

DAFTAR PUSTAKA

- Adam, F., Muniandy, L., & Thankappan, R. (2013). Ceria and titania incorporated silica based catalyst prepared from rice husk: adsorption and photocatalytic studies of methylene blue. *Journal of colloid and interface science*, 406, 209-216.
- Afrianita, R., & Dewilda, Y. (2013). Efisiensi dan Kapasitas Penyerapan Fly Ash sebagai Adsorben dalam Penyisihan Logam Timbal (Pb) Air limbah Industri Percetakan di Kota Padang. *Jurnal Dampak*, 10(1), 1-10.
- Ageena, N. A. (2010). The use of local sawdust as an adsorbent for the removal of copper ion from wastewater using fixed bed adsorption. *Engineering and Technology Journal*, 28(2), 224-235.
- Akmal, S., Jaya Malathi, J., Vijaya, Y., Popuri, S. R., & Venkata Subbaiah, M. (2012). Biosorption of Ni (II) from aqueous solutions by *Syzygium cumini* bark powder: Equilibrium and kinetic studies. *Desalination and Water Treatment*, 47(1-3), 59-68.
- Aksu, Z. dan Gonen, H. (2004). Biosorption of Phenol by Immobilized Activated Sludge in A Continuous Packed Bed: Prediction of Breakthrough Curves, *Process Biochem.* 39: 599–613
- Alberty, R.A dan Daniel, F. (1992). *Kimia Fisika*. Jakarta : Erlangga
- Andrianto, A. (2008). Penentuan unsur Cu, Cd, dan Pb dalam sampel limbah (Sludge) industri kertas secara spektrofotometri serapan atom (AAS). In *Prosiding Seminar Penelitian dan Pengelolaan Perangkat Nuklir*, 160-163
- Anna, A. N. (1991). Air Limbah Industri Permasalahan dan Penanggulangannya. In *Forum Geografi*, 8, 50-51
- Atkins, P. W. (1996). *Kimia Fisik Jilid 2, Edisi 4*. Jakarta: Erlangga.
- Aziz, N., (2000). *Geologi Fisik*. Bandung: ITB.
- Badan Pengawas Obat dan Makanan. (2010). *Laporan Tahunan Direktorat Inspeksi dan Sertifikasi Pangan Tahun 2009*. Jakarta: BPOM.
- Baharuddin, T. AM dan Syahidah. 2005. Pemanfaatan Serbuk Kayu Jati (*Tectona grandis*) Yang Direndam Dalam Air Dingin Sebagai Media Tumbuh Jamur Tiram (*Pleurotus camunicipae*). *Jurnal Perennial*, 2(1), 1-5.

- Baral, S. S., Das, S. N., & Rath, P. (2006). Hexavalent chromium removal from aqueous solution by adsorption on treated sawdust. *Biochemical Engineering Journal*, 31(3), 216-222.
- Biswas, S., & Mishra, U. (2015). Continuous fixed-bed column study and adsorption modeling: removal of lead ion from aqueous solution by charcoal originated from chemical carbonization of rubber wood sawdust. *Journal of Chemistry*, 2015.
- Božić, D., Stanković, V., Gorgievski, M., Bogdanović, G., & Kovačević, R. (2009). Adsorption of heavy metal ions by sawdust of deciduous trees. *Journal of hazardous materials*, 171(1-3), 684-692.
- Budiyono, S. S. (2013). *Teknik Pengolahan Air*. Graha Ilmu : Yogyakarta.
- Cahyanto, M. D., Aida, Y., & Pranata, F. S. (2009). Pemanfaatan Kitin Udang Sebagai Penyerap Timbal dan Tembaga pada Air limbah Industri Batik di Solo. *Biota: Jurnal Ilmiah Ilmu-Ilmu Hayati*, 13(1), 31-36.
- Çakır, E., Tosunoğlu, V., Boncuğuoğlu, R., Korkmaz, M., & Fil, B. A. (2017). Kinetic and Fixed Bed Studies For Copper Removal From Solutions by Walnut Tree Sawdust (*juglans regia linnaeus*).
- Caolli. (1967). *Irigation. Theory and Practice*. Vicas Publ.House: New Delhi.
- Cechinel, M, A, P., Guelli, S, M, A., & Ulson, A, A. (2013). *Study Of Lead (II) Adsorption Onto Activated Carbon Originating From Cow Bone*. Journal of Cleaner Production. Universidade Federal de Santa Catarina. Brasil
- Coughlan, M. P. (1989). *Enzyme System for Lignocellulose Degradation*. Elsevier Applied Science. London and New York.
- Collini, L. (Ed.). (2012). *Copper Alloys: Early Applications and Current Performance-Enhancing Processes*. BoD–Books on Demand.
- Darmono (2009). *Farmasi Forensik dan Toksikologi*. Jakarta: UI-Press. 160-164
- Darmono (2001). *Lingkungan Hidup dan Pencemaran Hubungannya dengan Toksikologi Senyawa Logam*. Jakarta : Universitas Indonesia Press
- Darmono. (1995). *Logam dalam sistem biologi makhluk hidup*. Jakarta: Universitas Indonesia.
- Darwis, I. H. (2017) *Pengelolaan Air Tanah*. Yogyakarta : Pustaka AQ

- Demcak, S., Balintova, M., Hurakova, M., Frontasyeva, M. V., Zinicovscaia, I., & Yushin, N. (2017). Utilization of poplar wood sawdust for heavy metals removal from model solutions. *Nova Biotechnologica et Chimica*, 16(1), 26-31.
- Dias, H.R. and Lu, H.L., 1995. Copper (I) Carbonyl Complex of a Trifluoromethylated Tris (pyrazolyl) borate Ligand. *Inorganic Chemistry*, 34(21), 5380-5382
- Eckenfelder Jr, W. W., & Updated by Staff. (2000). Wastewater treatment. *Kirk-Othmer Encyclopedia of Chemical Technology*.
- Eddy (2008) *Karakteristik Air limbah*. Jurnal Ilmiah Teknik Lingkungan, 2(2), 20.
- Effendi, K. (2005). Pengaruh Perendaman dan Kadar Air Perekat terhadap Sifat Fisis Mekanis Papan Partikel dari Ampas Tebu. [Skripsi]. Medan. Departemen Kehutanan Fakultas Pertanian. Universitas Sumatera Utara.
- Effendi, H. (2003). *Telaah kualitas air, bagi pengelolaan sumber daya dan lingkungan perairan*. Kanisius.
- El-Saied, F. A., Abo-Elenan, S. A., & El-shinawy, F. H. (2017). Removal of lead and copper ions from polluted aqueous solutions using nano-sawdust particles. *International Journal of Waste Resources*, (7), 305.
- Fengel, D., & Wegener, G. (1995). Kayu; Kimia, Ultrastruktur dan Reaksi-reaksi. *Penerjemah H. Sastrohamidjojo*. Yogyakarta: Gadjah Mada University.
- Fitriani, F., Bahri, S., & Nurhaeni, N. (2013). Produksi Bioetanol Tongkol Jagung (Zea Mays) dari Hasil Proses Delignifikasi. *Natural Science: Journal of Science and Technology*, 2(3).
- Gong, C., Huang, J., Feng, C., Wang, G., Tabil, L., & Wang, D. (2016). Effects and mechanism of ball milling on torrefaction of pine sawdust. *Bioresource technology*, 214, 242-247.
- Gu, X., Ma, X., Li, L., Liu, C., Cheng, K., & Li, Z. (2013). Pyrolysis of poplar wood sawdust by TG-FTIR and Py-GC/MS. *Journal of Analytical and Applied Pyrolysis*, 102, 16-23.
- Gupta. S., dan Babu, B.V., (2005). Modelling and simulation of fixed bed adsorption column: Effect of operating variables. *Proceedings of International Congress Chemistry and Environment (ICCE-2005)*, 24-26:391-94.

- Haider, S., & Park, S. Y. (2009). Preparation of the electrospun chitosan nanofibers and their applications to the adsorption of Cu (II) and Pb (II) ions from an aqueous solution. *Journal of Membrane Science*, 328(1-2), 90-96.
- Hendra, D. dan S. Darmawan, (2008), *Sifat Arang Aktif Dari Tempurung Kemiri*.
- Ibrahim, M. N. M., Ahmed-Haras, M. R., Sipaut, C. S., Aboul-Enein, H. Y., & Mohamed, A. A. (2010). Preparation and characterization of a newly water soluble lignin graft copolymer from oil palm lignocellulosic waste. *Carbohydrate polymers*, 80(4), 1102-1110.
- Igwe, J., dan Abia, A. A. (2006). A bioseparation process for removing heavy metals from waste water using biosorbents. *African journal of biotechnology*, 5(11).
- Indah, S. dan Rohaniah. (2014). Studi Regenerasi Adsorben Kulit Jagung (*Zea Mays L.*) Untuk Menyisihkan Logam Besi (Fe) Dan Mangan (Mn) Dari Air Tanah. *Jurnal Dampak Fakultas Teknik Universitas Andalas*.11(1).
- Inglezakis, V. J., Fyrrillas, M. M., & Stylianou, M. A. (2018). Two-phase homogeneous diffusion model for the fixed bed sorption of heavy metals on natural zeolites. *Microporous and Mesoporous Materials*, 266, 164-176.
- Irdhawati, I., Sinthadevi, N. N. T., & Sahara, E. (2020). Serbuk Gergaji Kayu Jati Teraktivasi EDTA Sebagai Penjerap Ion Tembaga (II) dan Krom (III). *Indonesian Journal of Chemical Research*, 7(2), 114-119.
- Iren, S, A, T., Vanny, M, A, T., & Minarni, R, J. (2018). Kondisi Optimum Adsorpsi Arang Hayati Dari Kulit Pisang Raja (*Musa X Paradisiaca L.*) Terhadap Logam Timbal (Pb) dan Tembaga (Cu). *Jurnal Akademi Kimia*. 7(2): 55-60.
- Ismail, M. S., & Waliuddin, A. M. (1996). Effect of rice husk ash on high strength concrete. *Construction and building materials*, 10(7), 521-526
- Isroi. 2008. *KOMPOS*. Balai Penelitian Bioteknologi Perkebunan Indonesia, Bogor.
- Jena, S., & Sahoo, R. K. (2017). Removal of Pb (II) from aqueous solution using fruits peel as a low cost adsorbent. *International Journal of Science, Engineering and Technology*, 5(1), 5-13.
- Kalavathy, M. H., & Miranda, L. R. (2010). Comparison of copper adsorption from aqueous solution using modified and unmodified *Hevea brasiliensis* saw dust. *Desalination*, 255(1-3), 165-174.

- Kataria, N., dan Garg, V. K. (2018). Green synthesis of Fe₃O₄ nanoparticles loaded sawdust carbon for cadmium (II) removal from water: Regeneration and mechanism. *Chemosphere*, 208:818–828.
- Klimmek S., Stan H.J., Wilke A., Bunke G., Buchholz R. (2001). Comparative analysis of the biosorption of cadmium, lead, nickel and zinc by Algae. *Environ. Sci. Technol.*, 35: 4283-4288.
- Kodoatie, R. J. (2012). *Tata Ruang Air Tanah*. Penerbit Andi.
- Komarawidjaja, W. (2017). Paparan air limbah industri mengandung logam berat pada lahan sawah di Desa Jelegong, Kecamatan Rancaekek, Kabupaten Bandung. *Jurnal Teknologi Lingkungan*, 18(2), 173-181.
- Komarayati, S., Nurhayati, T., & Gusmailina, G. (1993). Biodegradasi Komponen Kimia Pada Limbah Lignoselu-Losa Oleh Jamur Perusak Kayu (Biodegradation of Wood Chemical Components in Lignocellulosic Wastes by Whiterot Fungi). *Jurnal Penelitian Hasil Hutan*, 11(2), 57-64.
- Kovacova, Z., Demcak, S., & Balintova, M. (2019). Removal of Copper from Water Solutions by Adsorption on Spruce Sawdust. In *Multidisciplinary Digital Publishing Institute Proceedings*, 16(1), 52
- Kumar, S. (2012). *Co-liquefaction of coal and biomass for liquid fuel synthesis* (Doctoral dissertation, West Virginia University Libraries).
- Li, C. (2008). *Batch and Bench-Scaled Fixed-Bed Column Evaluations of Heavy Metal Removals from Aqueous Solutions and Synthetic Landfill Leachate using Low-Cost Natural Adsorbents*. Tesis. Kanada: Queen University.
- Liu, D., Sun, D., & Li, Y. (2010). Removal of Cu (II) and Cd (II) from aqueous solutions by polyaniline on sawdust. *Separation Science and Technology*, 46(2), 321-329.
- Liu, D., & Sun, D. (2012). Modeling adsorption of Cu (II) using polyaniline-coated sawdust in a fixed-bed column. *Environmental Engineering Science*, 29(6), 461-465.
- Luo, X., Deng, Z., Lin, X., & Zhang, C. (2011). Fixed-bed column study for Cu²⁺ removal from solution using expanding rice husk. *Journal of hazardous materials*, 187(1-3), 182-189.
- Markovic, R., Stevanovic, J., Stevanovic, Z., Bugarin, M., Nedeljkovic, D., Grujic, A., & Stajic-Trošić, J. (2011). Using the low-cost waste materials for heavy metals removal from the mine wastewater. *Materials Transactions*, 52(10), 1849-1852.

- Martawijaya, A., Kartasujana, I., Mandang, Y. I., Prawira, S. A., & Kadir, K. (2005). Atlas Kayu Indonesia Jilid II (edisi revisi). *Media Aksara. Bogor.*
- Metcalf dan Eddy, *Inc.* (2008). *Wastewater Engineering: Treatment, Disposal and Reuse.* McGraw-Hill, Inc: USA.
- Metcalf dan Eddy, *Inc.* (2003) *Wastewater Engineering: Treatment, Disposal and Reuse.* McGraw-Hill, Inc: USA.
- Mockovčiaková, A., Matik, M., Orolínová, Z., Hudec, P., & Kmecová, E. (2008). Structural characteristics of modified natural zeolite. *Journal of Porous Materials*, 15(5), 559-564.
- Moore, G. C., dan Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research* (2:3), 192-222.
- Motoyuki S (1990). *Adsorption Engineering.* Elsevier Sci. Publishers. pp. 5 – 61.
- Nasruddin, M. (2005). *Dynamic Modeling and Simulation of Two-bed Silicagel Water Adsorption Chiller.* Mainz.
- Niazi, N. K., Murtaza, B., Bibi, I., Shahid, M., White, J. C., Nawaz, M. F., ... & Wang, H. (2016). *Removal and recovery of metals by biosorbents and biochars derived from biowastes.* Environ Mater Waste Resour Recover Pollut Prevention.
- Padmavathy, K. S., Madhu, G., & Haseena, P. V. (2016). A study on effects of pH, adsorbent dosage, time, initial concentration and adsorption isotherm study for the removal of hexavalent chromium (Cr (VI)) from wastewater by magnetite nanoparticles. *Procedia Technology*, 24, 585-594.
- Palar, H., 1994. *Pencemaran & Toksikologi Logam Berat: Rineka Cipta.*
- Peraturan Pemerintah Republik Indonesia Nomor 82 Tahun 2001 tentang Pengelolaan Kualitas Air dan Pengendalian Pencemar Air.
- Peraturan Menteri Lingkungan Hidup Republik Indonesia No 5 tahun 2014. *Tentang Baku Mutu Air Limbah*
- Permenkes, R. I. (2010). No. 492/Menkes. *Per-IV/2010, Tentang Kualitas air minum.*
- Rafatullah, M., Sulaiman, O., Hashim, R., dan Ahmad, A. (2012). Removal of Cadmium (II) From Aqueous Solutions by Adsorption Using Meranti Wood. *Wood Sci Technil*, 46 : 221-222

- Rahman, M. S., & Islam, M. R. (2009). Effects of pH on isotherms modeling for Cu (II) ions adsorption using maple wood sawdust. *Chemical Engineering Journal*, 149(1-3), 273-280.
- Reynolds, T.D. dan Richards, P.A. (1996). *Unit Operation and Process in Environmental Engineering*. California: PWS. Publishing Company.
- Ruthven, S. (1984). *Principles of Adsorption and Adsorption Process*. John Wiley, New York.
- Saranpää, P. (2002). Effect of forest management on wood quality. *Finnish Forest Cluster Research Programme WOOD WISDOM (1998-2001). Final report/Ed. Paavilainen, L.*
- Schofler, M J C, Dijk, V dan Water, B V. (1991). The Netherlands And D. William Fluidized Bed Pellet Reactor to Recovery Metals or Anion. *Journal of Metal Finishing*, Catholic University Of Belgium
- Sekarwati, N. (2014). Dampak Logam Berat Cu (Tembaga) dan Ag (Perak) pada Air limbah Industri Perak Terhadap Kualitas Air Sumur dan Kesehatan Masyarakat serta Upaya Pengendaliannya di Kota Gede Yogyakarta (*Doctoral dissertation, UNS (Sebelas Maret University)*).
- Sembel, Dt. (2015). *Toksikologi Lingkungan Dampak Pencemaran dari Berbagai Bahan Kimia dalam Kehidupan Sehari-hari*. Yogyakarta: Penerbit Andi.
- Semerjian, L. (2018). Removal of heavy metals (Cu, Pb) from aqueous solutions using pine (*Pinus halepensis*) sawdust: Equilibrium, kinetic, and thermodynamic studies. *Environmental technology & innovation*, 12, 91-103.
- Shukla, S. R., & Sakhardande, V. D. (1991). Dyestuffs for improved metal adsorption from effluents. *Dyes and pigments*, 17(1), 11-17.
- Somerville, W. (2007). *Immigration under new labour*. Policy Press.
- Sontheimer, Crittenden dan Summers. 1998. *Activated Carbon for Water Treatment*. DVGW-Forschungsstelle
- Sulastri, S., dan Kristianingrum, S. (2010). Berbagai macam senyawa silika: Sintesis, karakterisasi dan pemanfaatan. In *Prosiding Seminar Nasional Penelitian, Pendidikan dan Penerapan MIPA, Jurusan Pendidikan Kimia, Fakultas MIPA, Universitas Negeri Yogyakarta*.

- Supradata, S. (2005). *Pengolahan Limbah Domestik Menggunakan Tanaman Hias Cyperus alternifolius, L. dalam Sistem Lahan Basah Buatan Aliran Bawah Permukaan (SSF-Wetlands)* (Doctoral dissertation, Program Pasca Sarjana Universitas Diponegoro).
- Syahputra, B. (2020). Pemanfaatan algae *Chlorella pyrenoidosa* untuk menurunkan tembaga (Cu) pada industri pelapisan logam. *Jurnal Lingkungan Sultan Agung*, 2(2), 1-10.
- Takarani, P., Findia, N. S., & Fathoni, R. (2019). *Pengaruh Massa dan Waktu Adsorben Selulosa Dari Kulit Jagung Terhadap Konsentrasi Penyerapan*. Prosiding Seminar Nasional Teknologi, 117-121.
- Tchobanoglous, G. (2014). *Wastewater Engineering: Treatment and Resource Recovery-Vol. 2*. McGraw-Hill.
- Tchobanoglous, G., Burton, F. L., & Stensel, H. D. (1991). *Wastewater engineering. Management*, 7, 1-4.
- Thomas, W. J. F., dan Crittenden, B. (1998). *Adsorption technology and design*. Butterworth-Heinemann.
- Udyani, K. (2013). *Adsorpsi Deterjen Dalam Air Menggunakan Adsorben Karbon Aktif Pada Kolom Fluidisasi*. Tugas Akhir. Sarjana. Jurusan Teknik Kimia, Fakultas Teknologi Industri ITATS.
- Veronika, T., Yusuf, B., & Gunawan, R. (2018). Decreased Level Of Metal Ions Of Copper (Cu) In The Electroplating Industry Waste Water Using Electrodeposition Method. *Jurnal Kimia Mulawarman*, 16(1), 60-65
- Vijayaraghavan, K., & Yun, Y. S. (2008). Bacterial biosorbents and biosorption. *Biotechnology advances*, 26(3), 266-291.
- Voice, T. C. (1997). Activated Carbon Adsorption. In H. M. Freeman (ed), *Standard Handbook of Hazardous Waste Treatment and Disposal* 2nd edn. New York : McGraw-Hill, 6.3-6.21
- Vouk, V. (1986). General chemistry of metals. *Handbook on the toxicology of metals*, 15-35.
- Waliszewska, Pradzynski, W., Zborowska, M., Stachowiak-Wencek, A., Waliszewska, H., & Malysko, E. (2015). Chemical composition of black walnut wood. *Annals of Warsaw University of Life Sciences-SGGW. Forestry and Wood Technology*, 91.

- Wang, Q., & Sarkar, J. (2018). Pyrolysis behaviors of waste coconut shell and husk biomasses. *Towards Energy Sustainability*, 111.
- Wang, G., Liu, J., Wang, X., Xie, Z., & Deng, N. (2009). Adsorption of uranium (VI) from aqueous solution onto cross-linked chitosan. *Journal of hazardous materials*, 168(2-3), 1053-1058.
- Wang, J., & Chen, C. (2009). Biosorbents for heavy metals removal and their future. *Biotechnology advances*, 27(2), 195-226.
- Wang, C., Fu, X. Q., Xue, X. Y., Wang, Y. G., dan Wang, T. H. (2007). Surface accumulation conduction controlled sensing characteristic of p-type CuO nanorods induced by oxygen adsorption. *Nanotechnology*, 18(14):145506.
- Wase, J., dan Foster, C., (1997). *Biosorbents for Metal Ions*. Taylor & Francis, London.
- Widowati, W., Sastiono, A., dan Jusuf, R. (2008). Efek toksik logam, pencegahan dan penanggulangan pencemaran. *Jogjakarta: Andy Offset*.
- Yunitawati, Nurmasari, R., & Mujiyanti D, R. (2011). Kajian pH dan Waktu Kontak Optimum Adsorpsi Cd (II) Dan Zn (II) Pada Humin. *Jurnal Sains dan Terapan Kimia*. 5(2): 151-157.
- Zhang, W, Lei, D, Han, Y, Haijiang, L, Ziwen, J, Xiaowei, K, Hu, Y, Aimin, L dan Rongshi, C. (2011). Removal of Methylene Blue from Aqueous Solutions by Straw Based Adsorbent in a Fixed-Bed Column. *Chemical Engineering Journal*, 173(2)

