

DAFTAR PUSTAKA

- Abas, SNA. Ismail, MHS. Kamal, Md.L. Izhar, S. 2012. Adsorption process of heavy metals by low cost adsorbent : A review. *World Applied Sciences Journal*. 28 (11) : 1518-1530.
- Abdel-Ghany NT and El-Chaghaby GA. 2014. Biosorption for Metal Ions Removal From Aqueous Solutions : A Review Recent Studies. *International Journal of Latest Research in Science and Technology*, 3(1) : 24-42
- Abeer A Alm-Eldeen, Sabry A El-Naggar, Kamal F El-Boray, Hassan A Elgebaly and Ismail H Osman. 2016. Protective Role of *Commiphora molmol* Extract against Liver and Kidney Toxicity Induced by Carbon Tetrachloride in Mice, *Tropical Journal of Pharmaceutical Research*: 15 (1): 65-72.
- Abiola F Adenowo, Muhibah F Ilori, Fatai O Balogun and Mutiu I Kazeem. 2014. Protective Effect of Ethanol Leaf Extract of *Carica papaya* Linn (Caricaceae) in Alloxan-induced Diabetic Rats, *Tropical Journal of Pharmaceutical* : 13 (11): 1877-1882.
- Abu Hasan, H., Abdullah, S.R.S., Kofli, N.T., Kamarudin, S.K. 2012. Isotherm equilibria of Mn²⁺ biosorption in drinking water treatment by locally isolated *Bacillus* species and sewage activated sludge. *J Environ Manage*. 111:34-43.
- Aimi, N., A. Hadi, & W.C. Sien. 2013. Removal of Cu (II) from Water by Adsorption on Chicken Eggshell. *International Journal of Engineering and Technology* 13(01): 40–45.
- Agbozu, I.E., & F.O. Emoruwa. 2014. Batch adsorption of heavy metals (Cu , Pb , Fe , Cr and Cd) from aqueous solutions using coconut husk. *African Journal of Biotechnology* 8: 239–246.
- Ahmad, R., R. Kumar, & S. Haseeb. 2012. Adsorption of Cu²⁺ from aqueous solution onto iron oxide coated eggshell powder: Evaluation of equilibrium, isotherms, kinetics, and regeneration capacity. *Arabian Journal of Chemistry* 5(3): 353–359.
- Ahmed, A.J., Begum, A.S., 2012. Adsorption Of Copper From Aqueous Solution. Using Low-Cost Adsorbent. *Archives of Applied Research*. 4(3) : 1532-1539.
- Ali, Ashraf, Khalid Saeed, Fazal Mabood, 2016, Removal of chromium (VI) from aqueous medium using chemically modified banana peels as efficient low-cost adsorbent, *Alexandria Engineering Journal*, 55: 2933–2942.
- Almansour, MI. 2008. Soybean Extract Antioxidant Protective Ectivity Against Copper Induced Cytotoxicity. *International Journal of Zoological Research*. 4 (3) : 165-175
- Amer MW, Ahmad RA, Awwad AM. 2015. Biosorption of Cu(II), Ni(II), Zn(II) and Pb(II) ions from aqueous solution by *Sophora japonica* pods powder. *International Journal of Industrial Chemistry*. 6(1) : 67-75.

- Antunes, WM. Luna, AS. Hanriques, CA. da Costa, ACA. 2003. An evaluation of copper biosorption by a brown seaweed under optimized conditions. *Electronic Journal of Biotechnology*. 6 (3) : 174-184.
- Ashish, B., Neeti, K. and Himanshu, K. 2013. *Research Journal of Recent Sciences* 2, 58. Saman Khan, Abida Farooqi, M. Ihsan Danish & Akif Zeb, *Ijrras*, 16(2), 297.
- Almansour, MI. 2008. Soybean Extract Antioxidant Protective Activity Against Copper Induced Cytotoxicity. *International Journal of Zoological Research*. 4 (3) : 165-175.
- Al-Tamimi, A. H., Al-Azzawi, A. J., & Al-A'dhmi, M. A. 2015. Chronic toxicity assessment of histological changes and micronuclei in fish *Cyprinus carpio* L. after exposed to copper. *American Scientific Research Journal for Engineering, Technology and Sciences*, 13(1), 194–210.
- Anayurt R.A., A. Sari., M. Tuzen. 2009. Equilibrium, thermodynamic and kinetic studies on biosorption of Pb(II) and Cd(II) from aqueous solution by macrofungus (*Lactarius scrobiculatus*) biomass., *Chemical Engineering Journal*, Vol. 151 : 255-261.
- Babaknejad, N., Moshtaghi, A.S., Shahanipour, K. 2015. The Toxicity Of Copper On Serum Parameters Related To Renal Functions In Male Wistar Rats. *Zahedan Journal Of Research In Medical Sciences*. 15: 29-31.
- Baker, S., Crump, K., Dourson, M., Haber, L., Hertzberg, R., 2007. Copper and human health: biochemistry, genetics, and strategies for modeling dose-response relationships. <https://doi.org/10.1080/10937400600755911>
- Bharali, MK. 2013. Effect of acute lead acetate exposure on liver of mice. *Journal of Global Biosciences*. 2 (5) : 121-125.
- C. N. Ginting, E. Fachrial, Almahdy, E. Yerizel, and R. Zein. 2017. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 8(2).
- Darweesh, Teeba M. dan Muthanna J. Ahmed, 2017, Batch and fixed bed adsorption of levofloxacin on granular activated carbon from date (*Phoenix dactylifera* L.) stones by KOH chemical activation, *Environmental Toxicology and Pharmacology*, 50: 159–166.
- Chaidir Z, Refilda, Munaf E, Almahdy, Fachrial E, Samin B. 2015. Biosorption of Cu(II) from aqueous solution using soursop (*Annona muricata* L) leaves powder as biosorbent. *Journal of Chemical and Pharmaceutical Research*. 7(9S) : 22-27.
- Demirbas, A. 2008. Heavy Metal adsorption onto agro-base waste material: a review. *J Hazard Mater*. 157: 220 – 229.
- Dalimartha, S. 1999. *Atlas Tumbuhan Obat Indonesia*. Jakarta : Trubus Agriwidya.
- Das, N.; Vimala, R.; Karthika, P. 2008. Biosorption of Heavy Metals - An Overview. *Indian Journal of Biotechnology*, 7, 159–169.

- Eduardo OC, Kaue A, Idania AA, et al. Influence of hemodialysis on the plasma concentration of adenosine deaminase in patients with chronic kidney disease. *J Bras Patol Med Lab.* 2015;51:153-157.
- El-Sayed, G.O. Dessouki, H.A. Ibrahim, S.S. 2010. Biosorption of Ni (II) and Cd (II) Ions From Aqueous Solutions Onto Rice Straw. *Chemical Sciences Journal.* Vol 2010 : 1-11
- El Hassouni, H Abdellaoui, D. El Hani,S. 2014. Biosorption of Cadmium (II) and Copper (II) from Aqueous Solution Using Red Alga (Osmundea pinnatifida). *J.Mater.EnvIRON.Sci.* 5(4) : 967-974.
- Evan Sabina Prince, Poorna Parameswari, Rasool Mahaboob Khanc. 2011. Protective Effect of *Ricinus communis* Leaves Extract on Carbon Tetrachloride Induced Hepatotoxicity in Albino Rats, *Iranian Journal of Pharmaceutical Sciences* : 7(4): 269-278.
- Ghani, N.T.A., El-Chaghaby, G.A., 2014. Biosorption for metal ions removal from aqueous solutions : A review of recent studies. *International Journal of Latest Research in Science and Technology.* 3(1) : 24-42
- Garcia-Nino W.R and pedraza-Chaverri, J. 2014. Protective effect of curcumin against heavy metals-induced liver damage. *Food and Chemical Toxicology* 69: 182-201.
- Gupta, VK. Rastogi, A. 2008. Biosorption of lead from Aqueous Solutions by Green Algae *Spirogyra* Species: Kinetics and Equilibrium Studies. *Journal of Hazardous Materials.* DOI:10.1016/j.j.07.028.
- Gupta, V.K., Rastogi, A., Nayak, A. 2010. Biosorption of nickel onto treated alga (*Oedogonium hatei*) : application of isotherm and kinetics models. *J Colloid Interface Sci.* 342 : 533-539.
- Hashish, EA and Elgami, SA. 2015. Hepatoprotective and Nephroprotective Effect of Curcumin Against Copper Toxicity in Rats. *Ind.J.Clin. Biochem.* 4-11.
- Harmiwati, Salmariza, Kurniawati, D., Lestari, I., Munaf, E., Desmiarti, R., Zein, R., 2015. Biosorption of cadmium ion from aqueous solutions by low-cost soybean waste (*Glycine max*). *J. Chem. Pharm. Res.* 7, 94–100.
- Hossain, M.Ngo,H.H.Guo,W.S.Setiadi,T. 2012. Adsorption and desorption of copper (II) ions onto garden grass. *Bioresour Technol.* 121:386-395.
- Joo, J.H., Hassan, S.H., Oh,S.E. 2010. Comparative study of biosorption of Zn²⁺ by *Pseudomonas aeruginosa* and *Bacillus cereus*. *Int Biodeterior Biodegradation.* 64 : 734-741.
- Kanyal, M., & A.A. Bhatt. 2015. Removal of Heavy Metals from Water (Cu and Pb) Using Household Waste as an Adsorbent. *Bioremediation and Biodegradation* 6(1): 1–6.

- Kolel Banerjee, ST. Ramesh, PV. Gandimathi, Nidesh and Bharathi Iranica, KS. 2012. A novel agricultural waste adsorbent, watermelons shell for the removal of copper from aqueous solutions. *Iranica Journal of Energy and Environment*. 3 (2) : 143-156.
- K. J., A., & D. Madhu, G. 2014. A Comparative Study on Metal Adsorption Properties of Different Forms of Chitosan. *International journal of inovative research in science, engineering and techology* 3(2): 9609–9617.
- Kumar, PS and Kirthika, K. 2009. Equilibrium and kinetic study of adsorption of nickel from aqueous solution onto bael tree leaf powder. *Journal of Engineering Science and Technology*. 4 : 352-262.
- Khajehnasiri, F., Mortazavi, B.S., Allameh, A., Akhondzadeh, S., and Hashemi, H., 2013. Total Antioxidant Capacity and Malondialdehyde in Depressive Rotational Shift Workers. *Hindawi Publishing Corporation Journal of Environmental and Public Health*. Volume 2013, Article ID 150693, 5 pages.
- Khan, S., Farooqi, A., Danish, M.I., Zeb, A. 2013. Biosorption Of Copper(II) From Aqueous Solution Using *Citrus sinensis* Peel And Wood Sawdust: Utilization In Purification Of Drinking And Water. *IJRRAS*. 16(2); 297-306.
- Lestari, I. et al. 2016. Effect of pH on the biosorption of heavy metal by alginate immobilized durian (*Durio zibethinus*) seed. *Der Pharma Chemica* 8(5): 294–300.
- Li Y, Helmreich B, Horn H. 2011. Biosorption of Cu(II) Ions From Aqueous Solution by Red Alga (*Palmaria palmate*) and Beer Draff. *Materials Sciences and Applications*. 2(2) : 70-80.
- Li, S.; Tan, H.; Wang, N.; Zhang, Z.; Lao, L.; Wong, C.; Feng, Y. 2015. The Role of Oxidative Stress and Antioxidants in Liver Diseases. *International Journal of Molecular Sciences*, 26087–26124.
- Lukman, S., M.H. Essa, N.D. Mu'azu, A. Bukhari, & C. Basheer. 2013. Adsorption and desorption of heavy metals onto natural clay material: Influence of initial pH. *Journal of Environmental Science and Technology* 6(1); 1–15.
- Massadeh, AM. Al-Safi, SA. Momani, IF. Al-Mahmoud, M. Alkofahi, AS. 2007. Analysis of Cadmium and Lead in Mice Organs. *Biological Trace Element Research*. 115 : 157-167
- Middleton E, Kaswandi C, Theoharides T.C. 2000. The effects of plants flavonoids on mammalian cells, implications for inflammation, heart disease, and cancer. *The Americans Society for Pharmacology and Experimental Therapeutics. Pharmacol*; 52(4):711-22.
- Munagapati, V.S., Yarramuthi, V., Nadavala, S.K., Alla, S.R., Abburi, K. 2010. Biosorption of Cu (II), Cd(II) dan Pb(II) by *Acacia leucocephala* bark powder : Kinetics, equilibrium and thermodynamics. *Chem Eng J*. 157 : 357-365.

- Nasution, A.N., Y. Amrina, R. Zein, H. Aziz, & E. Munaf. 2015. Biosorption characteristics of Cd (II) ions using herbal plant of mahkota dewa (*Phaleria macrocarpa*). *Journal of Chemical and Pharmaceutical Research* 7(7): 189–196.
- Nazaruddin, N., Zein, R.,Munaf, E.,Jin, J. 2014. Biosorption of Copper (II), Lead (II), Cadmium (II) and Zinc (II) ions from aqueous solution by *Nypa fruticans* Merr Shell on batch method.*Journal of Chemical and Pharmaceutical Research*. 6(12) : 370-376.
- Ngah, W.S. Hanafiah, M.A.K.M. 2008. Biosorption of copper ions from dilute aqueous solutions on base treated rubber (*Hevea brasiliensis*) leaves powder : kinetics, isotherm and biosorption mechanisms. *Journal of Environmental Sciences*. 20 (10) : 1168-1176.
- Pahlavanzadeh, H., Kesthkar,R., Safdari, J. Abadi, Z. 2010. Biosorption of nickel (II) from aqueous solution by brown algae : equilibrium, dynamic and thermodynamic studies. *J Hazard Mater*. 175 : 304-310.
- Patel, R and Chandel, M. 2015. Effect of pH and Temperature on the Biosorption of Heavy Metals by *Bacillus licheniformis*. *International Journal of Science and Research (IJSR)*. 4 (1) : 2272-2276.
- Rao, L.N and Prabhakar, G. 2011. Removal of Heavy Metals By Biosorption-An Overall Review. *Journal of Engineering Research and Studies*.2(4) :17-22.
- Ratafullah, M. Sulaiman, O. Hashim, R and Ahmad, A. 2009. Adsorption of copper (II), chromium (III), nickel (II) and lead (II) ions from aqueous solutions by meranti sawdust. *Journal of Hazardous Materials*. 170 : 969-977.
- Rathinam, A., Maharshi, B., Janardhanan, S.K., Jonnalagdda, R.R., Nair, B.U. 2010. Biosorption of cadmium metal ion from simulated wastewaters using *Hypnea valentiae* biomass : a kinetic and thermodynamic study. *Bioresour Technol*. 101 : 1466-1470.
- Raza, M.H. Sadiq, A. Faroq, U. Athar, M. Hussain, T. Mujahid, A. Salman, M. 2015. *Phragmites karka* as a Biosorbent for the Removal of Mercury Metal Ions from Aqueous Solution : Effect of Modification. *Journal of Chemistry*. Vol 2015 : 1-12
- Reddy, D.H.K., Ramana, D.K.V., Seshaiyah, K., Reddy, V.R. 2011. Biosorption of Ni (II) from aqueous phase by *Moringa oleifera* bark, a low cost biosorbent. *Desalination*. 268 : 150-157.
- Rodriguez-castro, K.I., Hevia-urrutia, F.J., Sturniolo, G.C., Rodriguez-castro, K.I., Terme, P.A., Terme, A., Rodriguez-castro, K.I., Hevia-, F.J., San, H., Dios, J. De, José, S., Rica, C., Rodriguez-castro, K.I., Sturniolo, G.C., Hevia-urrutia, F.J., Cima, H., Postal, A., José, S., Rica, C., 2015. Wilson ' s disease : A review of what we have learned. *world J. Hepatol*. 7, 2859–2870.
- Rustam, E.,Masri, M.,Arifin, H.2011.Penentuan LD-50 Dan Kajian Toksisitas Tertunda Ekstrak Etanol Daun *Nathopanaxscutellarium* Merr.*Jurnal Medika Planta*.1(3);75-82.

- Sadeq, O.R Al-Masri, I And Al-Kharaz, K. 2014. The effect of ibuprofen on hepatic glutamic puruvic transaminase (SGPT).Glutamic oxaloacetic transaminase (SGOT) and alkaline phosphatase (ALP) in dental patients.Internasional Jounar of pharma and Biosciences.
- Salehi P, Asghari B,Mohammadi F. 2010. Biosorption of Ni(II), Cu(II) and Pb(II) by Punica geranatum from aqueous solutions. Journal of Water Resource and Protection. 2(8) : 701-705.
- Samin, B.; Fachrial, E.; Munaf, E.; Chaidir, Z.2015. Adsorption Profile of Cu (II) Using Soursop (Annona Muricata L) Leaves Powder as Biosorbent. *Journal of Chemical and Pharmaceutical Research*, 7 (9S), 22–27.
- Salmani, M.H., M.H. Ehrampoush, S. Sheikhalishahi, & M. Dehvari. 2012. Removing Copper from Contaminated Water Using Activated Carbon Sorbent by Continuous Flow. *Journal of Health Research* 1(1): 11–18.
- Sulaiman, MS. 2015. Factors Affecting Biosorption of Cu (II) Ions From Industrial Wastewater. *Applied Research Journal*. 1 (5) : 311-315
- Singh D. 2011. Removal of copper (II) from aqueous solution by non-living Oscillatoria sp. WIT Transactions on Ecology and The Environment. 167 : 333-340.
- Sirilamduan,C.,Umpuch,C., Kaewsarn,P.2011.Removal Of Copper From Aqueous By Adsorption Using Modify *Zalacca edulis* peel modify.*Songklanakarinn Journal Of Science And Technology*. 33(6):725-732.
- Suyono, T., Yuser, M., Munaf, E., Aziz, H., Tjong, D.H., Zein, R., 2015. Removal of Pb (II) ions by using papaya (*Carica Papaya L*) leaves and Petai (*Parkia Speciosa Hassk*) peels as biosorbent. *J. Chem. Pharm. Res.* 7, 5–12.
- Suyono, T., Fachrial, E., Zein, R.,Chaidir, Z., Tjong, D.H., Aziz, H. 2016. The Effect of Pb(II) in the kidney of Experimental rats and the effectiveness of papaya (carica papaya) leaves powder as an antidote. *Research journal of pharmaceutical, biological and chemical sciences*,November-december 2016., RJPBS 7(6): Page No. 2172.
- Kumar V, Fausto N.. Cellular adaptations, cell injury,and cell death. Dalam : Kumar V Abbas AK, Fausto N, editor (penyunting). *Patologic basic of disease*. Philadelphia. Elsevier; 2005.
- Tay CC, Liew HH, Yong SK, Surif S, Redzwan G, Abdul Talib S.2012. Cu(II) Removal on to Fungal Derived Biosorbents : Biosorption Performance and The Half Saturation Constant Concentration Approach. *International Journal of Research in Chemistry and Environment*. 2(3) :138-143.
- Tchounwou, PB. Yedjou, CG. Patlolla, AK and Sutton, DJ. 2012. Heavy Metals Toxicity and the Environment. *NIH Public Access*. 101 : 133-164

- Tumin,N.D.,Chuah,L.A.,Zawani,Z.,Rashid,A.S.2008.Adsorption Of Copper From AqueousSolution By *Elais guineensis* Kernel Activated Carbon.*Journal Of Engineering Science And Technology*.3(2): 180-189.
- Tichaona,N.,Maria,M.N.,Emaculate,M.,Fidelis,C.,Upenyu,G.,Benias,N.2013.Isotherm Study Of the Biosorption Of Cu(II) From Aqueous Solution By *Vigna Subterranea*(L.) Verdc Hull.*Journal Of Scientific & Technology Research*. 2 : 119-206.
- Wahyuni,D.,Furqani,F.,Astuti,A.W.,Khoiriah,Indrawati,Zein,R., Munaf,E. 2014. Removal Of Cadmium (II) And Copper (II) From Aqueous Solution By Using Langsung Fruit (*Lansium Domesticum Corr*) Seed.*Research Journal Of Pharmaceutical,Biological And Chemical Sciences*. 5(5):1320-1328.
- Wientarsih, I., R. Madyastuti, B. F. Prasetyo dan D. Firnanda. 2012. Gambaran Serum Ureum dan Kreatinin pada Tikus Putih yang Diberi Fraksi Etil Asetat Daun Alpukat. *Jurnal veteriner* 13 (1): 57-62.
- Yahaya,Y.A and Don, M.M. 2014. *Pycnoporus sanguineus* as potential Biosorbent for Heavy Metal Removal from Aqueous Solution : A Review. *J. of Physical Sci.* 25 (1) : 1-32.
- Yusoff, SNM. Kamari, A. Putra, WP. Ishak, CF. Mohamed, A. Hashim, N. Isa IM. 2014. Removal of Cu(II), Pb(II) and Zn(II) Ions From Aqueous Soltions Using Selected Agricultrual Wastes : Adsorption and Characterization Studies. *Journal of Enviromental Protection*. 5 : 289-300.
- Velkova,Z.,Stytcheva,M.,Gochev,V.2012.Biosorption of Cu (II) Onto Chemically Modified Waste Mycelium Of *Aspergillus awamori*: Equilibrium, Kinetics and Modeling Studies.*J.BioSci.Biotech*.1(2):163-169.
- Vijayakumar, S. Sasikala, M. Dhanapal, R. 2012.Copper Poisoning-A Short Review. *International Journal of Pharmacology & Toxicology*. 2 (1) : 39-43.
- Valko, M. Morris, H. Cronin, MTD. 2005. Metals, Toxicity and Oxidative Stress. *Current Medicinal Chemistry*. 12 : 1161-1208
- Zein, R., Suhaili, R., Earnestly, F., Indrawati, Munaf, E., 2010. Removal of Pb(II), Cd(II) and Co(II) from aqueous solution using *Garcinia mangostana* L. fruit shell. *J. Hazard. Mater.* 181, 52–56.
- Zein, R., Hidayat, A.D., Elfia,M., Nazarudin, N., 2014. Munaf, E. Sugar Palm *Arenga pinnata* Mer (Magnoliophyta) fruit shell as biomaterial to remove Cr(III), Cr(VI), Cd(II), and Zn(II) from aqueous solution. *Journal of Water Supply: Research and Technology-Aqua*, 63(7), 553.
- Zein, R., S. Syukri,, M. Muhammad., I. Pratiwi., D.R. Yutaro. 2018. The Ability of *Pensi* (*Corbicula moltkiana*) shell to adsorb Cd(II) and Cr(IV) ions. *AIP Conference Proceedings*, 2023(020099).

Zuraida. Eti Yerizel. Eliza Anas. 2015. Pengaruh Pemberian Ekstrak Rosella (*Hibiscus sabdariffa Linn*) Terhadap Kadar Malondialdehid dan Aktivitas Katalase Tikus yang Terpapar Karbon Tetraklorid, Jurnal Kesehatan Andalas. 2015; 4(3), 795-802.

