

## DAFTAR PUSTAKA

- Abollino, O., M. Aceto, M. Malandrino, C. Sarzanini. & E. Mentasti. 2003. Adsorption of heavy metals on Na-montmorillonite. Effect of pH and organic substances. *Water Research*, 37(7):1619-1627.
- Adelson, J. 2016. *Hurricane Katrina Side Effect: Dramatically Lower Rates of Lead in New Orleans, Study Finds*. [https://www.theadvocate.com/new\\_orleans/neaws/article\\_29f329b6-55c0-11e6-a3fc-1bb6de67683b.html](https://www.theadvocate.com/new_orleans/neaws/article_29f329b6-55c0-11e6-a3fc-1bb6de67683b.html) Diakses tanggal 27 Februari, jam 02.35.
- Ahammad, S. J., Sumithra, S., Senthilkumar, P. 2018. Mercury uptake and translocation by indigenous plants. *Rasayan Journal Chemistry*, 11(1): 1-12.
- Aidid, S. B & Okamoto, H. 1992. Effects of lead, cadmium and zinc on the electric membrane potential at the xylem/ symplast interface and cell elongation on Impatiens balsamina. *Environ Exp Bot*, 32: 439–448.
- Aken, B. V., Correa, P. A. & Schnoor, J. L. 2009. Phytoremediation of polychlorinated biphenyls: new trends and promises. *Environ. Sci. Technol*, 44: 2767-2776.
- Ali, H., Khan, E. & Sajad, M. A. 2013. Phytoremediation of heavy metals-concepts and applications. *Chemosphere*, 91: 869-881.
- Aprilia, A. A., dan Purwani, K. I. 2013. Pengaruh Pemberian Mikoriza *Glomus fasciculatum* Terhadap Akumulasi Logam Pb Pada Tanaman *Euphorbia milii*. *Jurnal Sains dan Seni Pomits*, 2(2): 2337-3520.
- Azevedo R. & Rodriguez, E. 2012. Review article: Phytotoxicity mercury in plants: A Review. *Journal of Botany*, 2012: 1-6.
- Berti, W. R. & Cunningham, S. D. 2000. "Phytostabilization of metals," in *Phytoremediation of Toxic Metals: Using Plants to Clean-up the Environment*. eds I. Raskin and B. D. Ensley. NY: John Wiley & Sons, Inc. New York.
- Bidar, G., Pelfrêne, A., Schwartz, C., Waterlot, C., Sahmer, K., Xin Sun et al. 125 Marot, F. & Douay, F. 2020. Urban kitchen gardens: Effect of the soil contamination and parameters on the trace element accumulation in vegetables—A review. *Science of the Total Environment*, 738: 139569.
- Brunet, J., Varraud, G., Zuijly-Fodil, Y. & Repellin, A. 2009. Accumulation of lead in the roots of grass pea (*Lathyrus sativus L.*) plants triggers systemic variation in gene expression in the shoots. *Chemosphere*, 77: 1113–1120.
- Boyer, J. S., and B. L. Bowen. 1970. Inhibition of oxygen evolution in chloroplasts isolated from leaves with low water potentials. *Plant Physiol*, 45: 612-615.
- Cay, S. 2016. Enhancement of cadmium uptake by Amaranthus caudatus, an ornamental plant, using tea saponin. *Environ. Monit. Assess.*, 188(6): 320.
- Chatterjee, C., Dube, B.K., Sinha, P. & Srivastava, P. 2004. Detimental effects of lead phytotoxicity on growth, yield and metabolism of rice. *Commun. Soil Sci. Plant Anal.*, 35: 255–265.



- Chen, J., Zhu, C., Li, L., Sun, Z. & Pan, X. 2007. Effects of exogenous salicylic acid on growth and H<sub>2</sub>O<sub>2</sub>-metabolizing enzymes in rice seedlings under lead stress. *J. Environ. Sci.*, 19: 44–49.
- Cheng, H., Hu, Y., 2010. Lead (Pb) isotopic fingerprinting and its applications in lead pollution studies in China: a review. *Environmental Pollution*, 158: 1134-1146.
- Cheng, L., Wang, Y., Cai, Z., Liu, J., Yu, B. & Zhou, Q. 2016. Phytoremediation of petroleum hydrocarbon-contaminated saline-alkali soil by wild ornamental Iridaceae species. *Int. J. Phytoremediation*, 19(3): 300-30.
- Cui, S., Zhang, T., Zhao, S., Li, P., Zhou, Q., Zhang, Q. & Han, Q. 2013. Evaluation of Three Ornamental Plants for Phytoremediation of Pb-contaminated Soil, *International Journal of Phytoremediation*, 15(4): 299-306.
- DalCorso, G., Fasani, E., Manara, A., Visioli, G. & Furini, A. 2019. Heavy metal pollutions: state of the art and innovation in phytoremediation. *Int. J. Mol. Sci.*, 20:3412.
- Dalvi, A. A. & Bhalerao, S. A. 2013. Response of plants towards heavy metal toxicity: an overview of avoidance, tolerance and uptake mechanism. *Ann. Plant Sci.*, 2: 362-368.
- Dewi, I G.A.K.S.P., Sunariani, N.L.G.A. & Suprihatin, E. 2022. Penyerapan Kadar Pb Tanah Tercemar Dan Akumulasinya Pada Tanaman Gumitir (*Tagetes Erecta L.*) Dengan Remediasi. *Journal Of Chemistry*, 16(2): 162-167.
- Dresler, S., M. W. Kosior, I. Sowa, G. Stanislawski, I. Bany, and M. Wojcik. 2017. Effect of short-term Zn/Pb or long-term multi-metal stress on physiological and morphological parameters of metallicolous and nonmetallicolous *Echium vulgare L.* populations. *Plant Physiology and Biochemistry*, 115:380-389.
- Drzwięcka, K. & Mleczek, M., 2017. Salicylic acid accumulation as a result of Cu, Zn, Cd and Pb interactions in common reed (*Phragmites australis*) growing in natural ecosystems. *Acta Physiol. Plant.*, 39:182.
- Dushenkov, S .2003. Trends in phytoremediation of radionuclides. *Plant Soil*, 249: 167-175.
- Dobres, M.S. 2011. *Prospects for commercialisation of transgenic ornamentals*. In *Transgenic horticultural crops challenges and opportunities*. Edited by B. Mou and R. Scorza. CRC Press. Boca Raton.
- Eapen, S. & D'souza, S. 2005. Prospects of genetic engineering of plants for phytoremediation of toxic metals. *Biotechnol. Adv.*, 23: 97-114.
- Ernst, W. H., Verkleij, J. & Schat, H. 1992. Metal tolerance in plants. *Acta Bot. Neerl.*, 41: 229-248.
- Fahr, M., Laplace, L., Bendaou, N., Hocher, V., El Mzibri, M., Didier Bogusz, D., Smouni, A. 2013. Effect of lead on root growth. *Front. Plant Sci.*, (4): 1–7.
- Figlioli F, Sorrentino MC, Memoli V, Arena C, Maisto G, Giordano S, Capozzi F. & Spagnuolo V. 2019. Overall plant responses to Cd and Pb metal stress in maize: Growth pattern, ultrastructure, and photosynthetic activity. *Environ Sci Pollut Res Int.*, 26(2):1781-1790.



- Fritioff, Å., Kautsky, L. & Greger, M. 2005. Influence of temperature and salinity on heavy metal uptake by submersed plants.. *Environmental pollution*, 133 (2): 265-74 .
- Gajewska, E., Skłodowska, M., Ślaba, M. & Mazur., J. 2006. Effect of nickel on antioxidative enzyme activities, proline and chlorophyll contents in wheat shoots. *Biologia Plantarum*, 50: 653–659.
- Gerhardt, K. E., Gerwing, P. D. & Greenberg, B. M. 2017. Opinion: taking phytoremediation from proven technology to accepted practice. *Plant Sci*, 256: 170-185.
- Gupta, D., Huang, H., Yang, X., Razafindrabe, B. & Inouhe, M. 2010. The detoxification of lead in *Sedum alfredii* H. is not related to phytochelatins but the glutathione. *J. Hazard Mater*, 177: 437–444.
- Gupta, D.K., Nicoloso, F.T., Schetinger, M.R., Rossato, L.V., Pereira, L.B. & Castro, G.Y. 2009. Antioxidant defense mechanism in hydroponically grown *Zea mays* seedlings under moderate lead stress. *J. Hazard Mater*, 172: 479–484.
- Gupta, D. K., Vandenhove, H. & Inouhe, M. 2013. “Role of phytochelatins in heavy metal stress and detoxification mechanisms in plants,” in *Heavy Metal Stress in Plants*, eds D. K. Gupta, F. J. Corpas, and J. M. Palma. Springer. Berlin.
- Hadad, H. R., M. M Mufarrege, M. Pincioli, G. A. D. Luca, and M. A. Maine. 2010. Morphological response of *Typha domingensis* to an industrial effluent containing heavy metals in a constructed wetland. *Archives of Environmental Contamination and Toxicology*, 58:666-675.
- Hadi, F., 2015. A mini review on lead toxicity in plants. *J. Biol. Life Sci.*, 6: 91–101.
- Hall, J. 2002. Cellular mechanisms for heavy metal detoxification and tolerance. *J. Exp. Bot*, 53: 1-11.
- Hamim, H., Miftahudin, M. & Setyaningsih, L. 2018. *Cellular and ultrastructure alteration of plant roots in response to metal stress*. In Ratnadewi D and H. Hamim (Eds.). *Plant Growth and Regulation: Alteration to Sustain Unfavourable Conditions*. IntechOpen. London.
- Han, J., Liu, W., Qin, W., Zhang, T., Chang, Z. & Xue, K. 2017. Effects of sodium salts on the sulfidation of lead smelting slag. *Minerals Engineering*, 108: 1-11.
- Harpaz-Saad, S., Azoulay, T., Arazi, T., Ben-Yaakov, E., Mett, A., Shibolet, Y. M., Hortensteiner, S., Gidoni, D., Galon, A., Goldschmidt, E. E. & Eyal, Y. 2007. Chlorophyllase is a rate-limiting enzyme in chlorophyll catabolism and is post translationally regulated. *The Plant Cell*, 19(3): 1007–1022.
- Huang, X., S. Duan, Q. Wu, M. Yu. & S. Shabala. 2020. Reducing cadmium accumulation in plants: Structure–function relations and tissue-specific operation of transporters in the spotlight. *Plants*, 9:223.
- Hooda, P. & Alloway, B. 1993. Effects of time and temperature on the bioavailability of Cd and Pb from sludge-amended soils. *European Journal of Soil Science*, 44: 97-110.
- Hooda, V .2007. Phytoremediation of toxic metals from soil and waste water. *J. Environ. Biol*, 28(2): 367-376.



- Ikkonen, Elena. & Natalia Kaznina. 2022. Physiological Responses of Lettuce (*Lactuca sativa L.*) to Soil Contamination with Pb. *Horticulturae*, 8(10): 951.
- Imadi, S. R., Shah, S. W., Kazi, A. G., Azooz, M. M. & Ahmad, P. 2016. Phytoremediation of Saline Soils for Sustainable Agricultural Productivity. *Plant Metal Interaction*, 455-468.
- India Biodiversity Portal. 2024. *Celosia argentea argentea*. <https://indiabiodiversity.org/species/show/33021> Diakses tanggal 5 Mei, jam 01.45.
- Jana, S., Choudhari, M.A., 1982. Senescence in submerged aquatic angiosperms: effects of heavy metals. *New Phytol*, 90: 477–484.
- Islam, E., X. Yang, T. Li, D. Liu, X. Jin, and F. Meng. 2007. Effect of Pb toxicity on root morphology, physiology and ultrastructure in the two ecotypes of *Elsholtzia argyi*. *Journal of Hazardous Materials*, 147:806-816.
- ITIS. 2024. *Celosia argentea* 1. [https://www.itis.gov/servlet/singlerpt?search\\_topic=tsn&search\\_value=20778#null](https://www.itis.gov/servlet/singlerpt?search_topic=tsn&search_value=20778#null) Diakses tanggal 9 Maret, jam 01.27.
- Jacob, J. M., Karthik, C., Saratale, R. G., Kumar, S. S., Prabakar, D. Kadirvelu, K. 2018. Biological approaches to tackle heavy metal pollution: a survey of literature. *J. Environ. Manage*, 217: 56-70.
- Javed, M. T., Tanwir, K., Akram, M. S., Shahid, M., Niazi, N. K. & Lindberg, S. 2019. “Chapter 20 - Phytoremediation of cadmium-polluted water/sediment by aquatic macrophytes: role of plant-induced pH changes,” in *Cadmium Toxicity and Tolerance in Plants*. eds M. Hasanuzzaman, M. N. V. Prasad & M. Fujita. Academic Press. London.
- Juhaeti, T., Sharif, F. & Hidayati N. 2004. Inventarisasi Tumbuhan Potensial Untuk Fitoremediasi. *Jurnal Biodiversitas*, 6 (1): 31-33.
- Jiang, K., Bingde, Wu., Congyan, Wang. & Qiong, Ran. 2019. Ecotoxicological effects of metals with different concentrations and types on the morphological and physiological performance of wheat. *Ecotoxicology and Environmental Safety*, (167): 345-353.
- Kastori, R., Petrović, M. & Petrović, N. 1992. Effect of excess lead, cadmium, copper, and zinc on water relations in sunflower. *Journal of Plant Nutrition*, 15(11): 2427–2439.
- Khan, A. S. & Chaudhry, N. Y. 2006. GA3 improves flower yield in some cucurbits treated with lead and mercury. *African Journal of Biotechnology*, 5(2): 149-153.
- Khan, J., Malangisha, G.K. & Ali, A. 2021. Nitric oxide alleviates lead toxicity by inhibiting lead translocation and regulating root growth in watermelon seedlings. *Hortic. Environ. Biotechnol*, 62: 701–714.
- Kushwaha, A., Hans, N., Kumar, S. & Rani, R., 2018. A critical review on speciation, mobilization and toxicity of lead in soil-microbe-plant system and bioremediation strategies. *Ecotoxicol. Environ. Saf.*, 147: 1035–1045.
- Kumar, A. & Prasad, M.N.V. 2018. Review Plant-lead interaction: transport, toxicity, tolerance, and detoxification mechanisms. *Exotoxicology and Environmental Safety*, 166: 401-418.



- Lew, D. 2021. Advantages and Limitations of Phytoremediation. <https://www.drdarrinlew.us/ecotoxicological-effects/advantages-and-limitations-of-phytoremediation.html> Diakses tanggal 28 Februari, jam 13.11.
- Liu, J.N., Zhou, Q.X., Sun, T.H., Ma, L.Q. & Wang S. 2008. Growth responses of three ornamental plants to Cd and Cd-Pb stress and their metal accumulation characteristics. *J Hazard Mater*, 151(1): 261-267.
- Liu, J.N., Zhou, Q.X., Wang, X.F., Zhang, Q.R. & Sun, T. 2006. Potential analysis of ornamental plant resources applied to contaminated soil remediation. *Floriculture*, 3: 245-252.
- Londono, J. M. B., A. G. Carabali. & M. A. B. Londono. 2019. Nutrient absorption in *Tithonia diversifolia*. *Universitas Scientiarum*, 24 (1): 33-48.
- Lu, C.Y., Li, X., Wang, D.W. & Zhao, P.F. 2015. Research status and developmental potential of flower remediation technology for polluted environment. *Acta Agric. Jiangxi*, 27(2): 49-5.
- Lynch, D.V. & Steponkus, P.L., 1987. Plasma membrane lipid alterations associated with cold acclimation of winter rye seedlings (*Secale cereale* L. cv Puma). *Plant Physiology*, 83: 761–767.
- Mahar, A., Wang, P., Ali, A., Awasthi, M. K., Lahori, A. H. & Wang, Q. 2016. Challenges and opportunities in the phytoremediation of heavy metals contaminated soils: a review. *Ecotox. Environ. Safe*, 126: 111-121.
- Malecka, A., Piechalak, A., Morkunas, I. & Tomaszewska, B. 2008. Accumulation of lead in root cells of *Pisum sativum*. *Acta Physiol. Plant.*, 30: 629–637.
- Malik, N. & Biswas, A. K. 2012. Role of Higher Plants in Remediation of Metal Contaminated Sites. *Scientific Review and Chemical Communications*, 2(2):141-146.
- Manara, A. 2012. "Plant responses to heavy metal toxicity," in *Plants and Heavy Metals*, ed. A. Furini, Springer. Dordrecht.
- Marques, A.P., Moreira, H., Franco, A.R., Rangel, A.O. & Castro, P.M. 2013. Inoculating *Helianthus annuus* (sunflower) grown in zinc and cadmium contaminated soils with plant growth promoting bacteria—effects on phytoremediation strategies. *Chemosphere*, 92(1): 74-83.
- Marques, A. P., Rangel, A. O. & Castro, P. M. 2009. Remediation of heavy metal contaminated soils: phytoremediation as a potentially promising clean-up technology. *Crit. Rev. Env. Sci. Technol.*, 39: 622-654.
- Marwiani, L. 2015. *Dampak Paparan Timbal Pada Kesehatan Anak*, KLHK <https://sib3pop.menlhk.go.id/index.php/articles/view?slug=dampak-paparan-timbal-pada-kesehatan-anak> Diakses tanggal 1 Maret, jam 03.17.
- Mautsoe, P.J. & Beckett, R.P., 1996. A preliminary study of the factors affecting the kinetics of cadmium uptake by the liverwort *Dumortiera hirsute*. *South African Journal of Botany*, 62 (6): 332– 336.
- Mazumdar, K., Das, S. 2015. Phytoremediation of Pb, Zn, Fe, and Mg with 25 wetland plant species from a paper mill contaminated site in North East India. *Environ Sci Pollut Res*, 22(4): 701-710.
- Memon, A. R. & Schröder, P. 2009. Implications of metal accumulation mechanisms to phytoremediation. *Environ. Sci. Pollut. R.* 16: 162-175.



- Meriem, Selis. 2019. Kontrol Auksin dan PIN1 dalam Perkembangan dan Venasi Daun. *Prosiding Seminar Nasional Biodiversitas Indonesia*, 61-67.
- Mesjasz-Przybyłowicz, J., Nakonieczny, M., Migula, P., Augustyniak, M., Tarnawska, M. & Reimold, U. 2004. Uptake of cadmium, lead nickel and zinc from soil and water solutions by the nickel hyperaccumulator *Berkheya coddii*. *Acta Biol. Cracoviensis Ser. Bot*, 46: 75-85.
- Mishra, S., Srivastava, S., Tripathi, R., Kumar, R., Seth, C., Gupta, D. & 2006. Lead detoxification by coontail (*Ceratophyllum demersum L.*) involves induction of phytochelatins and antioxidant system in response to its accumulation. *Chemosphere*, 65: 1027–1039.
- Nababan, W., Jati, W. N. & Murwani, I. 2017. Efektivitas Penyerapan Logam Berat Cd (Kadmium) Oleh Tumbuhan Ketul (*Biden pilosa L.*) dengan Penambahan Mikoriza dan EDTA. *Jurnal Teknobiologi Univeritas Atma Jaya Yogyakarta*, 1- 14.
- Negrete, J. M., S. M. Madrid, J. P. Hernandez, J. Durango. & S. Diez. 2016. Screening of native plant species for phytoremediation potential at a Hg-contaminated mining site. *Science of The Total Environment*, 542:809- 816.
- Nilsen, E.T. & Orcutt, D.M., 1996. *Physiology of Plants under Stress Abiotic Factors*. New York: John Wiley & Sons, Inc.
- Nursidika, P., Sugihartina, G., Susanto, E. K. & Agustina, W. 2014. Kandungan Timbal Pada Air dan Padi di Daerah Industri Leuwigajah Cimahi. *Jurnal Kesehatan Kartika*, 9 (1): 13-22.
- Noman, A., Aqeel, M., Deng, J., Khalid, N., Sanaullah, T. & He, S. 2017. Biotechnological advancements for improving floral attributes in ornamental plants. *Fronti. Plant Sci*: 8.
- Novi C. & Abdilah, N. A. 2017. Fitoremediasi Logam Pb Dari Limbah Cair Industri Kertas Dengan Pemanfaatan *Marsilea Crenata* dan *Hydrilla Verticillata*. *J. Sci. Phar*, 3(2): 29-33.
- Noviardi, R. & Damanhuri, T. P. 2015. Absorption Of Metal Lead (Pb) Using Sunflower (*Helianthus Annuus L.*) With The Addition In Variation Of Compost And Bottom ASH In Soil Media. *Jurnal Ecolab*, 9(2):47 – 104.
- Oguntade, O. A., A. A. Adegbuyi, A. L. Nassir, S. O. Olagunju, W. A. Salamami & R. O. Adawale. 2020. Geoassessment of heavy metals in rural and urban floodplain soils: health implications for consumers of *Celosia argentea* and *Corchorus olitorius* vegetables in Sagamu, Nigeria. *Environment Monitoring Assessment*, 192:164.
- Ogunyebi, A. L., O. E. Olojuola, K. O. Omoyajowo. & G. E. Shodunmola. 2019. Metal bioaccumulation and translocation studies of Spinacea oleraceae and *Celosia argentea* cultivated on contaminated soil. *Ruhuna Journal of Science*, 10(2): 108-119.
- Parida, A. K., Das A. B. & Mittra, B. 2008. Effects of salt on growth, ion accumulation, photosynthesis and leaf anatomy of the mangrove *Bruguiera parviflora*. *Trees (Berl West)*, 18: 167–74.



- Parrys, E., Romanowska, E., Siedlecka, M., Poskuta, J., 1998. The effect of lead on photosynthesis and respiration in detached leaves and in mesophyll protoplasts of *Pisum sativum*. *Acta Physiol. Plant*, 20: 313–322.
- Peco, J. D. P. Higueras, J.A. Campos, A. Olmedilla, M.C. Romero-Puertas. & L.M. Sandalio. 2020. Deciphering lead tolerance mechanisms in a population of the plant species *Biscutella auriculata* L. from a mining area: Accumulation strategies and antioxidant defenses. *Chemosphere*, 261: 127721.
- Peer, W. A., Baxter, I. R., Richards, E. L., Freeman, J. L. & Murphy, A. S. 2005. “Phytoremediation and hyperaccumulator plants,” in *Molecular Biology of Metal Homeostasis and Detoxification*. eds M. J. Tamas and E. Martinoia. Springer. Berlin.
- Perkin-Elmer. 1982. Analytical Methods for Atomic Absorption Spectrophotometry. Perkin-Elmer Inc. Waltham.
- Piotrowska, A., Bajguz, A., Godlewska-Żyłkiewicz, B., Czerpak, R., Kamińska, M. 2009. Jasmonic acid as modulator of lead toxicity in aquatic plant *Wolffia arrhiza* (Lemnaceae). *Environ Exp Bot.*, 66(3): 507–513.
- Pourrut, B., Perchet, G., Silvestre, J., Cecchi, M., Guiresse, M., Pinelli, E. 2008. Potential role of NADPH-oxidase in early steps of lead-induced oxidative burst in *Vicia faba* roots. *J. Plant Physiol*, 165: 571–579.
- Pourrut, B., Shahid, M., Dumat, C., Winterton, P. & Pinelli, E. 2011. Lead Uptake, Toxicity, and Detoxification in Plants. *Reviews of Environmental Contamination and Toxicology*, 213: 113-136.
- Qufei, L. & Fashui, H. 2009. Effects of Pb<sup>2+</sup> on the structure and function of photosystem II of *Spirodes polyrrhiza*. *Biol. Trace Elem. Res.*, 129: 251–260.
- Rai, V. 2002. Role of amino acids in plant responses to stresses. *Biol. Plantarum*, 45: 481-487.
- Romanowska, E., Wróblewska, B., Drozak, A. & Siedlecka, M. 2006. High light intensity protects photosynthetic apparatus of pea plants against exposure to lead. *Plant Physiology and Biochemistry*, 44: 387–394.
- Roy, S. B. & Bera, A. 2002. Individual and combined effect of mercury and manganese on phenol and proline content in leaf and stem of mungbean seedlings. *J. Environ. Biol*, 23: 433-435.
- Sadeghipour, O. 2017. Nitric oxide increases Pb tolerance by lowering Pb uptake and translocation as well as phytohormonal changes in cowpea (*Vigna unguiculata* (L.) Walp). *Sains Malaysiana*, 46:189–195.
- Sanubari, M.O.S. & A. Miarsyah, M. 2016. Potensi *Acrostichum Aureum* L. (PTERIDACEAE) Sebagai Bioakumulator Logam BeratMangan (Mn) dan Tembaga (Cu). *Bioma*, 12(2): 1-5.
- Sarwar, N., Imran, M., Shaheen, M. R., Ishaque, W., Kamran, M. A. & Matloob, A. 2017. Phytoremediation strategies for soils contaminated with heavy metals: modifications and future perspectives. *Chemosphere*, 171: 710-721.
- Seregin, I.V. & Ivanov, V.B. 2001. Physiological aspects of cadmium and lead toxic effects on higher plants. *Russ. J. Plant Physiol*, 48: 523–544.
- Sharma P. & Dubey R. 2005. Lead toxicity in plants. *Braz. J. Plant Physiol*, (17): 35–52.



- Shen, Z., Y. Wang, Y. Chen. & Z. Zhang. 2017. Transfer of heavy metals from the polluted rhizosphere soil to *Celosia argentea* L. in Copper Mine Tailings. *Horticulture, Environment, and Biotechnology*, 58:93-100.
- Sheoran, V., Sheoran, A. & Poonia, P. 2011. Role of hyperaccumulators in phytoextraction of metals from contaminated mining sites: a review. *Crit. Rev. Env. Sci. Technol.*, 41: 168-214.
- Shu, X., Yin, L., Zhang, Q. & Wang, W. 2012. Effect of Pb toxicity on leaf growth, antioxidant enzyme activities, and photosynthesis in cuttings and seedlings of *Jatropha curcas* L. *Environmental Science and Pollution Research*, 19(3): 893–902.
- Singh, R. P., Bharti, N. & Kumar, G. 1994. Differential toxicity of heavy metals to growth and nitrate reductase activity of *Sesamum indicum* seedlings. *Phytochemistry*, 35(5): 1153–1156.
- Singh, R., Singapura, D. P., Kumar, N., Bhargava, S. K. & Barman, S. C. 2010. Accumulation and Translocation of Heavy Metals in soil and Plants from Fly Ash Contaminated Area. *Journal of Environmental Biology*, 31(4): 421-430.
- Singh, R., Tripathi, R.D., Dwivedi, S., Kumar, A., Trivedi, P.K., Chakrabarty, D., 2010. Lead bioaccumulation potential of an aquatic macrophyte *Najas indica* are related to antioxidant system. *Bioresour. Technol.*, 101: 3025–3032.
- SNI 8910 2021. Cara uji kadar logam dalam contoh uji limbah padat, sedimen, dan tanah dengan metode destruksi asam menggunakan Spektrometer Serapan Atom (SSA)-Nyala atau Inductively Coupled Plasma Optical Emission Spectrometric (ICP-OES), BSN. <http://sispk.bsn.go.id/PNPS/DetilPNPS/21297>. (Accessed on 31 Mei 2024).
- Stepanova, Anna., Gladkov, Evgeny., Osipova, Ekaterina., Gladkova, Olga. & Tereshonok, Dmitry. 2022. Bioremediation of Soil from Petroleum Contamination. *Processes.*, 10: 1224.
- Socfindo Conservation. 2024. Jengger Ayam. <https://www.socfindoconservation.co.id/plant/547> Diakses tanggal 10 Maret, jam 14.44.
- Souahi, H. 2021. Impact of lead on the amount of chlorophyll and carotenoids in the leaves of *Triticum durum* and *T. aestivum*. *Hordeum vulgare and Avena sativa*. *Biosystems Diversity*, 29(3): 207–210.
- Souahi, H., Meksem Amara, L. & Djebbar, M. R. 2016. Effects of sulfonylurea herbicides on protein content and antioxidants activity in wheat in semi-arid region. *International Journal of Advanced Engineering, Management and Science*, 2(9): 1471–1476.
- Suman, J., Uhlik, O., Viktorova, J. & Macek, T. 2018. Phytoextraction of heavy metals: a promising tool for clean-up of polluted environment?. *Front Plant Sci.*, 9: 1476.
- Sun, Y., Zhou, Q., Xu, Y., Wang, L. & Liang, X. 2011. Phytoremediation for co-contaminated soils of benzoapyrene (BaP) and heavy metals using ornamental plant *Tagetes patula*. *J. Hazard. Mater.*, 186: 2-3..
- Tang, J., Zhang, J., Ren, L., Zhou, Y., Gao, J., Luo, L., Yang, Y., Peng, Q., Huang, H. & Chen, A. 2019. Diagnosis of soil contamination using

- microbiological indices: A review on heavy metal pollution. *Journal of Environmental Management*, 242: 121-130.
- Tangahu, B. V., H. S. Titah. & S. Mangkoedihardjo. 2018. *Teknologi Remediasi Lingkungan*. Surabaya: Mobius.
- Tao, L., Ren, J., Cui, G.G., 2010. Ecotoxicological effects of Pb on *Brassice rapa*. *Asian J. Ecotoxicol*, 5: 876–883.
- Tao, Z., Ge, Q., Wang, H. & Dai, J. 2015. Phenological basis of determining tourism seasons for ornamental plants in central and eastern China. *J. Geogr. Sci.*, 25(11): 1343–1356.
- Takarina, N. D. & Pin, T. G. 2015. Bioconcentration Factor (BCF) and Translocation Factor (TF) of Heavy Metals in Mangrove Trees of Blanakan Fish Farm. *Makara Journal of Science*, 77-81.
- Taufiqr, A. R. Asri & Purnomo, J. 2008. Penanggulangan Klorosis pada Kacang Tanah di Alfisol Alkalies. *Bul. Brawijaya*, 3(1): 1-16.
- Thakur, S., Singh, L., Wahid, Z. A., Siddiqui, M. F., Atnaw, S. M. & Din, M. F. M. 2016. Plant-driven removal of heavy metals from soil: uptake, translocation, tolerance mechanism, challenges, and future perspectives. *Environ. Monit. Assess.*, 188: 206.
- Thompson, D., Bush, E. & H. Kirk-Ballard. 2021. Lead Phytoremediation in Contaminated Soils Using Ornamental Landscape Plants. *Journal of Geoscience and Environment Protection*, 9(5): 152-164.
- Tong, Y.-P., Kneer, R. & Zhu, Y.-G. 2004. Vacuolar compartmentalization: a second-generation approach to engineering plants for phytoremediation. *Trends Plant Sci.*, 9: 7-9.
- Ulfah, J. S. & Chairil A. S. 2010. *Fitoremediasi: Prinsip dan Prakteknya Dalam Restorasi Lahan Paska Tambang di Indonesia*. Southeast Asian Regional Center for Tropical Biology. Bogor.
- van Hoof, N. A., Hassinen, V. H., Hakvoort, H. W., Ballintijn, K. F., Schat, H. & Verkleij, J. A. 2001. Enhanced copper tolerance in *Silene vulgaris* (Moench) Garcke populations from copper mines is associated with increased transcript levels of a 2b-type metallothionein gene. *Plant Physiol*, 126: 1519-1526.
- Vangronsveld, J., Herzig, R., Weyens, N., Boulet, J., Adriaensen, K. & Ruttens, A. 2009. Phytoremediation of contaminated soils and groundwater: lessons from the field. *Environ. Sci. Pollut. R.*, 16: 765-794.
- Wang, C., Zhang, S., Wang, P., Hou, J., Qian, J., Ao, Y., Lu, J. & Li, L. 2011. Salicylic acid involved in the regulation of nutrient elements uptake and oxidative stress in *Vallisneria natans* (Lour.) Hara under Pb stress. *Chemosphere*, 84(1): 136-42.
- Wei, S.H., Zhou, Q.X. & Wang, X. 2005. Cadmium-hyperaccumulator *Solanum nigrum* L. and its accumulating characteristics. *Environ. Sci. China*, 26(3): 167–171.
- Wellburn, A. R. 1994. The Spectral Determination of Chlorophylls a and b, as well as Total Carotenoids, Using Various Solvents with Spectrophotometers of Different Resolution. *Journal of Plant Physiology*, 144 (3): 307-313.



- Weryszko-Chmielewska, E. & Chwil, M. 2005. Lead-Induced Histological and Ultrastructural Changes in the Leaves of Soybean (*Glycine max (L.) Merr.*). *Soil Science and Plant Nutrition*, 51(2): 203–212.
- Williams, L. E. & Mills, R. F. 2005. P1B-ATPases—an ancient family of transition metal pumps with diverse functions in plants. *Trends Plant Sci.*, 10: 491-502.
- Winarno, F.G., S. Fardiaz, dan D. Fardiaz. 1980. *Pengantar Teknologi Pangan*. Gramedia. Jakarta.
- Wińska-Krysiak M., Koropacka K., Gawroński S. 2015. Determination of the tolerance of sunflower to lead-induced stress. *J. Elem.*, 20(2): 491-502.
- Yadav, S., 2010. Heavy metals toxicity in plants: an overview on the role of glutathione and phytochelatins in heavy metal stress tolerance of plants. *South Afr. J. Bot.*, 76: 167–179.
- Yang, X. E., Long, X. X., Ni, W. Z. & Fu, C. X .2002. *Sedum alfredii* H: a new Zn hyperaccumulating plant first found in China. *Chin. Sci. Bull.*, 47: 1634-1637.
- Yap, C.K., Tan, S.G. & Omar, H. 2003. Accumulation, depuration and distribution of cadmium and zinc in the green-lipped mussel *Perna viridis* under laboratory. *Hydrobiologia*, 498(1 - 3): 151 –160.
- Yoshida, S. 1976. *Laboratory Manual for Physiological Studies of Rice (third)*. Manila: The International Rice Research Institute.
- Yusuf, M., Zubair, A., dan Arsyad, A. 2014. Fitoremediasi Tanah Tercemar Logam Berat Pb Dan Cd Dengan Menggunakan Tanaman Lidah Mertua (*Sansevieria trifasciata*). *Jurnal Teknik Lingkungan, Universitas Hasanuddin*, 1-8.
- Zhang, X., Yang, L., Li, Y., Li, H., Wang, W. & Ye, B. 2012. Impacts of lead/zinc mining and smelting on the environment and human health in China. *Environmental Monitoring and Assessment*, 184: 2261-2273.
- Zulfiqar, U., Farooq, M., Hussain, S., Maqsood, M., Hussain, M., Ishfaq, M., Ahmad, M. & Anjum, M. Z. 2019. Lead toxicity in plants: Impacts and remediation. *Journal of environmental management*, 15(250): 109557.
- Zwolak, A., M. Sarzynska, E. Szpyrka. & K. Stawarczyk. 2019. Sources of soil pollution by heavy metals and their accumulation in vegetables: A review. *Water Soil Pollut*, 230(164): 1-9.