

DAFTAR PUSTAKA

- Ali, I., Basheer, A.A., dan Alothman, Z.A., 2021. Advanced functional carbon materials for wastewater treatment. *RSC Advances*. 11(6), 3062–3085.
- Aziz, A., dan Sari, N.M., 2020. Analisis Gugus Fungsi Karbon Aktif dari Tempurung Kelapa dengan Metode Titrasi Boehm. *Jurnal Kimia dan Lingkungan*. 14(2), 85–92.
- Badan Standardisasi Nasional (BSN). 1995. SNI 06-3730-1995: Karbon Aktif Teknis. Jakarta: Badan Standardisasi Nasional.
- Boehm, H.P., 1994. Some aspects of the surface chemistry of carbon blacks and other carbons. *Carbon*, 32(5), 759–769.
- Astuti, W., dan Fikri, R., 2021. Pemanfaatan limbah cangkang kelapa sawit sebagai bahan baku karbon aktif untuk adsorpsi zat warna. *Jurnal Teknik Kimia*, 10(1), 15–23.
- Danarto, Y.C., 2007. Kajian Proses Adsorpsi dalam Pengolahan Limbah Cair Industri. *Jurnal Teknologi Lingkungan*, 8(1), 15–22
- Daud, W.M.A.W., dan Ali, W.S.W., 2020. Comparison on pore development of activated carbon produced from palm shell and coconut shell. *Bioresource Technology*, 93(1), 63–69.
- Diharyo., Salampak., Damanik, Z. dan Gumiri, S., 2020, Pengaruh Lama Aktifasi Dengan H_3PO_4 dan Ukuran Butir Arang Cangkang Kelapa Sawit Terhadap Ukuran Pori dan Luas Permukaan Butir Arang Aktif, *Prosiding Seminar Nasional Lingkungan Lahan Basah*, 5(1); 48-54.
- Foo, K.Y., dan Hameed, B.H., 2019. Factors affecting the carbonization and activation process for the synthesis of activated carbon from biomass materials. *Journal of Analytical and Applied Pyrolysis*, 135, 1-11.
- Goertzen, S.L., Theriault, K.D., Oickle, A.M., Tarasuk, A.C. dan Andreas, H.A., 2010. Standardization of the Boehm titration. Part I. CO_2 expulsion and endpoint determination, *Carbon*, 48; 1252-1261.
- Hartanto, D., dan Ratnawati, R., 2010. Pembuatan Karbon Aktif dari Tempurung Kelapa dan Aplikasinya sebagai Adsorben dalam Industri. *Jurnal Proses*, 4(2), 45–52.
- ini, M.A.A., 2018. Zinc chloride activated carbon for dye \ review. *Acta Chimica Slovaca*, 11(2), 99–106.



- Jasri, J., Nurhayati, N., dan Marlina, M. Karakterisasi Karbon Aktif dari Cangkang Kelapa Sawit dengan Aktivator $ZnCl_2$, H_3PO_4 , dan KOH . *Jurnal Integrasi Proses*, 2023; 13(2), 67–75.
- Kristianto, H., 2017. Review: Sintesis Karbon Aktif dengan Menggunakan Aktivasi Kimia $ZnCl_2$. *Jurnal Integrasi Proses*, 6(3), 104–111.
- Kusumaningrum, A., Irawan, D., dan Puspitasari, R., 2022. Pemanfaatan Karbon Aktif dari Limbah Biomassa sebagai Adsorben untuk Pengolahan Limbah Cair Industri Tekstil. *Jurnal Sains dan Aplikasi Kimia*, 26(2), 87–95.
- Larasati, T.D., Prakoso, T. dan Rizkiana, J., Karbonisasi Limbah Kelapa Sawit Dengan Proses Hidrotermal Sebagai Bahan Baku Elektroda Superkapasitor, *Jurnal Chemurgy*, 5(1); 22-29.
- Latupeirissa, J., Tanasale, M.F.J.D.P. dan Musa, S.H., 2018, Kinetika Adsorpsi Zat Warna Metilen Biru Oleh Karbon Aktif Dari Kulit Kemiri (*Aleurites moluccana* (L) Willd), *Indo. J. Chem. Res*, 6(1); 12-21.
- Liu, X., Zhao, Y., Li, X., dan Wang, H., 2020. Efficient removal of methylene blue dye using activated carbon prepared from biomass waste: Adsorption kinetics, isotherm and mechanism studies. *Journal of Environmental Chemical Engineering*, 8(4), 104364.
- Lua, A. C., dan Yang, T., 2004. Characteristics of activated carbon prepared from pistachio-nut shell by zinc chloride activation under nitrogen and air atmosphere. *Journal of Colloid and Interface Science*, 274(1), 594–599.
- Lubis, M. S., Sinaga, R., dan Sihombing, F. 2020. Karakterisasi Karbon Aktif dari Limbah Biomassa sebagai Adsorben pada Pengolahan Air. *Jurnal Teknik Kimia USU*, 9(2), 45–51
- Manurung, M., Suaniti, N. M., dan Ratnayani, O. 2024. Activated Bamboo Charcoal by $ZnCl_2$ as Remazol Yellow FG Adsorbent: Isotherm, Kinetic, and Thermodynamic Studies. *The Journal of Pure and Applied Chemistry Research*, 13(2), 72-81.
- Nasri, N. S., Hamzah, U., dan Zaidi, Z A M., 2013. Adsorption of Methylene Blue from Aqueous Solution Using Activated Carbon Prepared from Oil Palm Shell Activated by $ZnCl_2$. *Desalination and Water Treatment*, 51(16–18),
- Kristianto, R.Y.E, Rachimoallah, M., dan Putri, E.M.M., 2013. Sintesis karbon aktif dari arang kulit kelapa dengan aktivasi $ZnCl_2$ dan sebagai adsorben untuk penghilangan fenol dalam limbah cair. *MITS*.2(1).



- Rahman, M.A., Islam, M.A., dan Hossain, M. S., 2020. ZnCl₂ activation of carbon derived from jute sticks for methylene blue dye removal from aqueous solution. *Clean Technologies and Environmental Policy*, 22, 605–617.
- Rahman, M. M., Islam, M.A., Hameed, B. H., dan Taufiq-Yap, Y.H., Adsorption of methylene blue from aqueous solution by palm kernel shell activated carbon prepared by sodium carbonate activation: Equilibrium, kinetics, and thermodynamic studies. *Journal of Cleaner Production*. 2019; 206, 456–465.
- Rahmawati, D., 2020. “embuatan Karbon Aktif dari Cangkang Kelapa Sawit dengan Aktivator ZnCl₂.” *Jurnal Rekayasa Kimia dan Lingkungan*, 17(1), 45-52.
- Sahara, E., Sulihingtyas, W.D., dan Mahardika, I.P.A.S., 2017, Pembuatan dan Karakterisasi Arang Aktif dari Batang Tanam Gumitir (*Tagetes erecta*) yang Diaktivasi Dengan H₃PO₄, *Jurnal Kimia*, 11(1), 1-9.
- Sangon, S., Mongkolsiri, N., dan Chiarakorn, S., 2024. ZnCl₂-activated mesoporous carbon from rice straw: Optimization of its synthetic process and its application as a highly efficient adsorbent for amoxicillin. *Environmental Science. Water Research & Technology*, 10(2), 312–325.
- Suliestyah, dan Astuti. Optimasi aktivator ZnCl₂ dalam produksi karbon aktif dari batu bara dan pengujian sebagai adsorben. *J Teknol Mineral Batubara*. 2021;6(2):191-201.
- Tamara, M.G., 2016, Pemanfaatan Karbon Aktif Cangkang Kluwak (Pangium Edule Reinw) Sebagai Adsorben Zat Warna Metanil Kuning, Skripsi Tidak Diterbitkan, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Hasanuddin, Makassar.
- Tamez, A. B., Kumar, S., dan Vuppala, S. 2020. Removal of dye pollutants from wastewater using agricultural waste-derived adsorbents: A review. *Sustainable Environment Research*, 30(1), 1–14.
- Thommes, M., Kaneko, K., Neimark, A. V., Olivier, J. P., Rodriguez-Reinoso, F., Rouquerol, J., dan Sing, K. S. W. Physisorption of gases, with special reference to the evaluation of surface area and pore size distribution (IUPAC Technical Report). *Pure and Applied Chemistry*. 2015; 87(9–10), 1051–1069.
- ang, Y., Zhao, L., dan Xu, S. 2017. Adsorption of dyes from solutions by low-cost and eco-friendly biosorbents: A review. *Ind Surfaces A: Physicochemical and Engineering Aspects*, 264.



- Wang, T., Zhai, Y., Zhu, Y., Li, C., dan Zeng, G., 2018. A review of the hydrothermal carbonization of biomass waste for hydrochar formation: Process conditions, fundamentals, and physicochemical properties. *Renewable and Sustainable Energy Reviews*, 90, 223–247.
- Wang, J., dan Guo, X. 2020. Adsorption of methylene blue by activated carbon prepared from peanut shell: Equilibrium, kinetics, and thermodynamics. *Journal of Environmental Chemical Engineering*, 8(2), 103623.
- Yahya, M. A., 2015. Agricultural bio-waste materials as potential sustainable precursors used for activated carbon production: A review. *Renewable and Sustainable Energy Reviews*, 46, 218–235.
- Yagub, M.T., Sen, T.K., Afroze, S., dan Ang, H.M., 2014. Dye and its removal from aqueous solution by adsorption: A review. *Advances in Colloid and Interface Science*, 209, 172–184.
- Zhao, X., Wang, J., Wu, F., Liang, J., dan Zhang, L., 2022. Effect of carbonization temperature and $ZnCl_2$ activation on pore structure and adsorption performance of biomass-based activated carbon for dye removal. *Journal of Environmental Chemical Engineering*, 10(4), 107489.
- Zimmerman, A.R., Gao, B., dan Ahn, M.Y., 2020. Positive and negative carbon mineralization priming effects among a variety of biochar-amended soils. *Soil Biology and Biochemistry*, 43(6), 1169–1179.

