

REFERENCES

- Abdel-Aty, A. M., Ammar, N. S., Ghafar, H. H. A., & Ali, R. K. (2013). Biosorption of cadmium and lead from aqueous solution by fresh water alga *Anabaena sphaerica* biomass. *Journal of Advanced Research*, 4(4), 367-374.
- Abollino, O., Giacomino, A., Malandrino, M., & Mentasti, E. (2008). Interaction of metal ions with montmorillonite and vermiculite. *Applied Clay Science*, 38(3), 227-236.
- Abou-Shady, A., Peng, C., Bi, J., & Xu, H. (2012). Recovery of Pb (II) and removal of NO₃⁻ from aqueous solutions using integrated electro dialysis, electrolysis, and adsorption process. *Desalination*, 286, 304-315.
- Adedapo, A. D., Osude, Y. O., Adedapo, A. A., Moody, J. O., Adeagbo, A. S., Olajide, O. A., & Makinde, J. M. (2009). Blood pressure lowering effect of *Adenantha pavonina* seed extract on normotensive rats. *Records of Natural Products*, 3(2), 82.
- Agelidis, T., Fytianos, K., Vasilikiotis, G., & Jannakoudakis, D. (1988). Lead removal from wastewater by cementation utilising a fixed bed of iron spheres. *Environmental Pollution*, 50(3), 243-251.
- Ahalya, N., Ramachandra, T. V., & Kanamadi, R. D. (2003). Biosorption of heavy metals. *Research Journal of Chemistry and Environment*, 7(4), 71-79.
- Ahluwalia, S. S., & Goyal, D. (2007). Microbial and plant derived biomass for removal of heavy metals from wastewater. *Bioresource Technology*, 98(12), 2243-2257.
- Ahmad, A., Rafatullah, M., Sulaiman, O., Ibrahim, M. H., Chii, Y. Y., & Siddique, B. M. (2009). Removal of Cu (II) and Pb (II) ions from aqueous solutions by adsorption on sawdust of Meranti wood. *Desalination*, 247(1-3), 636-646.
- Ahmady-Asbchin, S., Tabaraki, R., Jafari, N., Allahverdi, A., & Azhdehakhoshpour, A. (2013). Study of nickel and copper biosorption on brown algae *Sargassum angustifolium*: application of response surface methodology (RSM). *Environmental Technology*, 34(16), 2423-2431.
- Akar, S. T., Akar, T., Kaynak, Z., Anilan, B., Cabuk, A., Tabak, Ö., ... & Gedikbey, T. (2009). Removal of copper (II) ions from synthetic solution and real wastewater by the combined action of dried *Trametes versicolor* cells and montmorillonite. *Hydrometallurgy*, 97(1-2), 98-104.
- Akar, T., & Tunali, S. (2005). Biosorption performance of *Botrytis cinerea* fungal by-products for removal of Cd (II) and Cu (II) ions from aqueous solutions. *Minerals Engineering*, 18(11), 1099-1109.
- Akkaya, G., & Özer, A. (2005). Biosorption of Acid Red 274 (AR 274) on *Dicranella varia*: Determination of equilibrium and kinetic model parameters. *Process Biochemistry*, 40(11), 3559-3568.

- Aksu, Z., & Yener, J. (2001). A comparative adsorption/biosorption study of mono-chlorinated phenols onto various sorbents. *Waste management*, 21(8), 695-702. (cited from Jain *et al.* 2016)
- Al-Asheh, S., & Duvnjak, Z. (1997). Sorption of cadmium and other heavy metals by pine bark. *Journal of Hazardous Materials*, 56(1-2), 35-51.
- Al-Dujaili, A. H., Awwad, A. M., & Salem, N. M. (2012). Biosorption of cadmium (II) onto loquat leaves (*Eriobotrya japonica*) and their ash from aqueous solution, equilibrium, kinetics, and thermodynamic studies. *International Journal of Industrial Chemistry*, 3(1), 22.
- Alfvén, T., Elinder, C. G., Carlsson, M. D., Grubb, A., Hellström, L., Persson, B., ... & Järup, L. (2000). Low-level cadmium exposure and osteoporosis. *Journal of Bone and Mineral Research*, 15(8), 1579-1586.
- Al-Hiyaly, S. A. K., McNeilly, T., Bradshaw, A. D., & Mortimer, A. M. (1993). The effect of zinc contamination from electricity pylons. Genetic constraints on selection for zinc tolerance. *Heredity*, 70(1), 22.
- Allievi, M. C., Sabbione, F., Prado-Acosta, M., Palomino, M. M., Ruzal, S. M., & Sanchez-Rivas, C. (2011). Metal biosorption by surface-layer proteins from *Bacillus* species. *Journal of Microbiology and Biotechnology*, 21(2), 147-153.
- Al-Shannag, M., Al-Qodah, Z., Nawasreh, M., Al-Hamamreh, Z., Bani-Melhem, K., & Alkasrawi, M. (2017). On the performance of *Ballota Undulata* biomass for the removal of cadmium (II) ions from water. *Desalination and Water Treatment*, 67, 223-230.
- Altun, T., & Pehlivan, E. (2007). Removal of Copper (II) Ions from Aqueous Solutions by Walnut, Hazelnut and Almond Shells. *CLEAN-Soil, Air, Water*, 35(6), 601-606.
- Alyüz, B., & Veli, S. (2009). Kinetics and equilibrium studies for the removal of nickel and zinc from aqueous solutions by ion exchange resins. *Journal of Hazardous Materials*, 167(1), 482-488.
- Amarasinghe, B. M. W. P. K., & Williams, R. A. (2007). Tea waste as a low cost adsorbent for the removal of Cu and Pb from wastewater. *Chemical Engineering Journal*, 132(1), 299-309.
- Ammari, T. G. (2014). Utilization of a natural ecosystem bio-waste; leaves of *Arundo donax* reed, as a raw material of low-cost eco-biosorbent for cadmium removal from aqueous phase. *Ecological Engineering*, 71, 466-473.
- Angelidis, T., Fytianos, K., & Vasilikiotis, G. (1989). Lead recovery from aqueous solution and wastewater by cementation utilizing an iron rotating disc. *Resources, Conservation and Recycling*, 2(2), 131-138.

- Angino, E. E., Magnuson, L. M., Waugh, T. C., Galle, O. K., & Bredfeldt, J. (1970). Arsenic in detergents: possible danger and pollution hazard. *Science*, *168*(3929), 389-390.
- Anwar, J., Shafique, U., Salman, M., Dar, A., & Anwar, S. (2010). Removal of Pb (II) and Cd (II) from water by adsorption on peels of banana. *Bioresource Technology*, *101*(6), 1752-1755.
- Aoyama, M., Kishino, M., & Jo, T. S. (2005). Biosorption of Cr (VI) on Japanese cedar bark. *Separation Science and Technology*, *39*(5), 1149-1162.
- APHA. (2005). *Standard methods for the examination of water and wastewater* (Vol. 2). American Public Health Association.
- Argun, M. E., & Dursun, S. (2008). Cadmium removal using activated pine bark. *Journal of International Environment Application & Science*, *3*(1), 37-42.
- Arief, V. O., Trilestari, K., Sunarso, J., Indraswati, N., & Ismadji, S. (2008). Recent progress on biosorption of heavy metals from liquids using low cost biosorbents: characterization, biosorption parameters and mechanism studies. *CLEAN–Soil, Air, Water*, *36*(12), 937-962.
- Arul Manikandan, N., Alemu, A. K., Goswami, L., Pakshirajan, K., & Pugazhenthii, G. (2016). Waste litchi peels for cr (vi) removal from synthetic wastewater in batch and continuous systems: sorbent characterization, regeneration and reuse study. *Journal of Environmental Engineering*, *142*(9), C4016001.
- ATSDR, Cadmium Fact Sheet (7440-43-9), Information Center, Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services. Retrieved from <https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=48&tid=15>
- Aydın, H., Bulut, Y., & Yerlikaya, Ç. (2008). Removal of copper (II) from aqueous solution by adsorption onto low-cost adsorbents. *Journal of Environmental Management*, *87*(1), 37-45.
- Babarinde, N. A., Babalola, J. O., & Sanni, R. A. (2006). Biosorption of lead ions from aqueous solution by maize leaf. *International Journal of Physical Sciences*, *1*(1), 23-26.
- Babel, S., & Kurniawan, T. A. (2003). Low-cost adsorbents for heavy metals uptake from contaminated water: a review. *Journal of Hazardous Materials*, *97*(1), 219-243.
- Bailey, S. E., Olin, T. J., Bricka, R. M., & Adrian, D. D. (1999). A review of potentially low-cost sorbents for heavy metals. *Water Research*, *33*(11), 2469-2479.
- Balogun, A. M., & Fetuga, B. L. (1985). Fatty acid composition of seed oils of some members of the Leguminosae family. *Food chemistry*, *17*(3), 175-182.

- Banerjee, K., Cheremisinoff, P. N., & Cheng, S. L. (1997). Adsorption kinetics of o-xylene by flyash. *Water Research*, 31(2), 249-261.
- Barbosa Jr, F., Tanus-Santos, J. E., Gerlach, R. F., & Parsons, P. J. (2005). A critical review of biomarkers used for monitoring human exposure to lead: advantages, limitations, and future needs. *Environmental Health Perspectives*, 113(12), 1669-1674.
- Barghiani, C., Gloffre, D., & Bargali, R. (1987). Mercury content in *Pinus* Sp of the Mt. Etna volcanic area. In *Heavy metals in the Environment*, 2. (cited from Nagajyoti *et al.*, 2010)
- Barka, N., Abdennouri, M., Boussaoud, A., & Makhfouk, M. E. (2010). Biosorption characteristics of Cadmium (II) onto *Scolymus hispanicus* L. as low-cost natural biosorbent. *Desalination*, 258(1), 66-71.
- Barrett, E. P., Joyner, L. G., & Halenda, P. P. (1951). The determination of pore volume and area distributions in porous substances. I. Computations from nitrogen isotherms. *Journal of the American Chemical Society*, 73(1), 373-380.
- Bassi, R., Prasher, S. O., & Simpson, B. K. (2000). Removal of selected metal ions from aqueous solutions using chitosan flakes. *Separation Science and Technology*, 35(4), 547-560.
- Basu, M., Guha, A. K., & Ray, L. (2017). Adsorption of cadmium ions by cucumber peel in continuous mode. *International Journal of Environmental Science and Technology*, 1-12.
- Bautista-Toledo, I., Rivera-Utrilla, J., Ferro-Garcia, M. A., & Moreno-Castilla, C. (1994). Influence of the oxygen surface complexes of activated carbons on the adsorption of chromium ions from aqueous solutions: Effect of sodium chloride and humic acid. *Carbon*, 32(1), 93-100.
- Baysal, Z., Cinar, E., Bulut, Y., Alkan, H., & Dogru, M. (2009). Equilibrium and thermodynamic studies on biosorption of Pb (II) onto *Candida albicans* biomass. *Journal of Hazardous Materials*, 161(1), 62-67.
- Benthal, A. P. (1946). The Trees of Calcutta and its neighbourhood. *The Trees of Calcutta and its neighbourhood*.
- Bertazzoli, R., Widner, R. C., Lanza, M. R., Di Iglia, R. A., & Sousa, M. F. (1997). Electrolytic removal of metals using a flow-through cell with a reticulated vitreous carbon cathode. *Journal of the Brazilian Chemical Society*, 8(5), 487-493.
- Beszedits, S. (1988). Chromium removal from industrial wastewaters. *Chromium in the natural and human environments*, 232-263. (cited from Ramachandra *et al.*, 2005)
- Bhatnagar, A., Minocha, A. K., & Sillanpää, M. (2010). Adsorptive removal of cobalt from aqueous solution by utilizing lemon peel as biosorbent. *Biochemical Engineering Journal*, 48(2), 181-186. (cited from Arul Manikandan *et al.* 2016)

- Bhattacharya, A. K., & Venkobachar, C. (1984). Removal of cadmium (II) by low cost adsorbents. *Journal of Environmental Engineering*, 110(1), 110-122.
- Bhattacharyya, K. G., & Gupta, S. S. (2008). Influence of acid activation on adsorption of Ni (II) and Cu (II) on kaolinite and montmorillonite: kinetic and thermodynamic study. *Chemical Engineering Journal*, 136(1), 1-13.
- Bhatti, H. N., Samin, G., & Hanif, M. A. (2008). Enhanced removal of Cu (II) and Pb (II) from aqueous solutions by pretreated biomass of *Fusarium solani*. *Journal of the Chinese Chemical Society*, 55(6), 1235-1242.
- Bohli, T., Villaescusa, I., & Ouederni, A. (2013). Comparative study of bivalent cationic metals adsorption Pb (II), Cd (II), Ni (II) and Cu (II) on olive stones chemically activated carbon. *Journal of Chemical Engineering & Process Technology*, 4(4), 10001581000151-1000158.
- Bolter, E. (1974). *Distribution of heavy metals in soils near an active lead smelter*. University of Missouri--Rolla, Department of Civil Engineering. (cited from Sharma, 2004)
- Bourikas, K., Vakros, J., Kordulis, C., & Lycourghiotis, A. (2003). Potentiometric mass titrations: experimental and theoretical establishment of a new technique for determining the point of zero charge (PZC) of metal (hydr) oxides. *The Journal of Physical Chemistry B*, 107(35), 9441-9451.
- Bradford, W. L. (1977). Urban stormwater pollutant loadings: a statistical summary through 1972. *Journal (Water Pollution Control Federation)*, 613-622.
- Brigatti, M. F., Campana, G., Medici, L., & Poppi, L. (1996). The influence of layer charge on Zn²⁺ and Pb²⁺ sorption by smectites. *Clay Minerals*, 31(4), 477-483.
- Brinza, L., Nygård, C. A., Dring, M. J., Gavrilesco, M., & Benning, L. G. (2009). Cadmium tolerance and adsorption by the marine brown alga *Fucus vesiculosus* from the Irish Sea and the Bothnian Sea. *Bioresource Technology*, 100(5), 1727-1733.
- Brunauer, S., Emmett, P. H., & Teller, E. (1938). Adsorption of gases in multimolecular layers. *Journal of the American Chemical Society*, 60(2), 309-319.
- Bunluesin, S., Kruatrachue, M., Pokethitiyook, P., Upatham, S., & Lanza, G. R. (2007). Batch and continuous packed column studies of cadmium biosorption by *Hydrilla verticillata* biomass. *Journal of Bioscience and Bioengineering*, 103(6), 509-513.
- Burkill, H. M. (1994). *The useful plants of west tropical Africa. Volume 2: Families EI (No. Edn 2)*. Royal Botanic Gardens.
- Burkill, I. H. (1966). A dictionary of the economic products of the Malay Peninsula. *A Dictionary of the Economic Products of the Malay Peninsula.*, 2(2nd edition). Retrieved from <https://www.cabi.org/isc/abstract/19680304804>

- Canfield, R. L., Henderson Jr, C. R., Cory-Slechta, D. A., Cox, C., Jusko, T. A., & Lanphear, B. P. (2003). Intellectual impairment in children with blood lead concentrations below 10 μg per deciliter. *New England Journal of Medicine*, 348(16), 1517-1526.
- Cannon, H. L., Connally, G. G., Epstein, J. B., Parker, J. G., Thornton, I., & Wixson, G. (1978). Rocks: geological sources of most trace elements. In *Report to the Workshop at South Scas Plantation Captiva Island, FL, US. Geochem Environ* (Vol. 3, pp. 17-31).
- Çelik, S., Akar, S. T., Şölener, M., & Akar, T. (2017). Anionically reinforced hydrogel network entrapped fungal cells for retention of cadmium in the contaminated aquatic media. *Journal of Environmental Management*, 204(1), 583-593.
- Chakravarty, P. (2011). *Heartwood of Areca catechu a new biosorbent for the removal of heavy metals from contaminated water* (Doctoral thesis). Retrieved from <http://hdl.handle.net/10603/116140>
- Chakravarty, P., Deka, D. C., Sarma, N. S., & Sarma, H. P. (2012). Removal of copper (II) from wastewater by heartwood powder of *Areca catechu*: kinetic and equilibrium studies. *Desalination and Water Treatment*, 40(1-3), 194-203.
- Chakravarty, P., Sarma, N. S., & Sarma, H. P. (2010). Biosorption of cadmium (II) from aqueous solution using heartwood powder of *Areca catechu*. *Chemical Engineering Journal*, 162(3), 949-955.
- Chakravarty, P., Sarma, N. S., & Sarma, H. P. (2010). Removal of lead (II) from aqueous solution using heartwood of *Areca catechu* powder. *Desalination*, 256(1), 16-21.
- Chakravarty, S., Mohanty, A., Sudha, T. N., Upadhyay, A. K., Konar, J., Sircar, J. K., ... & Gupta, K. K. (2010). Removal of Pb (II) ions from aqueous solution by adsorption using bael leaves (*Aegle marmelos*). *Journal of Hazardous Materials*, 173(1), 502-509.
- Chakravarty, S., Pimple, S., Chaturvedi, H. T., Singh, S., & Gupta, K. K. (2008). Removal of copper from aqueous solution using newspaper pulp as an adsorbent. *Journal of Hazardous Materials*, 159(2), 396-403.
- Chalkley, S. R., Richmond, J., & Barltrop, D. (1998). Measurement of vitamin D3 metabolites in smelter workers exposed to lead and cadmium. *Occupational and Environmental Medicine*, 55(7), 446-452.
- Chang, C. Y., Tsai, W. T., Ing, C. H., & Chang, C. F. (2003). Adsorption of polyethylene glycol (PEG) from aqueous solution onto hydrophobic zeolite. *Journal of Colloid and Interface Science*, 260(2), 273-279.
- Chantawong, V., Harvey, N. W., & Bashkin, V. N. (2003). Comparison of heavy metal adsorptions by Thai kaolin and ballclay. *Water, Air, and Soil Pollution*, 148(1-4), 111-125.

- Chen, C., & Wang, J. (2007). Influence of metal ionic characteristics on their biosorption capacity by *Saccharomyces cerevisiae*. *Applied Microbiology and Biotechnology*, 74(4), 911-917.
- Cheng, J., Subramanian, K. S., Chakrabarti, C. L., Guo, R., Ma, X., Lu, Y., & Pickering, W. F. (1993). Adsorption of low levels of lead (II) by granular activated carbon. *Journal of Environmental Science & Health Part A*, 28(1), 51-71.
- Cheraghi, E., Ameri, E., & Moheb, A. (2015). Adsorption of cadmium ions from aqueous solutions using sesame as a low-cost biosorbent: kinetics and equilibrium studies. *International Journal of Environmental Science and Technology*, 12(8), 2579-2592.
- Chipasa, K. B. (2003). Accumulation and fate of selected heavy metals in a biological wastewater treatment system. *Waste Management*, 23(2), 135-143.
- Chrastný, V., Komarek, M., Tlustoš, P., & Švehla, J. (2006). Effects of flooding on lead and cadmium speciation in sediments from a drinking water reservoir. *Environmental Monitoring and Assessment*, 118(1-3), 113-123.
- Christoforidis, A. K., Orfanidis, S., Papageorgiou, S. K., Lazaridou, A. N., Favvas, E. P., & Mitropoulos, A. C. (2015). Study of Cu (II) removal by *Cystoseira crinitophylla* biomass in batch and continuous flow biosorption. *Chemical Engineering Journal*, 277, 334-340.
- Cimino, G., & Ziino, M. (1983). Heavy metal pollution, Part VII. Emissions from Mount Etna Volcano. *Geophysical Research Letters*, 10(1), 31-34.
- Cimino, G., Passerini, A., & Toscano, G. (2000). Removal of toxic cations and Cr (VI) from aqueous solution by hazelnut shell. *Water Research*, 34(11), 2955-2962.
- Çolak, F., Atar, N., Yazıcıoğlu, D., & Olgun, A. (2011). Biosorption of lead from aqueous solutions by *Bacillus* strains possessing heavy-metal resistance. *Chemical Engineering Journal*, 173(2), 422-428.
- Dahiya, S., Tripathi, R. M., & Hegde, A. G. (2008). Biosorption of heavy metals and radionuclide from aqueous solutions by pre-treated arca shell biomass. *Journal of Hazardous Materials*, 150(2), 376-386.
- Davis, J. M. (1990). Risk assessment of the developmental neurotoxicity of lead. *Neurotoxicology*, 11(2), 285-291.
- Davis, T. A., Volesky, B., & Vieira, R. H. S. F. (2000). *Sargassum* seaweed as biosorbent for heavy metals. *Water Research*, 34(17), 4270-4278.
- Davydova, S. (2005). Heavy metals as toxicants in big cities. *Microchemical Journal*, 79(1-2), 133-136.

- Delle Site, A. (2001). Factors affecting sorption of organic compounds in natural sorbent/water systems and sorption coefficients for selected pollutants. A review. *Journal of Physical and Chemical Reference Data*, 30(1), 187-439.
- Demirbas, A. (2008). Heavy metal adsorption onto agro-based waste materials: a review. *Journal of Hazardous Materials*, 157(2), 220-229.
- Deng, L., Su, Y., Su, H., Wang, X., & Zhu, X. (2006). Biosorption of copper (II) and lead (II) from aqueous solutions by nonliving green algae *Cladophora fascicularis*: equilibrium, kinetics and environmental effects. *Adsorption*, 12(4), 267-277.
- Dhir, B. (2014). Potential of biological materials for removing heavy metals from wastewater. *Environmental Science and Pollution Research*, 21(3), 1614-1627.
- Di Toppi, L. S., & Gabbriellini, R. (1999). Response to cadmium in higher plants. *Environmental and Experimental Botany*, 41(2), 105-130.
- dos Santos, W. N., Cavalcante, D. D., da Silva, E. G. P., das Virgens, C. F., & de Souza Dias, F. (2011). Biosorption of Pb (II) and Cd (II) ions by *Agave sisalana* (sisal fiber). *Microchemical Journal*, 97(2), 269-273.
- Dubey, A., & Mishra, A. (2017). A Novel Plant-Based Biosorbent for Removal of Copper (II) from Aqueous Solutions: Biosorption of Copper (II) by Dried Plant Biomass. *Journal of Renewable Materials*, 5(1), 54-61.
- Dubey, A., Mishra, A., & Singhal, S. (2014). Application of dried plant biomass as novel low-cost adsorbent for removal of cadmium from aqueous solution. *International Journal of Environmental Science and Technology*, 11(4), 1043-1050.
- Dubin, M. (1960). The potential theory of adsorption of gases and vapors for adsorbents with energetically nonuniform surfaces. *Chemical Reviews*, 60(2), 235-241.
- Edris, G., Alhamed, Y., & Alzahrani, A. (2014). Biosorption of cadmium and lead from aqueous solutions by *Chlorella vulgaris* biomass: equilibrium and kinetic study. *Arabian Journal for Science and Engineering*, 39(1), 87-93.
- Ehrlich, R., Robins, T., Jordaan, E., Miller, S., Mbuli, S., Selby, P., ... & Todd, A. (1998). Lead absorption and renal dysfunction in a South African battery factory. *Occupational and Environmental Medicine*, 55(7), 453-460.
- El-Araby, H. A., Ibrahim, A. M. M. A., Mangood, A. H., & Adel, A. H. (2017). Sesame husk as adsorbent for copper (II) ions removal from aqueous solution. *Journal of Geoscience and Environment Protection*, 5(07), 109.
- El-Ashtoukhy, E. S., Amin, N. K., & Abdelwahab, O. (2008). Removal of lead (II) and copper (II) from aqueous solution using pomegranate peel as a new adsorbent. *Desalination*, 223(1-3), 162-173.

- Elouear, Z., Bouzid, J., Boujelben, N., Feki, M., & Montiel, A. (2008). The use of exhausted olive cake ash (EOCA) as a low cost adsorbent for the removal of toxic metal ions from aqueous solutions. *Fuel*, 87(12), 2582-2589.
- El-Shafey, E. I. (2007). Sorption of Cd (II) and Se (IV) from aqueous solution using modified rice husk. *Journal of Hazardous Materials*, 147(1), 546-555.
- EPA (1980). Development document for effluent limitation guidelines and standards for the inorganic chemicals manufacturing point source category, USEPA, Effluent Guidelines Division, Office of Water and Waste Management, Washington, DC.
- Eren, E., Tabak, A., & Eren, B. (2010). Performance of magnesium oxide-coated bentonite in removal process of copper ions from aqueous solution. *Desalination*, 257(1), 163-169.
- Ezeagu, I. E., Gopal Krishna, A. G., Khatoon, S., & Gowda, L. R. (2004). Physico-chemical characterization of seed oil and nutrient assessment of *Adenanthera pavonina*, L: An underutilized tropical legume. *Ecology of Food and Nutrition*, 43(4), 295-305.
- Factor-Litvak, P., Wasserman, G., Kline, J. K., & Graziano, J. (1999). The Yugoslavia Prospective Study of environmental lead exposure. *Environmental Health Perspectives*, 107(1), 9-15.
- Farhan, S. N., & Khadom, A. A. (2015). Biosorption of heavy metals from aqueous solutions by *Saccharomyces cerevisiae*. *International Journal of Industrial Chemistry*, 6(2), 119-130.
- Farinella, N. V., Matos, G. D., Lehmann, E. L., & Arruda, M. A. Z. (2008). Grape bagasse as an alternative natural adsorbent of cadmium and lead for effluent treatment. *Journal of Hazardous Materials*, 154(1), 1007-1012.
- Farooq, U., Khan, M. A., Athar, M., & Kozinski, J. A. (2011). Effect of modification of environmentally friendly biosorbent wheat (*Triticum aestivum*) on the biosorptive removal of cadmium (II) ions from aqueous solution. *Chemical Engineering Journal*, 171(2), 400-410.
- Febrianto, J., Kosasih, A. N., Sunarso, J., Ju, Y. H., Indraswati, N., & Ismadji, S. (2009). Equilibrium and kinetic studies in adsorption of heavy metals using biosorbent: a summary of recent studies. *Journal of Hazardous Materials*, 162(2), 616-645.
- Feng, D., & Aldrich, C. (2004). Adsorption of heavy metals by biomaterials derived from the marine alga *Ecklonia maxima*. *Hydrometallurgy*, 73(1-2), 1-10.
- Feng, N., Guo, X., Liang, S., Zhu, Y., & Liu, J. (2011). Biosorption of heavy metals from aqueous solutions by chemically modified orange peel. *Journal of Hazardous Materials*, 185(1), 49-54.
- Fiol, N., & Villaescusa, I. (2009). Determination of sorbent point zero charge: usefulness in sorption studies. *Environmental Chemistry Letters*, 7(1), 79-84.

- Florence, T. M. (1986). Electrochemical approaches to trace element speciation in waters. A review. *Analyst*, *111*(5), 489-505.
- Fox, C. R., & Kennedy, D. C. (1985). Conceptual design of adsorption systems. *Adsorption Technology: A Step-by-Step Approach to Process Evaluation and Application*. New York, 91-166.
- Freundlich, H. M. F. (1906). Over the adsorption in solution. *Journal of Physical Chemistry*, *57*(385471), 1100-1107 (cited from Chakravarty *et al.*, 2010)
- Fu, F., & Wang, Q. (2011). Removal of heavy metal ions from wastewaters: a review. *Journal of Environmental Management*, *92*(3), 407-418.
- Gadd, G. M. (1992). Metals and microorganisms: a problem of definition. *FEMS Microbiology Letters*, *100*(1-3), 197-203.
- Gadd, G. M. (1993). Interactions of fungus with toxic metals. *New Phytologist*, *124*(1), 25-60.
- Gadd, G. M. (2009). Biosorption: critical review of scientific rationale, environmental importance and significance for pollution treatment. *Journal of Chemical Technology and Biotechnology*, *84*(1), 13-28.
- Gadd, G. M., & Griffiths, A. J. (1977). Microorganisms and heavy metal toxicity. *Microbial Ecology*, *4*(4), 303-317.
- Gadd, G.M. (1988). Accumulation of metals by microorganisms and algae. *Biotechnology. Vol. 6b, Special Microbial Processes*, 401-433.
- Gao, Z., Bandosz, T. J., Zhao, Z., Han, M., & Qiu, J. (2009). Investigation of factors affecting adsorption of transition metals on oxidized carbon nanotubes. *Journal of Hazardous Materials*, *167*(1-3), 357-365.
- Gavrilescu, M. (2004). Removal of heavy metals from the environment by biosorption. *Engineering in Life Sciences*, *4*(3), 219-232.
- Gavrilescu, M. (2010). Biosorption in environmental remediation. In *Bioremediation Technology* (pp. 35-99). Springer Netherlands.
- Gavrilescu, M., Pavel, L. V., & Cretescu, I. (2009). Characterization and remediation of soils contaminated with uranium. *Journal of Hazardous Materials*, *163*(2-3), 475-510.
- Gelb, L. D., & Gubbins, K. E. (1998). Characterization of porous glasses by adsorption: models, simulations and data inversion. *Fundamentals of Adsorption*, *6*, 551.
- Ghodbane, I., Nouri, L., Hamdaoui, O., & Chiha, M. (2008). Kinetic and equilibrium study for the sorption of cadmium (II) ions from aqueous phase by eucalyptus bark. *Journal of Hazardous Materials*, *152*(1), 148-158.

- Gikas, P. (2008). Single and combined effects of nickel (Ni (II)) and cobalt (Co (II)) ions on activated sludge and on other aerobic microorganisms: a review. *Journal of Hazardous Materials*, 159(2-3), 187-203.
- Göksungur, Y., Üren, S., & Güvenç, U. (2005). Biosorption of cadmium and lead ions by ethanol treated waste baker's yeast biomass. *Bioresource Technology*, 96(1), 103-109.
- Gosset, T., Trancart, J. L., & Thévenot, D. R. (1986). Batch metal removal by peat: kinetics and thermodynamics. *Water Research*, 20(1), 21-26.
- Groffman, A., Peterson, S., & Brookins, D. (1992). Removing lead from wastewater using zeolite. *Water Environment & Technology*, 4(5), 54-9.
- Gunasundari, E., & Kumar, S. (2017). Adsorption isotherm, kinetics and thermodynamic analysis of Cu (II) ions onto the dried algal biomass (*Spirulina platensis*). *Journal of Industrial and Engineering Chemistry*, 56, 129-144.
- Gupta, H., & Gogate, P. R. (2016). Intensified removal of copper from waste water using activated watermelon based biosorbent in the presence of ultrasound. *Ultrasonics sonochemistry*, 30, 113-122.
- Gupta, R., Ahuja, P., Khan, S., Saxena, R. K., & Mohapatra, H. (2000). Microbial biosorbents: meeting challenges of heavy metal pollution in aqueous solutions. *Current science*, 967-973.
- Gutha, Y., Munagapati, V. S., Alla, S. R., & Abburi, K. (2011). Biosorptive removal of Ni (II) from aqueous solution by *Caesalpinia bonducella* seed powder. *Separation Science and Technology*, 46(14), 2291-2297.
- Guyo, U., Mhonyera, J., & Moyo, M. (2015). Pb (II) adsorption from aqueous solutions by raw and treated biomass of maize stover—a comparative study. *Process Safety and Environmental Protection*, 93, 192-200.
- Hadi, N. B. A., Rohaizer, N. A. B., & Sien, W. C. (2011). Removal of Cu (II) from water by adsorption on papaya seed. *Asian Transactions on Engineering*, 1, 49-55.
- Haider, M. A., & Pakshirajan, K. (2007). Screening and optimization of media constituents for enhancing lipolytic activity by a soil microorganism using statistically designed experiments. *Applied Biochemistry and Biotechnology*, 141(2-3), 377-390.
- Hajahmadi, Z., Younesi, H., Bahramifar, N., Khakpour, H., & Pirzadeh, K. (2015). Multicomponent isotherm for biosorption of Zn (II), Co (II) and Cd (II) from ternary mixture onto pretreated dried *Aspergillus niger* biomass. *Water Resources and Industry*, 11, 71-80.
- Hall, K. R., Eagleton, L. C., Acrivos, A., & Vermeulen, T. (1966). Pore-and solid-diffusion kinetics in fixed-bed adsorption under constant-pattern conditions. *Industrial & Engineering Chemistry Fundamentals*, 5(2), 212-223.

- Hameed, B. H. (2009). Evaluation of papaya seeds as a novel non-conventional low-cost adsorbent for removal of methylene blue. *Journal of Hazardous materials*, 162(2-3), 939-944.
- Han, R., Zou, W., Yu, W., Cheng, S., Wang, Y., & Shi, J. (2007). Biosorption of methylene blue from aqueous solution by fallen phoenix tree's leaves. *Journal of Hazardous Materials*, 141(1), 156-162.
- Hansen, H. K., Gutiérrez, C., Madrid, A., Jimenez, R., & Larach, H. (2017). Possible Use of the Algae *Lessonia nigrescens* as a Biosorbent: Differences in Copper Sorption Behavior Using Either Blades or Stipes. *Waste and Biomass Valorization*, 8(4), 1295-1302.
- Harvey, N. W., & Chantawong, V. (2001). Adsorption of heavy metals by Ballclay: their Competition and Selectivity, *Journal of Tokyo University of Information Sciences*, August, 78-86.
- Hegazi, H. A. (2013). Removal of heavy metals from wastewater using agricultural and industrial wastes as adsorbents. *HBRC Journal*, 9(3), 276-282.
- Hlihor, R. M., & Gavrilesco, M. (2009). Removal of some environmentally relevant heavy metals using low-cost natural sorbents. *Environmental Engineering & Management Journal (EEMJ)*, 8(2).
- Ho, Y. S. (2006). Review of second-order models for adsorption systems. *Journal of Hazardous Materials*, 136(3), 681-689.
- Ho, Y. S. (2006a). Second-order kinetic model for the sorption of cadmium onto tree fern: a comparison of linear and non-linear methods. *Water Research*, 40(1), 119-125.
- Ho, Y. S., & McKay, G. (1998). A comparison of chemisorption kinetic models applied to pollutant removal on various sorbents. *Process Safety and Environmental Protection*, 76(4), 332-340.
- Ho, Y. S., & McKay, G. (1999). Pseudo-second order model for sorption processes. *Process Biochemistry*, 34(5), 451-465.
- Ho, Y. S., & McKay, G. (2000). The kinetics of sorption of divalent metal ions onto sphagnum moss peat. *Water Research*, 34(3), 735-742.
- Ho, Y. S., & McKay, G. (2002). Application of kinetic models to the sorption of copper (II) on to peat. *Adsorption Science & Technology*, 20(8), 797-815.
- Ho, Y. S., Chiu, W. T., Hsu, C. S., & Huang, C. T. (2004). Sorption of lead ions from aqueous solution using tree fern as a sorbent. *Hydrometallurgy*, 73(1), 55-61.
- Ho, Y. S., Ng, J. C. Y., & McKay, G. (2001). Removal of lead (II) from effluents by sorption on peat using second-order kinetics. *Separation Science and Technology*, 36(2), 241-261.

- Holan, Z. R., & Volesky, B. (1994). Biosorption of lead and nickel by biomass of marine algae. *Biotechnology and Bioengineering*, 43(11), 1001-1009.
- Holan, Z. R., & Volesky, B. (1995). Accumulation of cadmium, lead, and nickel by fungal and wood biosorbents. *Applied Biochemistry and Biotechnology*, 53(2), 133-146.
- Holan, Z. R., Volesky, B., & Prasetyo, I. (1993). Biosorption of cadmium by biomass of marine algae. *Biotechnology and Bioengineering*, 41(8), 819-825.
- Hong, S., Candelone, J. P., & Boutron, C. F. (1997). Changes in zinc and cadmium concentrations in Greenland ice during the past 7760 years. *Atmospheric Environment*, 31(15), 2235-2242.
- Huang, C., Chung, Y. C., & Liou, M. R. (1996). Adsorption of Cu (II) and Ni (II) by pelletized biopolymer. *Journal of Hazardous Materials*, 45(2-3), 265-277.
- Huang, K., & Zhu, H. (2013). Removal of Pb²⁺ from aqueous solution by adsorption on chemically modified muskmelon peel. *Environmental Science and Pollution Research*, 20(7), 4424-4434.
- Huang, Y. H., Hsueh, C. L., Cheng, H. P., Su, L. C., & Chen, C. Y. (2007). Thermodynamics and kinetics of adsorption of Cu (II) onto waste iron oxide. *Journal of Hazardous Materials*, 144(1-2), 406-411.
- Hussain, A., Hussain, M. S., Rizvi, A., & Wahab, S. (2010). Pharmacognostical Standardization of Stem Bark of *Adenantha pavonina* L. *Pharmacognosy Journal*, 2(8), 240-246.
- Ibrahim, M. B., & Sani, S. (2014). Comparative isotherms studies on adsorptive removal of Congo red from wastewater by watermelon rinds and neem-tree leaves. *Open Journal of Physical Chemistry*, 4(04), 139.
- Iqbal, M., & Khera, R. A. (2015). Adsorption of copper and lead in single and binary metal system onto *Fumaria indica* biomass. *Chemistry International*, 1(4), 157b-163b.
- Irshad, M., Faridullah, A., Malik, N., & Khan, T. (2011). Effect of solid waste on heavy metal composition of soil and water at Nathiagali-Abbottabad. *Journal of the Chemical Society of Pakistan*, 33(6), 830-834.
- Isaac, C. P. J., & Sivakumar, A. (2013). Removal of lead and cadmium ions from water using *Annona squamosa* shell: kinetic and equilibrium studies. *Desalination and Water Treatment*, 51(40-42), 7700-7709.
- Iskandar, N. L., Zainudin, N. A. I. M., & Tan, S. G. (2011). Tolerance and biosorption of copper (Cu) and lead (Pb) by filamentous fungi isolated from a freshwater ecosystem. *Journal of Environmental Sciences*, 23(5), 824-830.

- ISSG. (2012). Global Invasive Species Database (GISD). Invasive Species Specialist Group of the IUCN Species Survival Commission. Retrieved from <http://www.issg.org/database>
- Iyer, A., Mody, K., & Jha, B. (2005). Biosorption of heavy metals by a marine bacterium. *Marine Pollution Bulletin*, 50(3), 340-343.
- Jain, C. K., Malik, D. S., & Yadav, A. K. (2016). Applicability of plant based biosorbents in the removal of heavy metals: a review. *Environmental Processes*, 3(2), 495-523.
- Jain, M., Garg, V. K., & Kadirvelu, K. (2009). Chromium (VI) removal from aqueous system using *Helianthus annuus* (sunflower) stem waste. *Journal of Hazardous Materials*, 162(1), 365-372.
- Jain, M., Garg, V. K., Kadirvelu, K., & Sillanpää, M. (2016). Adsorption of heavy metals from multi-metal aqueous solution by sunflower plant biomass-based carbons. *International Journal of Environmental Science and Technology*, 13(2), 493-500.
- Jalali, M., & Aboulghazi, F. (2013). Sunflower stalk, an agricultural waste, as an adsorbent for the removal of lead and cadmium from aqueous solutions. *Journal of Material Cycles and Waste Management*, 15(4), 548-555.
- Jalali, R., Ghafourian, H., Asef, Y., Davarpanah, S. J., & Sepehr, S. (2002). Removal and recovery of lead using nonliving biomass of marine algae. *Journal of Hazardous Materials*, 92(3), 253-262.
- Järup, L. (2003). Hazards of heavy metal contamination. *British medical bulletin*, 68(1), 167-182.
- Järup, L., & Alfvén, T. (2004). Low level cadmium exposure, renal and bone effects-the OSCAR study. *Biometals*, 17(5), 505-509.
- Järup, L., Berglund, M., Elinder, C. G., Nordberg, G., & Vanter, M. (1998). Health effects of cadmium exposure—a review of the literature and a risk estimate. *Scandinavian Journal of Work, Environment & Health*, 1-51.
- Javid, A., Bajwa, R., Shafique, U., & Anwar, J. (2011). Removal of heavy metals by adsorption on *Pleurotus ostreatus*. *Biomass and Bioenergy*, 35(5), 1675-1682.
- Jayaram, K., & Prasad, M. N. V. (2009). Removal of Pb (II) from aqueous solution by seed powder of *Prosopis juliflora* DC. *Journal of Hazardous Materials*, 169(1), 991-997.
- Jha, I. N., Iyengar, L., & Rao, A. P. (1988). Removal of cadmium using chitosan. *Journal of Environmental Engineering*, 114(4), 962-974.
- Jiang, M. Q., Wang, Q. P., Jin, X. Y., & Chen, Z. L. (2009). Removal of Pb (II) from aqueous solution using modified and unmodified kaolinite clay. *Journal of Hazardous Materials*, 170(1), 332-339.

- Jiju, A. (2003). Design of experiments for engineers and scientists. *Burlington, MA: Elsevier Ltd.*
- Joint, W. H. O., & World Health Organization. (2007). Health risks of heavy metals from long-range transboundary air pollution.
- Joshi, N. C. (2017). Heavy metals, conventional methods for heavy metal removal, biosorption and the development of low cost adsorbent. *European Journal of Pharmaceutical and Medical Research, 4*, 388-393.
- Kalavathy, M. H., Karthikeyan, T., Rajgopal, S., & Miranda, L. R. (2005). Kinetic and isotherm studies of Cu (II) adsorption onto H₃PO₄-activated rubber wood sawdust. *Journal of Colloid and Interface Science, 292*(2), 354-362.
- Kannan, N., & Sundaram, M. M. (2001). Kinetics and mechanism of removal of methylene blue by adsorption on various carbons—a comparative study. *Dyes and Pigments, 51*(1), 25-40.
- Kannan, N., & Veemaraj, T. (2009). Removal of Lead (II) Ions by Adsorption onto Bamboo Dust and Commercial Activated Carbons-A Comparative Study. *Journal of Chemistry, 6*(1), 247-256.
- Kanu, S. A., Moyo, M., Zvinowanda, C. M., & Okonkwo, J. O. (2016). Biosorption of Pb (II) from aqueous solution using Rooibos shoot powder (RSP). *Desalination and Water Treatment, 57*(12), 5614-5622.
- Kapoor, A., Viraraghavan, T., & Cullimore, D. R. (1999). Removal of heavy metals using the fungus *Aspergillus niger*. *Bioresource Technology, 70*(1), 95-104.
- Kariuki, Z., Kiptoo, J., & Onyancha, D. (2017). Biosorption studies of lead and copper using rogers mushroom biomass '*Lepiota hystrix*'. *South African Journal of Chemical Engineering, 23*, 62-70.
- Kazantzis, G. (1989). Lead: Ancient metal—modern menace?. In *Lead Exposure and Child Development* (pp. 119-128). Springer, Dordrecht.
- Khan, T. A., Mukhlif, A. A., Khan, E. A., & Sharma, D. K. (2016). Isotherm and kinetics modeling of Pb (II) and Cd (II) adsorptive uptake from aqueous solution by chemically modified green algal biomass. *Modeling Earth Systems and Environment, 2*(3), 1-13.
- Khaskheli, M. I., Memon, S. Q., Jatoi, W. B., Chandio, Z. A., Shar, G. K., Malik, A., & Khan, S. (2017). Competitive sorption of nickel, copper, lead and cadmium on okra leaves (*Abelmoschus esculentus*). *Global Nest Journal, 19*(2), 278-288.
- Kikot, P., Viera, M., Mignone, C., & Donati, E. (2010). Study of the effect of pH and dissolved heavy metals on the growth of sulfate-reducing bacteria by a fractional factorial design. *Hydrometallurgy, 104*(3-4), 494-500.

- Kiran, M. G., Pakshirajan, K., & Das, G. (2017). Heavy metal removal from multicomponent system by sulfate reducing bacteria: mechanism and cell surface characterization. *Journal of Hazardous Materials*, 324(A), 62-70.
- Komy, Z. R., Gabar, R. M., Shoriet, A. A., & Mohammed, R. M. (2006). Characterisation of acidic sites of *Pseudomonas* biomass capable of binding protons and cadmium and removal of cadmium via biosorption. *World Journal of Microbiology and Biotechnology*, 22(9), 975-982.
- Kraal, H., & Ernst, W. (1976). Influence of copper high tension lines on plants and soils. *Environmental Pollution (1970)*, 11(2), 131-135.
- Kratochvil, D., & Volesky, B. (1998). Advances in the biosorption of heavy metals. *Trends in biotechnology*, 16(7), 291-300.
- Kulczycki, E., Ferris, F. G., & Fortin, D. (2002). Impact of cell wall structure on the behavior of bacterial cells as sorbents of cadmium and lead. *Geomicrobiology Journal*, 19(6), 553-565.
- Kumar, R., Dhir, B., Sharma, A. K., & Mehta, D. (2014). Potential of some fungal and bacterial species in bioremediation of heavy metals. *Journal of Nuclear Physics*, 1(2), 213-223.
- Kumar, U. (2006). The use of agricultural products and by products has been widely investigated as a replacement for current costly methods of removing heavy metals from water and wastewater. *Scientific Research and Essay*, 1, 33-37.
- Kurniawan, T. A., Chan, G. Y., Lo, W. H., & Babel, S. (2006). Comparisons of low-cost adsorbents for treating wastewaters laden with heavy metals. *Science of the Total Environment*, 366(2), 409-426.
- Kurniawan, T. A., Chan, G. Y., Lo, W. H., & Babel, S. (2006a). Physico-chemical treatment techniques for wastewater laden with heavy metals. *Chemical Engineering Journal*, 118(1-2), 83-98.
- Lacerda, L. D. (1997). Global mercury emissions from gold and silver mining. *Water, Air, and Soil Pollution*, 97(3-4), 209-221.
- Lagergren, S. (1898). About the theory of so-called adsorption of soluble substances. , *Vetenskapsakad. Handl.* 24, 1–39. (cited from Ho and McKay, 2000)
- Lamb, D. T., Naidu, R., Ming, H., & Megharaj, M. (2012). Copper phytotoxicity in native and agronomical plant species. *Ecotoxicology and Environmental Safety*, 85, 23-29.
- Langmuir, I. (1916). The constitution and fundamental properties of solids and liquids. Part I. Solids. *Journal of the American chemical society*, 38(11), 2221-2295.
- Lansdown, R., & Yule, W. (1986). The lead debate: the environment, toxicology and child health. *Croom Helm Ltd. Beckenham, Kent*, (39235), 286.

- Le Cloirec, P., André, Y., Faur-Brasquet, C., & Gerente, C. (2003). Engineered biofilms for metal ion removal. *Reviews in Environmental Science and Biotechnology*, 2(2-4), 177-192.
- Lee, J. A., Marsden, I. D., & Glover, C. N. (2010). The influence of salinity on copper accumulation and its toxic effects in estuarine animals with differing osmoregulatory strategies. *Aquatic Toxicology*, 99(1), 65-72.
- Lee, J. C., Son, Y. O., Pratheeshkumar, P., & Shi, X. (2012). Oxidative stress and metal carcinogenesis. *Free Radical Biology and Medicine*, 53(4), 742-757.
- Lehmann, R. G., & Harter, R. D. (1984). Assessment of Copper-Soil Bond Strength by Desorption Kinetics. *Soil Science Society of America Journal*, 48(4), 769-772.
- Lens, P., Vallerol, M., Esposito, G., & Zandvoort, M. (2002). Perspectives of sulfate reducing bioreactors in environmental biotechnology. *Reviews in Environmental Science and Biotechnology*, 1(4), 311-325.
- Li, X., Liu, S., Na, Z., Lu, D., & Liu, Z. (2013). Adsorption, concentration, and recovery of aqueous heavy metal ions with the root powder of *Eichhornia crassipes*. *Ecological Engineering*, 60, 160-166.
- Li, X., Tang, Y., Cao, X., Lu, D., Luo, F., & Shao, W. (2008). Preparation and evaluation of orange peel cellulose adsorbents for effective removal of cadmium, zinc, cobalt and nickel. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 317(1-3), 512-521.
- Li, X., Xu, Q., Han, G., Zhu, W., Chen, Z., He, X., & Tian, X. (2009). Equilibrium and kinetic studies of copper (II) removal by three species of dead fungal biomasses. *Journal of Hazardous Materials*, 165(1), 469-474.
- Li, Z., Teng, T. T., Alkarkhi, A. F., Rafatullah, M., & Low, L. W. (2013). Chemical modification of *Imperata cylindrica* leaf powder for heavy metal ion adsorption. *Water, Air, & Soil Pollution*, 224(4), 1505.
- Lin, S. H., Lai, S. L., & Leu, H. G. (2000). Removal of heavy metals from aqueous solution by chelating resin in a multistage adsorption process. *Journal of Hazardous Materials*, 76(1), 139-153.
- Linnik, P. N. (2003). Complexation as the most important factor in the fate and transport of heavy metals in the Dnieper water bodies. *Analytical and Bioanalytical Chemistry*, 376(3), 405-412.
- Liu, H. L., Chen, B. Y., Lan, Y. W., & Cheng, Y. C. (2004). Biosorption of Zn (II) and Cu (II) by the indigenous *Thiobacillus thiooxidans*. *Chemical Engineering Journal*, 97(2), 195-201.
- Lodeiro, P., Barriada, J. L., Herrero, R., & De Vicente, M. S. (2006). The marine macroalga *Cystoseira baccata* as biosorbent for cadmium (II) and lead (II) removal: kinetic and equilibrium studies. *Environmental Pollution*, 142(2), 264-273.

- Lu, W. B., Shi, J. J., Wang, C. H., & Chang, J. S. (2006). Biosorption of lead, copper and cadmium by an indigenous isolate *Enterobacter* sp. J1 possessing high heavy-metal resistance. *Journal of Hazardous Materials*, 134(1), 80-86.
- Luk, C. H. J., Yip, J., Yuen, C. W. M., Pang, S. K., Lam, K. H., & Kan, C. W. (2017). Biosorption Performance of Encapsulated *Candida krusei* for the removal of Copper (II). *Scientific Reports*, 7(1), 1-9.
- Lundh, M., Jönsson, L., & Dahlquist, J. (2000). Experimental studies of the fluid dynamics in the separation zone in dissolved air flotation. *Water Research*, 34(1), 21-30.
- Luo, F., Liu, Y., Li, X., Xuan, Z., & Ma, J. (2006). Biosorption of lead ion by chemically-modified biomass of marine brown algae *Laminaria japonica*. *Chemosphere*, 64(7), 1122-1127.
- Madala, S., Mudumala, V. N. R., Vudagandla, S., & Abburi, K. (2015). Modified leaf biomass for Pb (II) removal from aqueous solution: application of response surface methodology. *Ecological Engineering*, 83, 218-226.
- Maliou, E., Malamis, M., & Sakellariades, P. O. (1992). Lead and cadmium removal by ion exchange. *Water Science and Technology*, 25(1), 133-138.
- Manzoor, Q., Nadeem, R., Iqbal, M., Saeed, R., & Ansari, T. M. (2013). Organic acids pretreatment effect on *Rosa bourbonia* phyto-biomass for removal of Pb (II) and Cu (II) from aqueous media. *Bioresource Technology*, 132, 446-452.
- Marschner, H., & Rimmington, G. (1988). Mineral nutrition of higher plants. *Plant Cell Environ*, 11(2), 147-148.
- Martín-Lara, M. Á., Rico, I. L. R., Vicente, I. D. L. C. A., García, G. B., & de Hoces, M. C. (2010). Modification of the sorptive characteristics of sugarcane bagasse for removing lead from aqueous solutions. *Desalination*, 256(1), 58-63.
- Masoumi, F., Khadivinia, E., Alidoust, L., Mansourinejad, Z., Shahryari, S., Safaei, M., ... & Noghabi, K. A. (2016). Nickel and lead biosorption by *Curtobacterium* sp. FM01, an indigenous bacterium isolated from farmland soils of northeast Iran. *Journal of Environmental Chemical Engineering*, 4(1), 950-957.
- Matheickal, J. T., & Yu, Q. (1996). Biosorption of lead from aqueous solutions by marine algae *Ecklonia radiata*. *Water Science and Technology*, 34(9), 1-7.
- Mathialagan, T., & Viraraghavan, T. (2005). Biosorption of pentachlorophenol by fungal biomass from aqueous solutions: a factorial design analysis. *Environmental Technology*, 26(5), 571-580.
- Matlock, M. M., Henke, K. R., & Atwood, D. A. (2002). Effectiveness of commercial reagents metal removal from water with new insights for future chelate designs. *Journal of Hazardous Materials*, 92(2), 129-142.

- Mattuschka, B., Junghaus, K., & Straube, G. (1993). Biosorption of metals by waste biomass, in *Biohydrometallurgical Technologies. Proceedings of the international biohydrometallurgical symposium*, Torma, A.E., Apel, M.L. and Brierley, C.L., (eds), The Minerals, Metals and Materials Society, Warrendale, PA. (cited from Chakravarty, 2011).
- Mavrov, V., Erwe, T., Blöcher, C., & Chmiel, H. (2003). Study of new integrated processes combining adsorption, membrane separation and flotation for heavy metal removal from wastewater. *Desalination*, 157(1-3), 97-104.
- Mckay, G., Blair, H. S., & Findon, A. (1989). Equilibrium studies for the sorption of metal-ions onto chitosan. *Indian Journal of Chemistry Section a-Inorganic Bio-Inorganic Physical Theoretical & Analytical Chemistry*, 28(5), 356-360.
- Mehta, S. K., & Gaur, J. P. (2005). Use of algae for removing heavy metal ions from wastewater: progress and prospects. *Critical Reviews in Biotechnology*, 25(3), 113-152.
- Mier, M. V., Callejas, R. L., Gehr, R., Cisneros, B. E. J., & Alvarez, P. J. (2001). Heavy metal removal with mexican clinoptilolite:: multi-component ionic exchange. *Water Research*, 35(2), 373-378.
- Mildvan, A. S. (1970). 9 Metals in Enzyme Catalysis. In *The Enzymes* (Vol. 2, pp. 445-536). Academic Press. (cited from Nagajyoti *et al.*, 2010)
- Mineral Resources Institute Technical Report Series (1985) Use of Alabama peat as an adsorbent for heavy metals. MRI Technical Report Series, T.R. No. 12 (cited from Bailey *et al.*, 1999)
- Miretzky, P., Munoz, C., & Carrillo-Chávez, A. (2008). Experimental binding of lead to a low cost on biosorbent: Nopal (*Opuntia streptacantha*). *Bioresource Technology*, 99(5), 1211-1217. (cited from Arul Manikandan *et al.* 2016)
- Mishra, S. P., Tiwari, D., & Dubey, R. S. (1997). The uptake behaviour of rice (Jaya) husk in the removal of Zn (II) ions—A radiotracer study. *Applied Radiation and Isotopes*, 48(7), 877-882.
- Mohamed, R. A., Abdel-Lateef, A. M., Mahmoud, H. H., & Helal, A. I. (2012). Determination of trace elements in water and sediment samples from Ismaelia Canal using ion chromatography and atomic absorption spectroscopy. *Chemical Speciation & Bioavailability*, 24(1), 31-38.
- Mohan, S. V., Ramanaiah, S. V., Rajkumar, B., & Sarma, P. N. (2007). Biosorption of fluoride from aqueous phase onto algal *Spirogyra* IO1 and evaluation of adsorption kinetics. *Bioresource Technology*, 98(5), 1006-1011.
- Moyo, M., Guyo, U., Mawenyiyo, G., Zinyama, N. P., & Nyamunda, B. C. (2015). Marula seed husk (*Sclerocarya birrea*) biomass as a low cost biosorbent for removal of Pb (II) and Cu (II) from aqueous solution. *Journal of Industrial and Engineering Chemistry*, 27, 126-132.

- Munagapati, V. S., Yarramuthi, V., Nadavala, S. K., Alla, S. R., & Abburi, K. (2010). Biosorption of Cu (II), Cd (II) and Pb (II) by *Acacia leucocephala* bark powder: kinetics, equilibrium and thermodynamics. *Chemical Engineering Journal*, 157(2), 357-365.
- Munagapati, V. S., Yarramuthi, V., Nadavala, S. K., Alla, S. R., & Abburi, K. (2010). Biosorption of Cu (II), Cd (II) and Pb (II) by *Acacia leucocephala* bark powder: kinetics, equilibrium and thermodynamics. *Chemical Engineering Journal*, 157(2), 357-365.
- Muñoz, A. J., Ruiz, E., Abriouel, H., Gálvez, A., Ezzouhri, L., Lairini, K., & Espínola, F. (2012). Heavy metal tolerance of microorganisms isolated from wastewaters: Identification and evaluation of its potential for biosorption. *Chemical Engineering Journal*, 210, 325-332.
- Nagajyoti, P. C., Lee, K. D., & Sreekanth, T. V. M. (2010). Heavy metals, occurrence and toxicity for plants: a review. *Environmental Chemistry Letters*, 8(3), 199-216.
- Nasab, S. M. H., Naji, A., & Yousefzadi, M. (2017). Kinetic and equilibrium studies on biosorption of cadmium (II) from aqueous solution by *Gracilaria corticata* and agar extraction algal waste. *Journal of Applied Phycology*, 29(4), 2107-2116
- Naseem, R., & Tahir, S. S. (2001). Removal of Pb (II) from aqueous/acidic solutions by using bentonite as an adsorbent. *Water Research*, 35(16), 3982-3986.
- Ngah, W. W., & 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.
- Nielsen, I. C., & Fortune, H. (1992). Flora Malesiana. Series I, Spermatophyta: flowering plants. Volume 11, part. 1: Mimosaceae (Leguminosae-Mimosoideae). *Flora Malesiana. Series I, Spermatophyta: flowering plants. Volume 11, part. 1: Mimosaceae (Leguminosae-Mimosoideae)*.
- Nies, D. H. (1999). Microbial heavy-metal resistance. *Applied Microbiology and Biotechnology*, 51(6), 730-750.
- Noh, J. S., & Schwarz, J. A. (1989). Estimation of the point of zero charge of simple oxides by mass titration. *Journal of Colloid and Interface Science*, 130(1), 157-164.
- Norani, A. (1983). A preliminary survey on nodulation and VA mycorrhiza in legume roots. *Malaysian Forester*, 46(2), 171-174.
- Nordberg, G., Jin, T., Bernard, A., Fierens, S., Buchet, J. P., Ye, T., ... & Wang, H. (2002). Low bone density and renal dysfunction following environmental cadmium exposure in China. *AMBIO: A Journal of the Human Environment*, 31(6), 478-481.

- Nourbakhsh, M. N., Kiliçarslan, S., Ilhan, S., & Ozdag, H. (2002). Biosorption of Cr^{6+} , Pb^{2+} and Cu^{2+} ions in industrial waste water on *Bacillus* sp. *Chemical Engineering Journal*, 85(2-3), 351-355.
- Nriagu, J. O. (1988). A silent epidemic of environmental metal poisoning?. *Environmental pollution*, 50(1-2), 139-161.
- Nriagu, J. O. (1989). A global assessment of natural sources of atmospheric trace metals. *Nature*, 338(6210), 47.
- Nuhoglu, Y., Malkoca, E., Gursesb, A., & Canpolat, N. (2002). The removal of Cu(II) from aqueous solutions by *Ulothrix zonata*. *Bioresource Technology*, 85 (3), 331-333.
- Nurchi, V. M., & Villaescusa, I. (2008). Agricultural biomasses as sorbents of some trace metals. *Coordination Chemistry Reviews*, 252(10), 1178-1188.
- O'Connell, D. W., Birkinshaw, C., & O'Dwyer, T. F. (2008). Heavy metal adsorbents prepared from the modification of cellulose: A review. *Bioresource Technology*, 99(15), 6709-6724.
- Ofomaja, A. E. (2010). Equilibrium studies of copper ion adsorption onto palm kernel fibre. *Journal of Environmental Management*, 91(7), 1491-1499.
- Ogundipe, K. D., & Babarinde, A. (2017). Comparative study on batch equilibrium biosorption of Cd (II), Pb (II) and Zn (II) using plantain (*Musa paradisiaca*) flower: kinetics, isotherm, and thermodynamics. *Chemistry International*, 3(2), 135-149.
- Oliveira, W. E., Franca, A. S., Oliveira, L. S., & Rocha, S. D. (2008). Untreated coffee husks as biosorbents for the removal of heavy metals from aqueous solutions. *Journal of Hazardous Materials*, 152(3), 1073-1081.
- Omri, A., & Benzina, M. (2012). Removal of manganese (II) ions from aqueous solutions by adsorption on activated carbon derived a new precursor: *Ziziphus spina-christi* seeds. *Alexandria Engineering Journal*, 51(4), 343-350.
- Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., & Simons, A. (2009). Agroforestry database: a tree species reference and selection guide version 4.0. *World Agroforestry Centre ICRAF, Nairobi, KE*. Retrieved from <http://www.worldagroforestry.org/af/treedb/>
- Ouki, S. K., & Kavannagh, M. (1997). Performance of natural zeolites for the treatment of mixed metal-contaminated effluents. *Waste Management & Research*, 15(4), 383-394.
- Owamah, H. I. (2014). Biosorptive removal of Pb (II) and Cu (II) from wastewater using activated carbon from cassava peels. *Journal of Material Cycles and Waste Management*, 16(2), 347-358.

- Owamah, H. I. (2014). Biosorptive removal of Pb (II) and Cu (II) from wastewater using activated carbon from cassava peels. *Journal of Material Cycles and Waste Management*, 16(2), 347-358.
- Pacyna, J. (1986). Atmospheric trace elements from natural and anthropogenic sources. *Toxic Metals in the Atmosphere*, 17, 33-52.
- Pan, J., Ge, X., Liu, R., & Tang, H. (2006). Characteristic features of *Bacillus cereus* cell surfaces with biosorption of Pb (II) ions by AFM and FT-IR. *Colloids and surfaces B: Biointerfaces*, 52(1), 89-95.
- Panday, K. K., Prasad, G., & Singh, V. N. (1985). Copper (II) removal from aqueous solutions by fly ash. *Water Research*, 19(7), 869-873.
- Pardo, R., Herguedas, M., Barrado, E., & Vega, M. (2003). Biosorption of cadmium, copper, lead and zinc by inactive biomass of *Pseudomonas putida*. *Analytical and Bioanalytical Chemistry*, 376(1), 26-32.
- Pauling, L. (1960). *The Nature of the Chemical Bond*. (Vol. 260, pp. 3175-3187). Ithaca, NY: Cornell University Press.
- Pavasant, P., Apiratikul, R., Sungkhum, V., Suthiparinyanont, P., Wattanachira, S., & Marhaba, T. F. (2006). Biosorption of Cu²⁺, Cd²⁺, Pb²⁺, and Zn²⁺ using dried marine green macroalga *Caulerpa lentillifera*. *Bioresource Technology*, 97(18), 2321-2329.
- Pawley, J. B. (1997). The development of field-emission scanning electron microscopy for imaging biological surfaces. *Scanning*, 19, 324-336.
- Pehlivan, E., Yanik, B. H., Ahmetli, G., & Pehlivan, M. (2008). Equilibrium isotherm studies for the uptake of cadmium and lead ions onto sugar beet pulp. *Bioresource Technology*, 99(9), 3520-3527.
- PIER. (2012). Pacific Islands Ecosystems at Risk. Honolulu, USA: HEAR, University of Hawaii. Retrieved from <http://www.hear.org/pier/index.html>
- Plazinski, W., Dziuba, J., & Rudzinski, W. (2013). Modeling of sorption kinetics: the pseudo-second order equation and the sorbate intraparticle diffusivity. *Adsorption*, 19(5), 1055-1064.
- Pocock, S. J., Smith, M., & Baghurst, P. (1994). Environmental lead and children's intelligence: a systematic review of the epidemiological evidence. *British medical Journal*, 309(6963), 1189-1197.
- Polat, H., & Erdogan, D. (2007). Heavy metal removal from waste waters by ion flotation. *Journal of Hazardous Materials*, 148(1-2), 267-273.
- Ponnusami, V., Krithika, V., Madhuran, R., & Srivastava, S. N. (2007). Biosorption of reactive dye using acid-treated rice husk: factorial design analysis. *Journal of Hazardous Materials*, 142(1-2), 397-403.

- Poots, V. J. P., McKay, G., & Healy, J. J. (1978). Removal of basic dye from effluent using wood as an adsorbent. *Journal (Water Pollution Control Federation)*, 926-935.
- Prasad, M., Xu, H. Y., & Saxena, S. (2008). Multi-component sorption of Pb (II), Cu (II) and Zn (II) onto low-cost mineral adsorbent. *Journal of Hazardous Materials*, 154(1-3), 221-229.
- PROSEA. (2012). Plant Resources of South East Asia. Retrieved from <http://www.prosea.nl/>
- Puranik, P. R., & Paknikar, K. M. (1999). Biosorption of lead, cadmium, and zinc by *Citrobacter* strain MCM B□181: Characterization Studies. *Biotechnology Progress*, 15(2), 228-237.
- Purkayastha, D., Mishra, U., & Biswas, S. (2014). A comprehensive review on Cd (II) removal from aqueous solution. *Journal of Water Process Engineering*, 2, 105-128.
- Putra, W. P., Kamari, A., Yusoff, S. N. M., Ishak, C. F., Mohamed, A., Hashim, N., & Isa, I. M. (2014). Biosorption of Cu (II), Pb (II) and Zn (II) ions from aqueous solutions using selected waste materials: Adsorption and characterisation studies. *Journal of Encapsulation and Adsorption Sciences*, 4(01), 25.
- Qaiser, S., Saleemi, A. R., & Mahmood Ahmad, M. (2007). Heavy metal uptake by agro based waste materials. *Electronic Journal of Biotechnology*, 10(3), 409-416.
- Rajaram, T., & Das, A. (2008). Water pollution by industrial effluents in India: discharge scenarios and case for participatory ecosystem specific local regulation. *Futures*, 40(1), 56-69.
- Rajesh, V., Kumar, A. S. K., & Rajesh, N. (2014). Biosorption of cadmium using a novel bacterium isolated from an electronic industry effluent. *Chemical Engineering Journal*, 235, 176-185.
- Rajfur, M., Kłos, A., & Wacławek, M. (2012). Sorption of copper (II) ions in the biomass of alga *Spirogyra* sp. *Bioelectrochemistry*, 87, 65-70.
- Ramachandra, T. V., Ahalya, N., & Kanamadi, R. (2005). Biosorption: techniques and mechanisms. A report. Retrieved from <http://ces.iisc.ernet.in/energy>, <http://ces.iisc.ernet.in/biodiversity>, cestvr@us.iisc.ernet.in.
- Rao, M. M., Ramesh, A., Rao, G. P. C., & Seshaiyah, K. (2006). Removal of copper and cadmium from the aqueous solutions by activated carbon derived from *Ceiba pentandra* hulls. *Journal of Hazardous Materials*, 129(1), 123-129.
- Rao, R. A. K., & Rehman, F. (2012). Use of *Polyalthia longifolia* seeds (seeds of Indian Mast Tree) as adsorbent for the removal of Cd (II) from aqueous solution. *Journal of Dispersion Science and Technology*, 33(4), 472-481.

- Reddy, D. H. K., Harinath, Y., Seshaiyah, K., & Reddy, A. V. R. (2010). Biosorption of Pb (II) from aqueous solutions using chemically modified *Moringa oleifera* tree leaves. *Chemical Engineering Journal*, 162(2), 626-634.
- Reddy, D. H. K., Ramana, D. K. V., Seshaiyah, K., & Reddy, A. V. R. (2011). Biosorption of Ni (II) from aqueous phase by *Moringa oleifera* bark, a low cost biosorbent. *Desalination*, 268(1), 150-157.
- Reddy, D. H. K., Seshaiyah, K., Reddy, A. V. R., & Lee, S. M. (2012). Optimization of Cd (II), Cu (II) and Ni (II) biosorption by chemically modified *Moringa oleifera* leaves powder. *Carbohydrate Polymers*, 88(3), 1077-1086.
- Reed, B. E., & Arunachalam, S. (1994). Use of granular activated carbon columns for lead removal. *Journal of Environmental Engineering*, 120(2), 416-436.
- Reed, B. E., Arunachalam, S., & Thomas, B. (1994). Removal of lead and cadmium from aqueous waste streams using granular activated carbon (GAC) columns. *Environmental Progress & Sustainable Energy*, 13(1), 60-64.
- Romera, E., Gonzalez, F., Ballester, A., Blazquez, M. L., & Munoz, J. A. (2006). Biosorption with algae: a statistical review. *Critical Reviews in Biotechnology*, 26(4), 223-235.
- Ross, S. M. (1994). *Toxic Metals in Soil-plant Systems*. John Wiley and Sons Ltd. (cited from Toppi *et al.*, 1999)
- Roy, A. S., Hazarika, J., Manikandan, N. A., Pakshirajan, K., & Syiem, M. B. (2015). Heavy metal removal from multicomponent system by the cyanobacterium *Nostoc muscorum*: kinetics and interaction study. *Applied Biochemistry and Biotechnology*, 175(8), 3863-3874.
- Ruiz, M., Sastre, A. M., & Guibal, E. (2000). Palladium sorption on glutaraldehyde-crosslinked chitosan. *Reactive and Functional Polymers*, 45(3), 155-173.
- Runping, H. A. N., Pan, H. A. N., Zhaohui, C. A. I., Zhenhui, Z. H. A. O., & Mingsheng, T. A. N. G. (2008). Kinetics and isotherms of Neutral Red adsorption on peanut husk. *Journal of Environmental Sciences*, 20(9), 1035-1041.
- Russ, J. C. (2013). *Fundamentals of Energy Dispersive X-Ray Analysis: Butterworths Monographs in Materials*. Butterworth-Heinemann.
- Sadrzadeh, M., Mohammadi, T., Ivakpour, J., & Kasiri, N. (2008). Separation of lead ions from wastewater using electrodialysis: comparing mathematical and neural network modeling. *Chemical Engineering Journal*, 144(3), 431-441.
- Saeed, A., Akhter, M. W., & Iqbal, M. (2005). Removal and recovery of heavy metals from aqueous solution using papaya wood as a new biosorbent. *Separation and Purification Technology*, 45(1), 25-31.

- Saha, R., Mukherjee, K., Saha, I., Ghosh, A., Ghosh, S. K., & Saha, B. (2013). Removal of hexavalent chromium from water by adsorption on mosambi (*Citrus limetta*) peel. *Research on Chemical Intermediates*, 39(5), 2245-2257.
- Şahan, T., Ceylan, H., Şahiner, N., & Aktaş, N. (2010). Optimization of removal conditions of copper ions from aqueous solutions by *Trametes versicolor*. *Bioresource Technology*, 101(12), 4520-4526.
- Sahoo, N. K., Pakshirajan, K., & Ghosh, P. K. (2014). Evaluation of 4-bromophenol biodegradation in mixed pollutants system by *Arthrobacter chlorophenolicus* A6 in an upflow packed bed reactor. *Biodegradation*, 25(5), 705-718.
- Saiano, F., Ciofalo, M., Cacciola, S. O., & Ramirez, S. (2005). Metal ion adsorption by *Phomopsis* sp. biomaterial in laboratory experiments and real wastewater treatments. *Water Research*, 39(11), 2273-2280.
- Saifuddin, N., & Raziah, A. Z. (2007). Removal of heavy metals from industrial effluent using *Saccharomyces cerevisiae* (Baker's yeast) immobilized in chitosan/lignosulphonate matrix. *Journal of Applied Science Research*, 3, 2091-2099.
- Saikaew, W., Kaewsarn, P., & Saikaew, W. (2009). Pomelo peel: agricultural waste for biosorption of cadmium ions from aqueous solutions. *World Academy of Science, Engineering and Technology*, 56(56), 287-291.
- Salvadori, M. R., Ando, R. A., do Nascimento, C. A. O., & Corrêa, B. (2014). Intracellular biosynthesis and removal of copper nanoparticles by dead biomass of yeast isolated from the wastewater of a mine in the Brazilian Amazonia. *PLoS One*, 9(1), e87968.
- Sao, K., Pandey, M., Pandey, P. K., & Khan, F. (2017). Highly efficient biosorptive removal of lead from industrial effluent. *Environmental Science and Pollution Research*, 24(22), 18410-18420.
- Sarma, A. (2004). *Designing a novel adsorbent from neem Azadirachta indica leaves and investigating its characteristics for treatment of synthetic effluents* (Doctoral thesis). Retrieved from <http://hdl.handle.net/10603/68086>
- Sarma, P. J., Kumar, R., & Pakshirajan, K. (2015). Batch and Continuous Removal of Copper and Lead from Aqueous Solution using Cheaply Available Agricultural Waste Materials. *International Journal of Environmental Research*, 9(2), 635-648.
- Satarug, S., & Moore, M. R. (2004). Adverse health effects of chronic exposure to low-level cadmium in foodstuffs and cigarette smoke. *Environmental Health Perspectives*, 112(10), 1099-1103.
- Satarug, S., Nishijo, M., Lasker, J. M., Edwards, R. J., & Moore, M. R. (2006). Kidney dysfunction and hypertension: role for cadmium, p450 and heme oxygenases?. *The Tohoku Journal of Experimental Medicine*, 208(3), 179-202.

- Schmuhl, R., Krieg, H. M., & Keizer, K. (2001). Adsorption of Cu (II) and Cr (VI) ions by chitosan: Kinetics and equilibrium studies. *Water SA*, 27(1), 1-8.
- Schut, S., Zauner, S., Hampel, G., König, H., & Claus, H. (2011). Biosorption of copper by wine-relevant *lactobacilli*. *International Journal of Food Microbiology*, 145(1), 126-131.
- Schwartz, J. (1994). Low-level lead exposure and children' s IQ: a metaanalysis and search for a threshold. *Environmental Research*, 65(1), 42-55.
- Seaward, M. R. D., & Richardson, D. H. S. (1989). Atmospheric sources of metal pollution and effects on vegetation. *Heavy Metal Tolerance in Plants: Evolutionary Aspects*, 75-92.
- Senga Kitumbe, P., OpotaOnya, D., Tamba Vemba, A., Tona Lutete, G., Kambu Kabangu, O., Covaci, A., ... & Cimanga, K. (2013). Chemical composition and nutritive value study of the seed oil of *Adenantha pavonina* L.(Fabaceae) growing in Democratic Republic of Congo. *International journal of Pharmtech Research*, 5(1), 205-216.
- Şengil, İ. A., & Özacar, M. (2009). Competitive biosorption of Pb²⁺, Cu²⁺ and Zn²⁺ ions from aqueous solutions onto valonia tannin resin. *Journal of Hazardous Materials*, 166(2-3), 1488-1494.
- Serencam, H., Gundogdu, A., Uygur, Y., Kemer, B., Bulut, V. N., Duran, C., ... & Tufekci, M. (2008). Removal of cadmium from aqueous solution by Nordmann fir (*Abies nordmanniana* (Stev.) Spach. Subsp. *nordmanniana*) leaves. *Bioresource Technology*, 99(6), 1992-2000.
- Shaalan, H. F., Sorour, M. H., & Tewfik, S. R. (2001). Simulation and optimization of a membrane system for chromium recovery from tanning wastes. *Desalination*, 141(3), 315-324.
- Shafique, U., Ijaz, A., Salman, M., uz Zaman, W., Jamil, N., Rehman, R., & Javid, A. (2012). Removal of arsenic from water using pine leaves. *Journal of the Taiwan Institute of Chemical Engineers*, 43(2), 256-263.
- Sharma, A., & Bhattacharyya, K. G. (2005). Azadirachta indica (Neem) leaf powder as a biosorbent for removal of Cd (II) from aqueous medium. *Journal of Hazardous Materials*, 125(1-3), 102-112.
- Sharma, A., & Bhattacharyya, K. G. (2005). Azadirachta indica (Neem) leaf powder as a biosorbent for removal of Cd (II) from aqueous medium. *Journal of Hazardous Materials*, 125(1-3), 102-112.
- Sharma, D. C., & Forster, C. F. (1993). Removal of hexavalent chromium using sphagnum moss peat. *Water Research*, 27(7), 1201-1208.
- Sharma, R. K., & Agrawal, M. (2005). Biological effects of heavy metals: an overview. *Journal of Environmental Biology*, 26(2), 301-313.

- Shawabkeh, R., Al-Harashsheh, A., & Al-Otoom, A. (2004). Copper and zinc sorption by treated oil shale ash. *Separation and Purification Technology*, 40(3), 251-257.
- Sheng, P. X., Ting, Y. P., & Chen, J. P. (2007). Biosorption of heavy metal ions (Pb, Cu, and Cd) from aqueous solutions by the marine alga *Sargassum* sp. in single-and multiple-metal systems. *Industrial & Engineering Chemistry Research*, 46(8), 2438-2444.
- Shrestha, B., Homagai, P. L., Pokhrel, M. R., & Ghimire, K. N. (2013). Exhausted Tea Leaves—a low cost bioadsorbent for the removal of Lead (II) and Zinc (II) ions from their aqueous solution. *Journal of Nepal Chemical Society*, 30, 123-129.
- Shrivastava, A. K. (2009). A review on copper pollution and its removal from water bodies by pollution control technologies. *Indian Journal of Environmental Protection*, 29(6), 552-560.
- Singh, R., Chadetrik, R., Kumar, R., Bishnoi, K., Bhatia, D., Kumar, A., ... & Singh, N. (2010). Biosorption optimization of lead (II), cadmium (II) and copper (II) using response surface methodology and applicability in isotherms and thermodynamics modeling. *Journal of Hazardous Materials*, 174(1), 623-634.
- Smedley, P. L., Nicolli, H. B., Macdonald, D. M. J., Barros, A. J., & Tullio, J. O. (2002). Hydrogeochemistry of arsenic and other inorganic constituents in groundwaters from La Pampa, Argentina. *Applied Geochemistry*, 17(3), 259-284.
- Smičiklas, I., Dimović, S., Plečaš, I., & Mitrić, M. (2006). Removal of Co^{2+} from aqueous solutions by hydroxyapatite. *Water Research*, 40(12), 2267-2274.
- Song, S., Lopez-Valdivieso, A., Hernandez-Campos, D. J., Peng, C., Monroy-Fernandez, M. G., & Razo-Soto, I. (2006). Arsenic removal from high-arsenic water by enhanced coagulation with ferric ions and coarse calcite. *Water Research*, 40(2), 364-372.
- Sooksawat, N., Meetam, M., Kruatrachue, M., Pokethitiyook, P., & Inthorn, D. (2016). Equilibrium and kinetic studies on biosorption potential of charophyte biomass to remove heavy metals from synthetic metal solution and municipal wastewater. *Bioremediation Journal*, 20(3), 240-251.
- Srivastava, S. K., Bhattacharjee, G., Tyagi, R., Pant, N., & Pal, N. (1988). Studies on the removal of some toxic metal ions from aqueous solutions and industrial waste. Part I (Removal of lead and cadmium by hydrous iron and aluminium oxide). *Environmental Technology*, 9(10), 1173-1185.
- Srivastava, S. K., Tyagi, R., & Pant, N. (1989). Adsorption of heavy metal ions on carbonaceous material developed from the waste slurry generated in local fertilizer plants. *Water Research*, 23(9), 1161-1165.
- Staessen, J. A., Roels, H. A., Emelianov, D., Kuznetsova, T., Thijs, L., Vangronsveld, J., & Fagard, R. (1999). Environmental exposure to cadmium, forearm bone density,

and risk of fractures: prospective population study. *The Lancet*, 353(9159), 1140-1144.

- Subbaiah, M. V., Yuvaraja, G., Vijaya, Y., & Krishnaiah, A. (2011). Equilibrium, kinetic and thermodynamic studies on biosorption of Pb (II) and Cd (II) from aqueous solution by fungus (*Trametes versicolor*) biomass. *Journal of the Taiwan Institute of Chemical Engineers*, 42(6), 965-971.
- Sud, D., Mahajan, G., & Kaur, M. P. (2008). Agricultural waste material as potential adsorbent for sequestering heavy metal ions from aqueous solutions—A review. *Bioresource Technology*, 99(14), 6017-6027.
- Sudilovskiy, P. S., Kagramanov, G. G., & Kolesnikov, V. A. (2008). Use of RO and NF for treatment of copper containing wastewaters in combination with flotation. *Desalination*, 221(1-3), 192-201.
- Sun, Q., & Yang, L. (2003). The adsorption of basic dyes from aqueous solution on modified peat-resin particle. *Water Research*, 37(7), 1535-1544.
- Suresh, C., Reddy, D., Harinath, Y., Naik, B. R., Sessaiah, K., & Reddy, A. V. R. (2014). Development of wood apple shell (*Feronia acidissima*) powder biosorbent and its application for the removal of Cd (II) from aqueous solution. *The Scientific World Journal*, 2014, 1-8.
- Swann, G. E., & Patwardhan, S. V. (2011). Application of Fourier Transform Infrared Spectroscopy (FTIR) for assessing biogenic silica sample purity in geochemical analyses and palaeoenvironmental research. *Climate of the Past*, 7(1), 65-74.
- Tafakori, V., Zadmand, R., Tabandeh, F., Amoozegar, M. A., & Ahmadian, G. (2017). Equilibrium Isotherm, Kinetic Modeling, Optimization, and Characterization Studies of Cadmium Adsorption by Surface-Engineered *Escherichia coli*. *Iranian Biomedical Journal*, 21(6), 380-391.
- Taqvi, S. I. H., Hasany, S. M., & Bhangar, M. I. (2006). Sorption profile of Cd (II) ions onto beach sand from aqueous solutions. *Main Group Metal Chemistry*, 29(3), 157-172.
- Thaman, R. R., Clarke, W. C., Manner, H. I., Decker, B. G., & Ali, I. (1993). *Agroforestry in the Pacific Islands: Systems for sustainability*. United Nations University Press.
- Thomas, W. J., & Crittenden, B. (1998). *Adsorption technology and design*. Butter-worth - Heinemann, Oxford.
- Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polasky, S. (2002). Agricultural sustainability and intensive production practices. *Nature*, 418(6898), 671-677.
- Tofan, L., Paduraru, C., Bunia, I., Mihailescu Amalinei, R. L., & Miron, A. (2017). Removal of cadmium (II) from aqueous effluents by sorption on Romanian silver fir tree bark (*Abies alba* Mill.) wastes. *Global Nest Journal*, 19(1), 107-114.

- Tong, S. (1998). Lead exposure and cognitive development: persistence and a dynamic pattern. *Journal of Paediatrics and Child Health*, 34(2), 114-118.
- Tong, S., Schirnding, Y. E. V., & Prapamontol, T. (2000). Environmental lead exposure: a public health problem of global dimensions. *Bulletin of the World Health Organization*, 78, 1068-1077.
- Tripathi, R. M., Raghunath, R., Mahapatra, S., & Sadasivan, S. (2001). Blood lead and its effect on Cd, Cu, Zn, Fe and hemoglobin levels of children. *Science of the Total Environment*, 277(1-3), 161-168.
- Tsekova, K., Todorova, D., Dencheva, V., & Ganeva, S. (2010). Biosorption of copper (II) and cadmium (II) from aqueous solutions by free and immobilized biomass of *Aspergillus niger*. *Bioresource Technology*, 101(6), 1727-1731.
- Tunali, S., & Akar, T. (2006). Zn (II) biosorption properties of *Botrytis cinerea* biomass. *Journal of Hazardous Materials*, 131(1-3), 137-145.
- Tunali, S., Cabuk, A., & Akar, T. (2006). Removal of lead and copper ions from aqueous solutions by bacterial strain isolated from soil. *Chemical Engineering Journal*, 115(3), 203-211.
- Turner, D. R., Pabalan, R. T., & Bertetti, F. P. (1998). Neptunium (V) sorption on montmorillonite: an experimental and surface complexation modeling study. *Clays and Clay Minerals*, 46(3), 256-269.
- Tüzün, I., Bayramoğlu, G., Yalçın, E., Başaran, G., Celik, G., & Arica, M. Y. (2005). Equilibrium and kinetic studies on biosorption of Hg (II), Cd (II) and Pb (II) ions onto microalgae *Chlamydomonas reinhardtii*. *Journal of Environmental Management*, 77(2), 85-92.
- U.S. EPA. (1979). Environmental Pollution: Control Alternatives: Economics of Wastewater Treatment Alternatives for the Electroplating Industry. EPA – 625/5-79-016, Cincinnati, Ohio.
- Van der Heen, P. (1977). The removal of traces of heavy metals from drinking water and industrial effluent with ion exchanger. In *The Regional Chemical Society Meeting*.
- Vankar, P. S., Sarswat, R., & Malik, D. S. (2010). Biosorption of lead and cadmium ions from aqueous solutions onto natural dye waste of *Hibiscus rosa sinensis*. *Environmental Progress & Sustainable Energy*, 29(4), 421-427.
- Veeken, A. H. M., De Vries, S., Van der Mark, A., & Rulkens, W. H. (2003). Selective precipitation of heavy metals as controlled by a sulfide-selective electrode. *Separation Science and Technology*, 38(1), 1-19.
- Velazquez-Jimenez, L. H., Pavlick, A., & Rangel-Mendez, J. R. (2013). Chemical characterization of raw and treated agave bagasse and its potential as adsorbent of metal cations from water. *Industrial Crops and Products*, 43, 200-206.

- Verkleij, J. A. (1993). The effects of heavy metal stress on higher plants and their use as biomonitors. *Plant as bioindicators: indicators of heavy metals in the terrestrial environment*. VCH, New York, 415-424.
- Vermette, S. J., & Bingham, V. G. (1986). Trace elements in Frobisher Bay rainwater. *Arctic*, 177-179.
- Vilar, V. J., Botelho, C. M., & Boaventura, R. A. (2007). Chromium and zinc uptake by algae *Gelidium* and agar extraction algal waste: Kinetics and equilibrium. *Journal of Hazardous Materials*, 149(3), 643-649.
- Vimala, R., & Das, N. (2009). Biosorption of cadmium (II) and lead (II) from aqueous solutions using mushrooms: a comparative study. *Journal of Hazardous Materials*, 168(1), 376-382.
- Volesky, B. (1990). Removal and recovery of heavy metals by biosorption. *Biosorption of heavy metals*, 7-43.
- Volesky, B. (2007). Biosorption and me. *Water Research*, 41(18), 4017-4029.
- Wafwoyo, W., Seo, C. W., & Marshall, W. E. (1999). Utilization of peanut shells as adsorbents for selected metals. *Journal of Chemical Technology and Biotechnology*, 74(11), 1117-1121.
- Wang, G., Zhang, S., Yao, P., Chen, Y., Xu, X., Li, T., & Gong, G. (2015). Removal of Pb (II) from aqueous solutions by *Phytolacca americana* L. biomass as a low cost biosorbent. *Arabian Journal of Chemistry*, 11(1), 99-110.
- Wang, J., & Chen, C. (2006). Biosorption of heavy metals by *Saccharomyces cerevisiae*: a review. *Biotechnology Advances*, 24(5), 427-451.
- Wang, S., Zhu, Z. H., Coomes, A., Haghseresht, F., & Lu, G. Q. (2005). The physical and surface chemical characteristics of activated carbons and the adsorption of methylene blue from wastewater. *Journal of Colloid and Interface Science*, 284(2), 440-446.
- Wang, Z. L. (2000). Transmission electron microscopy of shape-controlled nanocrystals and their assemblies. *The Journal of Physical Chemistry*, 104(6), 1153-1175.
- Wase, D. J., & Wase, J. (Eds.). (2002). *Biosorbents for metal ions*. Taylor & Francis, London. pp 238.
- Wasserman, G. A., Liu, X., Lolocono, N. J., Factor-Litvak, P., Kline, J. K., Popovac, D., ... & Lelic, V. (1997). Lead exposure and intelligence in 7-year-old children: the Yugoslavia Prospective Study. *Environmental Health Perspectives*, 105(9), 956.
- Weaver, V. M., Jaar, B. G., Schwartz, B. S., Todd, A. C., Ahn, K. D., Lee, S. S., ... & Lee, B. K. (2005). Associations among lead dose biomarkers, uric acid, and renal function in Korean lead workers. *Environmental Health Perspectives*, 113(1), 36-42.

- Weber Jr, W. J. (1985). Adsorption theory, concepts and models. *Adsorption Technology: A step-by-step approach to process evaluation and application*, 1-35.
- Weber, W. J., & Morris, J. C. (1963). Kinetics of adsorption on carbon from solution. *Journal of the Sanitary Engineering Division*, 89(2), 31-60.
- Weber, W. J., & Van Vliet, B. M. (1978). Fundamental concepts for application of activated carbon in water and wastewater treatment. *Prepr. Pap. Natl. Meet., Div. Environ. Chem., Am. Chem. Soc. (United States)*, 18(CONF-780902-). Retrieved from <https://www.osti.gov/scitech/biblio/5218444-fundamental-concepts-application-activated-carbon-water-wastewater-treatment>
- World Health Organization. (1992). Environmental health criteria 134: cadmium. World Health Organization, Geneva, 17-35.
- World Health Organization. (2006). *Guidelines for the safe use of wastewater, excreta and greywater* (Vol. 1). World Health Organization.
- World Health Organization. (2007). Health risks of heavy metals from long range trans-boundary air pollution. Copenhagen. *World Health Organization Regional Office for Europe*, 40-45.
- Wu, F. C., Tseng, R. L., & Juang, R. S. (2001). Kinetic modeling of liquid-phase adsorption of reactive dyes and metal ions on chitosan. *Water Research*, 35(3), 613-618.
- Wu, X., Jin, T., Wang, Z., Ye, T., Kong, Q., & Nordberg, G. (2001). Urinary calcium as a biomarker of renal dysfunction in a general population exposed to cadmium. *Journal of Occupational and Environmental Medicine*, 43(10), 898-904.
- Xia, Y., & Liyuan, C. (2002). Study of gelatinous supports for immobilizing inactivated cells of *Rhizopus oligosporus* to prepare biosorbent for lead ions. *The International Journal of Environmental Studies*, 5, 1-6.
- Xie, J. Z., Chang, H. L., & Kilbane II, J. J. (1996). Removal and recovery of metal ions from wastewater using biosorbents and chemically modified biosorbents. *Bioresource Technology*, 57(2), 127-136.
- Yan, G., & Viraraghavan, T. (2003). Heavy-metal removal from aqueous solution by fungus *Mucor rouxii*. *Water Research*, 37(18), 4486-4496.
- Yanqun, Z., Yuan, L., Jianjun, C., Haiyan, C., Li, Q., & Schwartz, C. (2005). Hyperaccumulation of Pb, Zn and Cd in herbaceous grown on lead-zinc mining area in Yunnan, China. *Environment International*, 31(5), 755-762.
- Yao, Z. Y., Qi, J. H., & Wang, L. H. (2010). Equilibrium, kinetic and thermodynamic studies on the biosorption of Cu (II) onto chestnut shell. *Journal of Hazardous Materials*, 174(1), 137-143.

- Yruela, I. (2005). Copper in plants. *Brazilian Journal of Plant Physiology*, 17(1), 145-156.
- Zakir, M. (2013, June). Adsorption of lead (II) and copper (II) ions on rice husk activated carbon under sonication, In International Symposium on Chemical and Bioprocess Engineering (pp. 25-28).
- Žalac, S., & Kallay, N. (1992). Application of mass titration to the point of zero charge determination. *Journal of Colloid and Interface Science*, 149(1), 233-240.
- Zamzow, M. J., Eichbaum, B. R., Sandgren, K. R., & Shanks, D. E. (1990). Removal of heavy metals and other cations from wastewater using zeolites. *Separation Science and Technology*, 25(13-15), 1555-1569.
- Zarazua, G., Ávila-Pérez, P., Tejeda, S., Barcelo-Quintal, I., & Martínez, T. (2006). Analysis of total and dissolved heavy metals in surface water of a Mexican polluted river by total reflection X-ray fluorescence spectrometry. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 61(10-11), 1180-1184.
- Zarnowski, R., Jaromin, A., Certik, M., Czabany, T., Fontaine, J., Jakubik, T., ... & Pietr, S. J. (2004). The oil of *Adenantha pavonina* L. seeds and its emulsions. *Zeitschrift für Naturforschung C*, 59(5-6), 321-326.
- Zhang, X., Zhao, X., Wan, C., Chen, B., & Bai, F. (2016). Efficient biosorption of cadmium by the self-flocculating microalga *Scenedesmus obliquus* AS-6-1. *Algal Research*, 16, 427-433.
- Zheng, L., Dang, Z., Yi, X., & Zhang, H. (2010). Equilibrium and kinetic studies of adsorption of Cd (II) from aqueous solution using modified corn stalk. *Journal of Hazardous Materials*, 176(1), 650-656.
- Zheng, W., Li, X. M., Wang, F., Yang, Q., Deng, P., & Zeng, G. M. (2008). Adsorption removal of cadmium and copper from aqueous solution by areca—a food wastes. *Journal of Hazardous Materials*, 157(2), 490-495.
- Zouboulis, A. I., Loukidou, M. X., & Matis, K. A. (2004). Biosorption of toxic metals from aqueous solutions by bacteria strains isolated from metal-polluted soils. *Process Biochemistry*, 39(8), 909-916.