DAFTAR PUSTAKA

Acquah, C., Sie Yon, L., Tuah, Z., Ling Ngee, N., & Danquah, M. K. (2016). Synthesis and performance analysis of oil palm ash (OPA) based Adsorben as a palm oil bleaching material. *Journal of Cleaner Production*, *139*, 1098–1104. https://doi.org/10.1016/j.jclepro.2016.09.004

Ade Oktasari .(2018). Kulit Kacang Tanah (Arachis hypogaea L.) sebagai Adsorben Ion Pb(II) Ade Oktasari. *Jurnal Ilmu Kimia dan Terapan. 2*(1). 17-27.

Afrialdi., Zainuri. , S. F. (2021). Stabilitas Tanah Gambut Menggunakan Abu kerak boilerAbu Tndan Sawit Terhadap Nilai California Bearing Ratio. *J.Inersia*, *13*(2), 55–60. https://doi.org/10.33369/ijts.13.2.55-60

Ahmed, Y., Yaakob, Z., Akhtar, P., & Sopian, K. (2015). Production of biogas and performance evaluation of existing treatment processes in palm oil mill effluent (POME). In *Renewable and Sustainable Energy Reviews* (Vol. 42, pp. 1260–1278). Elsevier Ltd. https://doi.org/10.1016/j.rser.2014.10.073

Al-Ghouti, M. A., & Razavi, M. M. (2020). Water reuse: Brackish water desalination using Prosopis juliflora. *Environmental Technology and Innovation*, *17*. 1-16 https://doi.org/10.1016/j.eti.2020.100614

Anastopoulos, I., Mittal, A., Usman, M., Mittal, J., Yu, G., Núñez-Delgado, A., & Kornaros, M. (2018). A review on halloysite-based Adsorbens to remove pollutants in water and wastewater. In *Journal of Molecular Liquids* (Vol. 269, pp. 855–868). Elsevier B.V. https://doi.org/10.1016/j.molliq.2018.08.104

Araga, Ramya., Shantana Soni & Chandra S. Sharma. (2017). Fluoride Adsorption from Aqueous Solution using Activated Carbon Obtained from KOH- treated Jamun (Syzygium Cumini) Seed. Journal of Environmental Chemical Engineering, Volume 5, Issue 6, Pages 5608-5616. https://www.sciencedirect.com/science/article/pii/S2213343717305249?via%3Dihub

Asyri, F., Hafni, K. N., & Simamora, A. H. (2015). Pengaruh Limbah Abu Pembakaran Biomassa Kelapa Sawit Terhadap Sifat-Sifat Fisika dan Mekanik High Impact Polystyrene. In *Jurnal Teknik Kimia USU* (Vol. 4, Issue 3). 23-28

Atmayudha, A. (2007). *Pembuatan Karbon Aktif Berbahan Dasar tempurung Kelapa Dengan Perlakuan Aktivasi Terkontrol Serta Uji Kinerjanya*. Universitas Indonesia.

Ayawei, N. A. S. S. & W. D. (2017). Mg/Fe Layered Double Hydroxide as a Novel Adsorben for the Removal of Congo red. In *International Journal of Applied Science and Technology* Vol. 7, Issue 2. 83-92. https://www.researchgate.net/publication/319329138

Batool, F., Akbar, J., Iqbal, S., Noreen, S., & Bukhari, S. N. A. (2018). Study of Isothermal, Kinetic, and Thermodynamic Parameters for Adsorption of Cadmium: An Overview of Linear and Nonlinear Approach and Error Analysis. *Bioinorganic Chemistry and Applications*. 1-12. https://doi.org/10.1155/2018/3463724

Batubara, R. (2022). *Pemanfaatan Abu kerak boilerKelapa Sawit Sebagai Adsorben Untuk Penyisihan Logam Timbal (Pb)*. Universitas Islam Negeri Ar-Raniry.

Botahala.L. (2019). *Perbandingan Efektivitas Daya Adsorpsi Sekam Padi Dan Cangkang Kemiri Terhadap Logam Besi (Fe) pada Air Sumur Gali*. Ed.; 1st ed., Vol. 1). CV.Budi Utama.

Chang, R. (2003). *Kimia Dasar : Konsep-konsep Inti*. Ed.; 3rd ed., Vol. 2. Erlangga.

Chen, G., & Shi, L. (2017). Removal of Cd(II) and Pb(II) ions from natural water using a low-cost synthetic mineral: Behavior and mechanisms. *RSC Advances*, *7*(69), 43445–43454. https://doi.org/10.1039/c7ra08018b

Cheng, W. P., Gao, W., Cui, X., Ma, J. H., & Li, R. F. (2016). Phenol adsorption equilibrium and kinetics on zeolite X/activated carbon composite. *Journal of the Taiwan Institute of Chemical Engineers*, *62*, 192–198. https://doi.org/10.1016/j.jtice.2016.02.004

Chiang, Y. C., & Juang, R. S. (2017). Surface modifications of carbonaceous materials for carbon dioxide adsorption: A review. *Journal of the Taiwan Institute of Chemical Engineers*, *71*, 214–234. https://doi.org/10.1016/j.jtice.2016.12.014

Dada, A. O., Adekola, F. A., & Odebunmi, E. O. (2017). Kinetics, mechanism, isotherm and thermodynamic studies of liquid phase adsorption of Pb 2+ onto wood activated carbon supported zerovalent iron (WAC-ZVI) nanocomposite . *Cogent Chemistry*, *3*(1). 1-20. 1351653. https://doi.org/10.1080/23312009.2017.1351653

Durán-Jiménez, G., Hernández-Montoya, V., Rodríguez Oyarzun, J., Montes-Morán, M. Á., & Binner, E. (2019). Pb(II) removal using carbon Adsorbens prepared by hybrid heating system: Understanding the microwave heating by dielectric characterization and numerical simulation. *Journal of Molecular Liquids*, *277*, 663–671. https://doi.org/10.1016/j.molliq.2018.12.143

Duruibe, J., & Egwurugwu, J. (2007). Heavy Metal Pollution and Human Biotoxic Effects. *In Article in Journal of Physical Sciences* Vol. 2 (5), pp. 112-118.http://www.academicjournals.org/IJPS

Ekramul Mahmud, H. N. M., Obidul Huq, A. K., & Yahya, R. B. (2016). The removal of heavy metal ions from wastewater/aqueous solution using polypyrrole-based Adsorbens: A review. In *RSC Advances*. Vol. 6, Issue 18, pp. 14778–14791. Royal Society of Chemistry. https://doi.org/10.1039/c5ra24358k

El-Wakeel, S. T., El-Tawil, R. S., Abuzeid, H. A. M., & Ghany, A. E. A. (2017). Synthesis and structural properties of MnO2 as Adsorben for the removal of lead

(Pb2+) from aqueous solution. *Journal Taiwan Institute, Chemical Engineers*, *72*, 95–103.

Elysabeth, T., & Jufrodi, H. (2015). Adsorbsi Logam Berat Besi dan Timbal Menggunakan Zeolit Alam Bayah Teraktivasi. In *Jurnal Chemtech* (Vol. 1).26-29.

Enache, D. F., Vasile, E., Simonescu, C. M., Răzvan, A., Nicolescu, A., Nechifor, A. C., Oprea, O., Pătescu, R. E., Onose, C., & Dumitru, F. (2017). Cysteine-functionalized silica-coated magnetite nanoparticles as potential nanoAdsorbens. *Journal of Solid State Chemistry*, *253*, 318–328. https://doi.org/10.1016/j.jssc.2017.06.013

Firman, F., Rizhan, M., & Sahidi, A. A. (2020). *Analisis Kandungan Logam Berat Abu Batubara Pltu Bangko Barat Kab. Muara Enim Sumatera Selatan*. *Journal of Science and Engineering.* V3:01. 10–16 http://ejournal.unkhair.ac.id/index.php/josae

Fu, R., Liu, Y., Lou, Z., Wang, Z., Baig, S. A., & Xu, X. (2016). Adsorptive removal of Pb(II) by magnetic activated carbon incorporated with amino groups from aqueous solutions. *Journal of the Taiwan Institute of Chemical Engineers*, *62*, 247–258. https://doi.org/10.1016/j.jtice.2016.02.012

Gautam, R. K., Mudhoo, A., Lofrano, G., & Chattopadhyaya, M. C. (2014). Biomass-derived biosorbents for metal ions sequestration: Adsorben modification and activation methods and Adsorben regeneration. In *Journal of Environmental Chemical Engineering*. Vol. 2, Issue 1, pp. 239–259. Elsevier Ltd. https://doi.org/10.1016/j.jece.2013.12.019

Goñi, S., Guerrero, A., Luxán, M. P., & Macías, A. (2003). Activation of the abu terbang pozzolanic reaction by hydrothermal conditions. *Cement and Concrete Research*, *33*(9), 1399–1405. https://doi.org/10.1016/S0008-8846(03)00085-1

Shofa. (2012). Pembuatan Karbon Aktif Berbahan Baku Ampas Tebu Dengan Aktivasi Kalium Hidroksida. Skripsi. Fakultas Teknik. Universitas Indonesia.

Hussein, H. K., Abu-Zinadah, O. A., El-Rabey, H. A., & Meerasahib, M. F. (2013). Estimation of some heavy metals in polluted well water and mercury accumulation in broiler organs. *Brazilian Archives of Biology and Technology*, *56*(5), 767–776. https://doi.org/10.1590/S1516-89132013000500007.

Issabayeva, G., Aroua, M.K., and Sulaiman N.M.N. (2005). Removal of Lead from

Aqueous Solutions on Palm Shell Activated Carbon. Bioresource Technology, 97, 2350–2355.
https://www.researchgate.net/publication/7446602_Removal_of_lead_from_aqueous_solutions_on_palm_shell_activated_carbon

Jain, A., Balasubramanian, R., & Srinivasan, M. P. (2015). Production of high surface area mesoporous activated carbons from waste biomass using hydrogen peroxide-mediated hydrothermal treatment for adsorption applications. *Chemical Engineering Journal*, *273*, 622–629. https://doi.org/10.1016/j.cej.2015.03.111

Juniarto, T., & Isnasia, I. D. (2021). Uji Kualitas Minyak Goreng Sawit Yang Beredar di Entikong Kalimantan Barat. *Food Scientia : Journal of Food Science and Technology*, *1*(2), 117–130. https://doi.org/10.33830/fsj.v1i2.1916.2021

Karanac, M., Đolić, M., Veljović, Đ., Rajaković-Ognjanović, V., Veličković, Z., Pavićević, V., & Marinković, A. (2018). The removal of Zn2+, Pb2+, and As(V) ions by lime activated abu terbang and valorization of the exhausted Adsorben. *Waste Management*, *78*, 366–378. https://doi.org/10.1016/j.wasman.2018.05.052

Karaoğlu, M. H., Zor, Ş., & Uğurlu, M. (2010). Biosorption of Cr(III) from solutions using vineyard pruning waste. *Chemical Engineering Journal*, *159*(1–3), 98–106. https://doi.org/10.1016/j.cej.2010.02.047

Karimi. (2017). Effect of pH and Initial pb(II) Concentration on The Lead Removal Efficiency from Industrial Wastewater Using Ca(OH)2. *International Journal of Water and Wastewater Treatment*, *3*(2). 1-4. https://doi.org/10.16966/2381-5299.139

Khanday, W. A., Marrakchi, F., Asif, M., & Hameed, B. H. (2017). Mesoporous zeolite–activated carbon composite from oil palm ash as an effective Adsorben for methylene blue. *Journal of the Taiwan Institute of Chemical Engineers*, *70*, 32–41. https://doi.org/10.1016/j.jtice.2016.10.029

Kholis. N. (2022). Efektivitas Suhu Aktivasi Terhadap Adsorben Crumb Rubber Sludge,Tatal Karet dan Abu Sawit Dalam Penyisihan Limbah Cair Artifisial Krom dan Nikel. Fakultas Teknik.Universitas Batanghari

Lang, L. Y. (2007). Treatability of Palm Oil Mill Effluent (POME) Using Black Liquor In An Anaerobic Treatment Process.

Lestari, I., Mahraja, M., Farid, F., Gusti, D. R., & Permana, E. (2020). Penyerapan Ion Pb (II) Menggunakan Adsorben Dari Limbah Padat Lumpur Aktif Pengolahan Air Minum. *CHEMISTRY PROGRESS*, *13*(2). https://doi.org/10.35799/cp.13.2.2020.31391

Li, Y., Xia, B., Zhao, Q., Liu, F., Zhang, P., Du, Q., Wang, D., Li, D., Wang, Z., & Xia, Y. (2011). Removal of copper ions from aqueous solution by calcium alginate immobilized kaolin. *Journal of Environmental Sciences*, *23*(3), 404–411. https://doi.org/10.1016/S1001-0742(10)60442-1

Lin, Y. H., & Ho, B. H. (2022). Kinetics and Performance of Biological Activated Carbon Reactor for Advanced Treatment of Textile Dye Wastewater. *Processes*, *10*(1). https://doi.org/10.3390/pr10010129

Liu, L., Liu, J., Zeng, Y., Tan, S. J., Do, D. D., & Nicholson, D. (2019). Formaldehyde adsorption in carbon nanopores – New insights from molecular simulation. *Chemical Engineering Journal*, *370*, 866–874. https://doi.org/10.1016/j.cej.2019.03.262

M.A Lillo-Ródenas, D. C.-A. A. L.-Solano. (2003). *Understanding chemical reactions between carbons and NaOH and KOH: An insight into the chemical activation mechanism.* Universidad de Alicante.

Manocha, S. M. (2003). Porous carbons. In *S¯adhan¯a* (Vol. 28).

Marsh, H. , R.-R. F. (2006). *Activated Carbon*. Elsevier Science & Technology.

Massimo Corradi and Antonio Mutti. (2011). Metal ions affecting the pulmonary and cardiovascular systems. *Met Ions Life Sci . 2011:8:81-105.*, *8*, 81–105.

Muh Rizal B. (2020). *Studi Isoterm, Kinetika dan Termodinamika Adsorpsi Ion Logam Pb (II) Menggunakan Abu Layang Batubara Termobilisasi Ditizon*. Universitas Gadjah Mada.

Mwamulima, T., Zhang, X., Wang, Y., Song, S., & Peng, C. (2018). Novel approach to control Adsorben aggregation: iron fixed bentonite-abu terbang for Lead (Pb) and Cadmium (Cd) removal from aqueous media. *Frontiers of Environmental Science and Engineering*, *12*(2). 1-12. https://doi.org/10.1007/s11783-017-0979-6

Myllymäki, P., Lahti, R., Romar, H., & Lassi, U. (2018). Removal of total organic carbon from peat solution by hybrid method—Electrocoagulation combined with adsorption. *Journal of Water Process Engineering*, *24*, 56–62. https://doi.org/10.1016/j.jwpe.2018.05.008

Ngan Ma Ah, S. G. E. Jenny. T. S. Leong. L. T. (1990). *Industrial Processes & The Envirinmenty*. Loth Botahala, Ed.; 3rd ed., Vol. 3. Department Of Environment.

Nur Permata, A., Roro Adinda, R. P., & Takwanto Jurusan Teknik Kimia, A. (2019). *Studi Awal Pengaruh Suhu dan Konsentrasi Pada Proses Aktivasi Karbon Dari Kayu Halaban Menggunakan ZNCL ₂ dan KOH*. Jurnal Teknologi Separasi. *5*(2), 141–146. http://distilat.polinema.ac.id

Obike, A. I., Igwe, J. C., Emeruwa, C. N., & Uwakwe, K. J. (2018). Equilibrium and kinetic studies of Cu (II), Cd (II), Pb (II) and Fe (II) adsorption from aqueous solution using cocoa (*Theobroma cacao*) pod husk. *Journal of Applied Sciences and Environmental Management*, *22*(2), 182. https://doi.org/10.4314/jasem.v22i2.5

Patel, H. (2018). Charcoal as an Adsorben for textile wastewater treatment. *Separation Science and Technology (Philadelphia)*, *53*(17), 2797–2812. https://doi.org/10.1080/01496395.2018.1473880

Praipipat, P., Jangkorn, S., & Ngamsurach, P. (2023). Powdered and beaded zeolite A from recycled coal abu terbang with modified iron (III) oxide-hydroxide for lead adsorptions. *Environmental Nanotechnology, Monitoring and Management*, *20*. https://doi.org/10.1016/j.enmm.2023.100812

Prianti, E., Malino, M., B'allo, & Lapanporo, B., P. (2015) Pemanfaatan Abu Kerak Boiler Hasil Pembakaran Limbah Kelapa Sawit Sebagai Pengganti Parsial Pasir pada Pembuatan Beton. *POSITRON*, *V*(1), 26–29.

Pujiyanto. (2010). *Pembuatan Karbon Aktif Super dari Batubara dan Tempurung Kelapa* [Tesis]. Fakultas Teknik Universitas Indonesia .

Purwanto, D. (2011). Arang Dari Limbah Tempurung Kelapa Sawit *(Elaeis guineensis Jacq)*. Jurnal Penelitian Hasil Hutan Vol. 29 No. 1: 57-66

Putri, R.W., Haryati.S., & Rahmatullah. 2019. Pengaruh suhu karbonisasi terhadap kualitas karbon aktif dari Limbah Ampas Tebu. *Jurnal Teknik Kimia*. No.1,Vol.25, 1-4

Ray, P. Z., & Shipley, H. J. (2015). Inorganic nano-Adsorbens for the removal of heavy metals and arsenic: A review. *RSC Advances*, *5*(38), 29885–29907. https://doi.org/10.1039/c5ra02714d

Riyanto. (2014). *Validasi & Verifikasi Metode Uji Sesuai Dengan Iso/Iec 17025 Laboratorium Pengujian dan Kalibrasi* (1st ed., Vol. 1). DEEPUBLISH.

Samadi, N., Hasanzadeh, R., & Rasad, M. (2015). Adsorption isotherms, kinetic, and desorption studies on removal of toxic metal ions from aqueous solutions by polymeric Adsorben. *Journal of Applied Polymer Science*, *132*(11). 1-13. https://doi.org/10.1002/app.41642

Santoso, R. H., Susilo, B., Nugroho, W. A., Keteknikan, J., Teknologi, P.-F., Brawijaya, P.-U., Veteran, J., & Korespondensi, P. (2014). Pembuatan dan Karakterisasi Karbon Aktif dari Kulit Singkong (Manihot esculenta Crantz) Menggunakan Activating Agent KOH. In *Jurnal Keteknikan Pertanian Tropis dan Biosistem*. Vol. 2, Issue 3. 279-286.

Shahbeik, H., Bagheri, N., Hallajisani, A., Pourkarimi, S., Shahbeig, H., Ghorbanian, S. A., Hallajisani, A., & Poorkarimi, S. (2013). A new adsorption isotherm model of aqueous solutions on granular activated carbon. In *UK World Journal of Modelling and Simulation.* Vol. 9, Issue 4. pp 243- 254. https://www.researchgate.net/publication/258784710

Sophia A., C., & Lima, E. C. (2018). Removal of emerging contaminants from the environment by adsorption. *Ecotoxicology and Environmental Safety*, *150*, 1–17. https://doi.org/10.1016/j.ecoenv.2017.12.026

Suparma, B. L., Panggaben, T. W., & Mude, S. (2014). Potensi Penggunaan Limbah Kelapa Sawit Sebagai Agregat Pengisi Pada Campuran Hot Rolled Sheet-Base. *Jurnal Transportasi* , *14*(2), 87–96.

Taha, M. R., & Ibrahim, A. H. (2014). COD removal from anaerobically treated palm oil mill effluent (AT-POME) via aerated heterogeneous Fenton process: Optimization study. *Journal of Water Process Engineering*, *1*, 8–16. https://doi.org/10.1016/j.jwpe.2014.02.002

Taşar, Ş., & Özer, A. (2020). A thermodynamic and kinetic evaluation of the adsorption of pb(Ii) ions using peanut (arachis hypogaea) shell-based biochar from aqueous media. *Polish Journal of Environmental Studies*, *29*(1), 293–305. https://doi.org/10.15244/pjoes/103027

Tighadouini, S., Radi, S., Elidrissi, A., Haboubi, K., Bacquet, M., Degoutin, S., Zaghrioui, M., & Garcia, Y. (2019). Removal of toxic heavy metals from river water samples using a porous silica surface modified with a new β-ketoenolic host. *Beilstein Journal of Nanotechnology*, *9*(1), 262–273. https://doi.org/10.3762/bjnano.10.25

Tiwari, D., Laldanwngliana, C., Choi, C. H., & Lee, S. M. (2011). Manganese-modified natural sand in the remediation of aquatic environment contaminated with heavy metal toxic ions. *Chemical Engineering Journal*, *171*(3), 958–966. https://doi.org/10.1016/j.cej.2011.04.046

Tomasz, K., Anna, K., & Ryszard, C. (2019). Effective Adsorption of Lead Ions Using abu terbang Obtained in the Novel Circulating Fluidized Bed Combustion. *Microchem*, *145*, 1011–1025.

Triawan, D. A., Nesbah, N., Fitriani, D., Kimia, J., Matematika, F., Pengetahuan, I., & Universitas Bengkulu, A. (2017). Crude Palm Oil's (CPO) Abu terbang As A Low-Cost Adsorben For Removal of Methylen Blue (MB) From Aqueous Solution. *Jurnal Kimia Riset*, *2*(1). 10-15.

Tyagi, M., Rana, A., Kumari, S., & Jagadevan, S. (2018). Adsorptive removal of cyanide from coke oven wastewater onto zero-valent iron: Optimization through response surface methodology, isotherm and kinetic studies. *Journal of Cleaner Production*, *178*, 398–407. https://doi.org/10.1016/j.jclepro.2018.01.016

Xiyili, H., Çetintaş, S., & Bingöl, D. (2017). Removal of some heavy metals onto mechanically activated abu terbang: Modeling approach for optimization, isotherms, kinetics and thermodynamics. *Process Safety and Environmental Protection*, *109*, 288–300. https://doi.org/10.1016/j.psep.2017.04.012

Yang, Y., Li, H., Peng, L., Chen, Z., & Zeng, Q. (2016). Assessment of Pb and Cd in seed oils and meals and methodology of their extraction. *Food Chemistry*, *197*, 482–488. https://doi.org/10.1016/j.foodchem.2015.10.143

Zhang, Y., Li, Y., Xiangli, Q., Lina, C., Xiangjun, N., Zhijian, M., & Zhang, Z. (2008). Integration of biological method and membrane technology in treating palm oil mill effluent. In *Journal of Environmental Sciences* (Vol. 20). 559-564.