thommes, M., Kaneko, K., Neimark, A. V, Olivier, J. P., Rodriguez-reinoso, F., Rouquerol, J., & Sing, K. S. W. (2015). *Physisorption of gases , with special reference to the evaluation of surface area and pore size distribution (IUPAC*

- Technical Report*). 87, 1051–1069. <https://doi.org/10.1515/pac-2014-1117>
- Ukpong, A. A., Asuquo, E. O., & Edekhe, G. I. (2023). The Adsorption Equilibrium and Kinetic Studies for The Removal of Crystal Violet Dye (Methyl Violet 6b) from Aqueous Solution Using Avocado Pear Seed Activated Carbon. *International Journal of Research and Scientific Innovation*, 10, 154. <https://doi.org/10.51244/IJRSI>
- Verti, E. A., Mustikarini, E. D., & Lestari, T. (2021). Diversity of Avocado germplasm (*Persea americana*) in Bangka island based on morphological character. *Fisheries and Biology*, 33–38.
- Virtanen, T., Rudolph, G., Lopatina, A., Al-Rudainy, B., Schagerlöf, H., Puro, L., Kallioinen, M., & Lipnizki, F. (2020). Analysis of membrane fouling by Brunauer-Emmet-Teller nitrogen adsorption/desorption technique. *Scientific Reports*, 10(1), 1–10. <https://doi.org/10.1038/s41598-020-59994-1>
- Wathukarage, A., Herath, I., Iqbal, M. C. M., & Vithanage, M. (2019). Mechanistic understanding of crystal violet dye sorption by woody biochar: implications for wastewater treatment. *Environmental Geochemistry and Health*, 41(4), 1647–1661. <https://doi.org/10.1007/s10653-017-0013-8>
- Witono, J. R., Setyadi, F. F., Deandra, P. P., Wanta, K. C., Miryanti, A., Santoso, H., Astuti, D. A., & Bulin, C. D. Q. M. (2024). A Comprehensive Analysis of Chitin Extraction from the Black Soldier Fly for Chitosan Production. *Periodica Polytechnica Chemical Engineering*, 68(3), 507–522. <https://doi.org/10.3311/PPch.23714>
- Zamouche, M., Habib, A., Saaidia, K., & Bencheikh Lehocine, M. (2020). Batch mode for adsorption of crystal violet by cedar cone forest waste. *SN Applied Sciences*, 2(2). <https://doi.org/10.1007/s42452-020-1976-0>
- Zein, R., Akmal, C., Safni, S., Fauzia, S., & Ramadhani, P. (2023). Banana Stem (*Musa balbisiana* Colla) as Potential Biosorbent to Remove Methylene Blue Dye in Wastewater: Isotherm, Kinetic, Thermodynamic Studies and Its Application. *Applied Environmental Research*, 45(3). <https://doi.org/10.35762/AER.2023015>
- Zein, R., Astuti, A. W., Wahyuni, D., Furqani, F., & Munaf, E. (2015). s Removal of Methyl Red from Aqueous Solution by *Nephelium lappaceum* . *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 6(86), 86–97.
- Zein, R., Billian, Z., Syiffa, T., & Zilfa, F. (2020). Modification of rice husk silica with bovine serum albumin (BSA) for improvement in adsorption of metanil yellow dye. *Journal of the Iranian Chemical Society*, 0123456789. <https://doi.org/10.1007/s13738-020-01955-6>
- Zein, R., Chaidir, Z., Zilfa Zilfa, Fauzia, S., & Ramadhani, P. (2020). Isotherm and Kinetic Studies on the Adsorption Behavior of Metanil Yellow Dyes onto Modified Shrimp Shell-Polyethylenimine (SS-PEI). *Jurnal Kimia Valensi*, 8, 10–22. <https://doi.org/10.15408/jkv.v8i1.22566>
- Zein, R., Marliani, I. T., Emriadi, E., Ramadhani, P., & Fauzia, S. (2023). Potensi Biosorben Kulit Batang Sagu (*Metroxylon sago*) untuk Penyerapan Zat Warna Crystal Violet: Studi Isoterm, Kinetika, Termodinamika, dan Aplikasi. *Journal of The Indonesian Society of Integrated Chemistry*, 15(2), 83–98. <https://doi.org/10.22437/jisic.v15i2.29245>
- Zein, R., Prestica, Y., Deswati, D., & Ramadhani, P. (2025). Utilization of Coffee Peel Waste as Biosorbent for Rhodamine B Dye. *Indonesian Journal of*

- Environmental Management and Sustainability*, 9, 36–45.
- Zein, R., Putri, C. N., Deswati, & Fauzi, S. (2024). Pb(II) Removal from Aqueous Solutions Using Citric Acid Modified Kepok Banana Peel: Batch and Kinetic Studies. *Analytical and Bioanalytical Chemistry Research*, 11(2), 227–238. <https://doi.org/10.22036/abcr.2024.410961.1966>
- Zein, R., Satrio Purnomo, J., Ramadhani, P., Safni, Alif, M. F., & Putri, C. N. (2023). Enhancing sorption capacity of methylene blue dye using solid waste of lemongrass biosorbent by modification method. *Arabian Journal of Chemistry*, 16(2), 104480. <https://doi.org/10.1016/j.arabjc.2022.104480>
- Zein, R., Wulandari, S., Ramadhani, P., & Deswati, D. (2024a). Utilisation of Shrimp Shell As a Low-Cost Biosorbent for the Adsorption of Methylene Blue Dyes. *Ecological Chemistry and Engineering S*, 31(1), 63–73. <https://doi.org/10.2478/eces-2024-0005>
- Zein, R., Wulandari, S., Ramadhani, P., & Deswati, D. (2024b). UTILISATION OF SHRIMP SHELL AS A LOW-COST BIOSORBENT FOR THE ADSORPTION OF METHYLENE BLUE DYES. *Ecological Chemistry and Engineering S*, 31(1), 63–73. <https://doi.org/10.2478/eces-2024-0005>
- Zhang, X., Li, L., & Xu, F. (2022). Chemical Characteristics of Wood Cell Wall with an Emphasis on Ultrastructure: A Mini-Review. *Forests*, 13(3). <https://doi.org/10.3390/f13030439>

