

DAFTAR PUSTAKA

- Adebajo, S.O., Akintokun, P.O., Ojo, A.E., and Ajamu, I.A., 2019, Effects of Rice Husk Biochar On The Growth Characteristics, Rhizospheric Microflora and Yield of Tomato Plants, *JAES*, 19(1), 60-72.
- Ahmed, N., Zhang, B., Chachar, Z., Li, J., Xiao, G., Wang, Q., Hayat, F., Deng, L., Narejo, M.N., Bozdar, B., and Tu, P., 2024, Micronutrients and Their Effects on Horticultural Crop Quality, Productivity and Sustainability, *Sci. Hortic.*, 323, 112512.
- Alita, G.S., Suprpto, S., 2023, Optimasi Tablet Lepas Lambat Kaptopril Menggunakan PVP Sebagai Bahan Pengikat dan Talk-Magnesium Stearat Sebagai Bahan Pelicin dengan Metode *Simplex Lattice Design*, *Journal of Pharmac*, 2(1), 86-107.
- Alwi, M.A., Hamzah, H., dan Lewa, A. F., 2022, Determinan dan Faktor Risiko Stunting pada Remaja di Indonesia: Literature Review: Determinant and Risk Factor Stunting on Adolescents in Indonesia: Literature Review, *Svasta Harena: Jurnal Ilmiah Gizi*, 3(1), 7-12.
- Aly, G.S., Shaalan, A.H., Mattar, M.K., Ahmed, H.H., Zaki, M.E., and Abdallah, H.R., 2014, Oxidative Stress Status in Nutritionally Stunted Children, *Gaz Egypt Paediatr Assoc*, 62(1), 28-33.
- Amruddin, Mashur, Lestari, S.U., Arniroh, A., Ahmad, F., Sutrisno, E., Suwardi, dan Muzafri, 2022, *Membangun Pertanian dan Peternakan Berwawasan Lingkungan: Membangun Pertanian dan Peternakan Berwawasan Lingkungan*, Global Aksara Pres, Surabaya.
- Andriani, Y., Pratama, R.I., and Hanidah, I.I., 2024, A Review on Chicken Feather Flour Potential for Fish Feed. *Torani: Journal of Fisheries and Marine Science*, 7(2), 171-180.
- Angin, I., Aksakal, E.L., Oztas, T., and Hanay, A., 2013, Effects of Municipal Solid Waste Compost (MSWC) Application on Certain Physical Properties of Soils Subjected to Freeze–Thaw, *SOIL TILL RES*, 130, 58-61.
- Aqilah, P.N., 2023, Analisis Komposit Abu Sekam Padi dan Ekstrak Peptida Rantai Pendek Sebagai Sumber Mikronutrien (Fe, Zn dan Ni), *Skripsi*, Universitas Gadjah Mada.
- Astuti, W., 2017, *Adsorben Berbasis Abu Layang Batu Bara*. UNNES PRESS, Semarang.
- Astuti, W., 2018, *Adsorpsi Menggunakan Material Berbasis Lignoselulosa*, Unnes Press, Semarang.
- Azevedo, R., and Rodriguez, E., 2012, Phytotoxicity of Mercury In Plants: A Review, *J. Bot.*, 2012(1), 848614.
- Azis, A., Muyassir, M., dan Bakhtiar, B., 2012, Perbedaan Jarak Tanam dan Dosis pupuk Kandang Terhadap Sifat Kimia Tanah dan Hasil Padi Sawah. *Journal of Nat Res EnvMan*, 1(2), 120-125.
- Babeker, T.M.A., and Chen, Q., 2021, Heavy Metal Removal From Wastewater by Adsorption With Hydrochar Derived From Biomass: Current Applications and Research Trends, *Curr. Pollut. Rep.*, 7, 54-71.
- Badan Pusat Statistik, 2024, *Statistik Indonesia 2024*, Badan Pusat Statistik

Indonesia, Jakarta.

- Badan Standardisasi Nasional, 2009, *Air dan air limbah – Bagian 19: Cara uji klorida (Cl⁻) dengan metode argentometri* (SNI 6989.19:2009), Badan Standardisasi Nasional.
- Badan Standardisasi Nasional, 2009, *SNI 7387:2009 tentang batas maksimum cemaran logam berat dalam pangan*, Jakarta: Badan Standardisasi Nasional.
- Badan Standardisasi Nasional, 2018, *SNI 7763:2018 Pupuk organik padat - Syarat dan metode uji*, Jakarta: Badan Standardisasi Nasional.
- Badruzzaman, D.Z., Juanda, W., dan Hidayati, Y.A., 2016, Kajian Kualitas Kascing Pada Vermicomposting Dari Campuran Feses sapi Perah dan Jerami Padi, *J.l Ilmu Ternak*, 16(2), 43-48.
- Balali-Mood, M., Naseri, K., Tahergorabi, Z., Khazdair, M.R., and Sadeghi, M., 2021, Toxic Mechanisms of Five Heavy Metals: Mercury, Lead, Chromium, Cadmium, and Arsenic. *Front. pharmacol.*, 12, 643972.
- Banakar, U.V., 1992, *Pharmaceutical Dissolution Testing*, New York: marcel Dekker, Inc.
- Barker, A.V., and Pilbeam, D. J., 2015, *Handbook of Plant Nutrition*, CRC press.
- Beeby, J.L., 1978, The Theory of Desorption, *Crit. Rev. Solid State Mater. Sci.*, 7(2), 153-166.
- Bhari, R., Kaur, M., and Sarup Singh, R., 2021, Chicken Feather Waste Hydrolysate as a Superior Biofertilizer in Agroindustry. *Curr. Microbiol.*, 78(6), 2212-2230.
- Borg, S., Brinch-Pedersen, H., Tauris, B., and Holm, P.B., 2009, Iron Transport, Deposition and Bioavailability in The Wheat and Barley Grain, *Plant and Soil*, 325, 15-24.
- Brady, N.C. and Weil, R.R., 2002, *The Nature and Properties of Soils*, 15th edition. Macmillan, NewYork.
- Calgaroto, N.S., Castro, G.Y., Cargnelutti, D., Pereira, L.B., Gonçalves, J.F., Rossato, L.V., Antes, F.G., Dressler, V.L., Flores, E.M.M., Schetinger, M.R.C., and Nicoloso, F.T., 2010, Antioxidant System Activation by Mercury in Pfaffia Glomerata Plantlets, *BioMetals*. 23, 295–305.
- Candra, Sari, S. P., Putri, R. T., dan Fabiani, V. A., 2023, Ekstraksi dan Karakterisasi Silika dari Sekam Padi Asal Bangka. *Prosiding Seminar Nasional Sains dan Terapan*, 1(1), 78-81.
- Cao, X., Liu, X., Zhu, J., Wang, L., Liu, S., and Yang, G., 2017, Characterization of Phosphorus Sorption on The Sediments of Yangtze River Estuary and Its Adjacent Areas, *Mar. Pollut. Bull.*, 114(1), 277-284.
- Cesarino, I., and Cavalheiro, E.T.G., 2008, Thiol-functionalized Silica Thin Film Modified Electrode in Determination of Mercury Ions in Natural Water, *Electroanalysis: An International Journal Devoted to Fundamental and Practical Aspects of Electroanalysis*, 20(21), 2301-2309.
- Chen, H., Alexander, D. T., and Hébert, C., 2024, Leveraging Machine Learning for Advanced Nanoscale X-ray Analysis: Unmixing Multicomponent Signals and Enhancing Chemical Quantification, *Nano letters*, 24(33),

10177-10185.

- Chen, Z., Guo, Y., Luo, L., Liu, Z., Miao, W., and Xia, Y., 2024, A Critical Review of Hydrochar Based Photocatalysts by Hydrothermal Carbonization: Synthesis, Mechanisms, And Applications, *Biochar*, 6(1), 1-34.
- Costa, P. and Lobo, J.M.S., (2001), Modeling and Comparison of Dissolution Profiles, *Eur. J. Pharm. Sci.*, 13(2), 123– 133.
- Cyprianus, S., and Muzakky, M., 2010, Proses Desorpsi Logam Berat Pada Sedimen Sungai Daerah Muria Dengan Pelarut Asam. *Ganendra Majalah IPTEK Nuklir*, 13(1).
- D'Hose, T., Cougnon, M., De Vlieghe, A., Vandecasteele, B., Viaene, N., Cornelis, W., Blockstaele, E.V., and Reheul, D., 2014, The Positive Relationship Between Soil Quality and Crop Production: A Case Study on The Effect of Farm Compost Application. *Appl. Soil Ecol.*, 75, 189-198.
- Danarto YC., Nugrahey, A., Noviani, S.M., 2017, Kinetika Slow Release Pupuk Urea Berlapis Chitosan Termodifikasi, *Equilibrium*, 16(2), 45-49.
- Dhumal, R. C., and Sadgir, P., 2024, Chloride Ion Sequestration by Vetiver Root Biosorption: Isotherm, Kinetic, and Thermodynamic Analyses and ANN Prediction, *Water Supply*, 24(4), 1377-1392.
- Dimkpa, C.O., and Bindraban, P.S., 2016, Fortification of Micronutrients for Efficient Agronomic Production: A Review. *AGRON SUSTAIN DEV*, 36(1), 7.
- EFSA Panel on Food Additives and Flavourings (FAF), Younes, M., Aquilina, G., Castle, L., Engel, KH. , Fowler, P., Fürst, P., Gürtler, R., Gundert-Remy, U., Husøy, T., Mennes, W., Moldeus, P., Oskarsson, A., Shah, R., Waalkens-Berendsen, I., Wölflé, D., Boon, P., Crebelli, R., Di Domenico, A., Filipič, M., Mortensen, A., Van Loveren, H., Woutersen, R., Giarola, A., Lodi, F., Riolo, F., and Frutos Fernandez, MJ., 2019, Re-evaluation of Hydrochloric Acid (E 507), Potassium Chloride (E 508), Calcium Chloride (E 509) and Magnesium Chloride (E 511) as food additives, *EFSA J.* 17(7), e05751
- El Messaoudi, N., El Khomri, M., Goodarzvand Chegini, Z., Chlif, N., Dbik, A., Bentahar, S., Iqbal, M., Jada, A., and Lacherai, A. 2023. Desorption Study And Reusability of Raw and H₂SO₄ Modified Jujube Shells (*Zizyphus lotus*) for The Methylene Blue Adsorption, *J. Environ. Anal. Chem.*, 103(16), 3762-3778.
- Elfarisna, Rahmayuni, E., Herman, W., Putri, E.L., and Kurniati, 2024, Soil Organic Matter and Its Correlation with Several Chemical Properties of Inceptisols in Rice Fields in Java, *Univers. J. Agric. Res.*, 12(2), 242-248
- Eliuz, E.A.E., and Yabalak, E., 2022, Chicken Feather Hydrochar Incorporated With Phenolic Extract of *Rosa Damascena* Mill. to Enlarge The Antibacterial Performance Against *Acinobacter Baumannii* and *Staphylococcus Aureus*, *J. Environ. Chem. Eng.*, 10(5), 108289.
- Eriska, H., Dewi, K., Pasek, A.D., and Damanhuri, E., 2017, Hydrothermal Carbonization of Biomass Waste by Using a Stirred Reactor: an Initial Experimental Results, *Reaktor*, 16(4), 212-217.
- Eustis, S.N., Radisic, D., Bowen, K.H., Bachorz, R.A., Haranczyk, M., Schenter,

- G. K., and Gutowski, M., 2008, Electron-Driven Acid-Base Chemistry: Proton Transfer From Hydrogen Chloride to Ammonia, *Science*, 319(5865), 936-939.
- Fadilla, U., Nusantara, R.W., dan Manurung, R., 2024, Analisis Beberapa Sifat Kimia Tanah Pada Dua Macam Penggunaan Lahan Di Sungai Kakap, Kabupaten Kubu Raya, Kalimantan Barat, *JTSL*, 11(1), 247-252.
- Fan, J., Ding, W., Xiang, J., Qin, S., Zhang, J., and Ziadi, N., 2014, Carbon Sequestration in an Intensively Cultivated Sandy Loam Soil in The North China Plain as Affected by Compost and Inorganic Fertilizer Application, *Geoderma*, 230, 22-28.
- Fang, K., Kou, D., Wang, G., Chen, L., Ding, J., Li, F., Yang, G., Qin, S., Liu, L., Zhang, Q. and Yang, Y., 2017, Decreased Soil Cation Exchange Capacity Across Northern China's Grasslands Over the Last Three Decades, *J GEOPHYS RES-BIOGEO*, 122(11), 3088–3097.
- FAO, 2022, *Soils for nutrition: state of the art*. Rome
- Firda, Mulyani, O., dan Yuniarti, A., 2016, Pembentukan, Karakteristik serta Manfaat Asam Humat Terhadap Adsorpsi Logam Berat, *Jurnal Soilrens*, 14(2), 9-13.
- França, A.A., Schultz, J., Borges, R., Wypych, F., and Mangrich, A.S., 2017, Rice Husk Ash as Raw Material for The Synthesis of Silicon and Potassium Slow-Release Fertilizer, *J. Braz. Chem. Soc.*, 28(11), 2211-2217.
- Gani, S. N., Yunginger, R., Tamuntuan, G. H., dan Demulawa, M., 2023, Identifikasi Karakteristik Mineral Magnetik Berdasarkan Analisis XRF di Lahan Pertanian Sekitar Sungai Biyonga Kabupaten Gorontalo, *Jurnal Natural Scientiae*, 3(2).
- Geethakarthis, A., 2021, Novel Approaches Towards Sustainable Management of an Agricultural Residue-The Rice Husk, *Nat. Environ. Pollut. Technol.*, 20(1).
- Goldstein, J.I., Newbury, D.E., Echlin, P., Joy, D.C., Lyman, C.E., Lifshin, E., Sawyer, L. and Michael, J.R., 2003, Special Topics in Electron Beam X-Ray Microanalysis, *Scanning Electron Microscopy and X-ray Microanalysis: Third Edition*, 453-536.
- Gupta, S., Sharma, S., Aich, A., Verma, A.K., Bhuyar, P., Nadda, A.K., Mulla S. I., and Kalia, S., 2023, Chicken Feather Waste Hydrolysate as a Potential Biofertilizer For Environmental Sustainability in Organic Agriculture Management, *Waste Biomass Valor.*, 14(9), 2783-2799.
- Gurmu, G., 2019, Soil Organic Matter and Its Role in Soil Health and Crop Productivity Improvement, *For. Ecol. Manag.*, 7(7), 475-483.
- Harahap, F.S., Walida, H., Oesman, R., Rahmaniah, Arman, I., Wicaksono, M., Harhap D.A., dan Hasibuan, R., 2020, Pengaruh Pemberian Abu Sekam Padi dan Kompos Jerami Padi Terhadap Sifat Kimia Tanah Ultisol Pada Tanaman Jagung Manis, *JTSL*, 7(2), 315-320.
- Hartati, S., Minardi, S., dan Ariyanto, D.P., 2013, Muatan Titik Nol Berbagai Bahan Organik, Pengaruhnya Terhadap Kapasitas Tukar Kation di Lahan Terdegradasi, *Sains Tanah*, 10(1), 27-36.
- Hartoyo, B., 2022, Perbaikan Mutu Gizi Bahan Pangan Melalui Biofortifikasi Kandungan Mineral Improving the Nutritional Quality of Food Ingredients

- Through Biofortification of Mineral Content, *Jurnal Agrifoodtech*, 1(1), 12-20.
- Haryanto, B., Sinaga, W.K., dan Saragih, F.T., 2019, Kajian Model Interaksi Pada Adsorpsi Logam Berat Kadmium (Cd²⁺) Dengan Menggunakan Adsorben Dari Pasir Hitam, *Jurnal Teknik Kimia USU*, 8(2), 79-84.
- Hayes, M.H., Swift, R.S., MByrnè, C., and Simpson, A.J., 2010, The Isolation and Characterization of Humic Substances and Humin from Grey Brown Podzolic and Gley Grassland Soils. , *19th world congress of soil science, soil solution for changing world, 1-6 august 2010, Brisbane*
- Hazleton P. A. and Murphy, B. W., 2007, *Interpreting Soil Test Results What Do All The Numbers Mean*, CSIRO Publishing: Melbourne.
- He, H., Zhang, N., Chen, N., Lei, Z., Shimizu, K., and Zhang, Z., 2019, Efficient Phosphate Removal From Wastewater by MgAl-LDHs Modified Hydrochar Derived From Tobacco Stalk, *Bioresour. Technol. Rep.*, 8, 100348.
- Hidayat, B., 2015, Remediasi Tanah Tercemar Logam Berat Dengan Menggunakan Biochar, *Petrop*, 2(1), 51-61.
- Hindarwati, Y., Soeprbowati, T.R., Izzati, M., dan Hadiyanto, H., 2023, Kontaminan Logam Berat (Pb, Cd, dan Cu) pada Tanah dari Pupukan Berbasis Jerami Padi, *Jurnal Ilmu Lingkungan*, 21(1), 8-14.
- Hisham, N.E.B., and Ramli, N.H., 2019, Effect of Rice Husk Ash on The Physicochemical Properties of Compost, *Indones. J. Chem.*, 19(4), 967-974.
- Homann, P.H., 2005, Chloride and Calcium in Photosystem II: from effects to enigma, *Discoveries in Photosynthesis*, 383-389.
- Hoque, M., Roshed, M.M., and Asaduzzaman, M., 2023, Heavy Metals in Poultry Chicken and Human Health Threat: A Mini Review, *Middle East Res J. Humanities Soc. Sci*, 3(4), 101-106.
- Husaini, M.A., 2015, Studi Desorpsi Fosfat dan Kalium Dari Humin Sintetik, *Skripsi*, Universitas Gadjah Mada,
- Inaya, N., Armita, D., dan Hafsan, H., 2021, Identifikasi Masalah Nutrisi Berbagai Jenis Tanaman di Desa Palajau Kabupaten Jeneponto, *Filogeni: Jurnal Mahasiswa Biologi*, 1(3), 94-102.
- Ischia, G., and Fiori, L., 2021, Hydrothermal Carbonization of Organic Waste and Biomass: A Review on Process, Reactor, and Plant Modeling, *Waste and Biomass Valorization*, 12, 2797-2824.
- Islabão, G.O., Vahl, L.C., Timm, L.C., Paul, D.L., and Kath, A.H., 2014, Rice Husk Ash as Corrective of Soil Acidity, *Rev. Bras. Ciênc. Solo*, 38, 934-941.
- Jabri, A.M., 2008, *Pengelolaan Hara Terpadu Pada Lahan Sawah Dalam Hubungannya Terhadap Inovasi Teknologinya Menunjang P2BN*. Prosiding Seminar Nasional dan Dialog Sumberdaya Lahan Pertanian, Badan Penelitian dan Pengembangan Pertanian, Bogor.
- Jayanudin, J., Rochmadi, R., Yulvianti, M., Imanudin, A. dan Sari, T.R., 2017. Kinetika Release Mikrokapsul Oleoresin Jahe Merah. *Reaktor*, 16(3), 128-140.
- Jones, C., and Kathrin, O.R., 2016, Plant Nutrition and Soil Fertility. *Nutrient Management Module*, 2, 1-12.
- Jose, S., Fanguero, J.F., Smitha, J., Cinu, T.A., Chacko, A.J., Premaletha, K., and

- Souto, E.B., 2013, Predictive modeling of insulin release profile from cross-linked chitosan microspheres, *Eur. J. Med. Chem.*, 60, 249-253.
- Juhriah, J., dan Alam, M., 2016, Fitoremediasi Logam Berat Merkuri (Hg) ada Tanah Dengan Tanaman *Celosia Plumosa* (Voss) Burv, *Bioma: Jurnal Biologi Makassar*, 1(1).
- Julinawati, Marlina, Nasution, R., dan Sheilatina., 2015, Applying SEM-EDX Techniques to Identifying the Types of Mineral of Jades (Giok) Takengon, Aceh, *Jurnal Natural*, 15(2).
- Juwita, L., 2003, Karakteristik Material Menggunakan XRF, XRD dan SEM-EDX, *Jurnal Teknik: Media Pengembangan Ilmu dan Aplikasi Teknik*, 2(2), 177-192.
- Kafkafi, U., Xu, G., Imas, P., Magen, H., Tarchitzky, J., and Johnston, A.E., 2001, *Potassium and Chloride in crops and Soils: The Role of Potassium Chloride Fertilizer in Crop Nutrition*, Switzerland, International Potash Institute.
- Katyal, J. C., and Randhawa, N. S., 1983, *Micronutrients* (Fertilizer and Plant Nutrition Bulletin No. 7), Indian Council of Agricultural Research, New Delhi, India. Food and Agriculture Organization (FAO).
- Khan, A.T., Zakaria, M.E.T., Kim, H.J., Ghazali, S., and Jamari, S.S., 2020, Carbonaceous Microsphere-Based Superabsorbent Polymer as Filler for Coating of NPK Fertilizer: Fabrication, Properties, Swelling, and Nitrogen Release Characteristics, *Appl. Polym. Sci.*, 137(8), 48396.
- Khanzada, A.K., Al-Hazmi, H.E., Kurniawan, T.A., Majtacz, J., Piechota, G., Kumar, G., Ezzati, P., Saeb, M.R., Rabiee, N., Maleh, H.K., Lima, E.C., and Maĳinia, J., 2024, Hydrochars as a Bio-Based Adsorbent For Heavy Metals removal: A Review of Production Processes, Adsorption Mechanisms, Kinetic Models, Regeneration and Reusability of Hydrochar, *Sci. Total Environ.*, 173972.
- Khosravi, A., Yuan, Y., Liu, Q., Zheng, H., Hashemi, M., Tang, Y., and Xing, B., 2024, Hydrochars as Slow-Release Phosphorus Fertilizers for Enhancing Corn and Soybean Growth in an Agricultural Soil, *Carbon Res.*, 3(1).
- Kristianto, H., Prasetyo, S., dan Sugih, A. K., 2019, Pemanfaatan Ekstrak Protein Dari Kacang-Kacangan Sebagai Koagulan Alami. *J. Rek. Pros.*, 13(2), 65-80.
- Kumar, L., and Singh, S. K., 2015, Removal of Chloride from Ground Water by Bio Adsorption, *Int J Adv Res*, 3, 140-154.
- Kuncaka, A., 2014, Metode Memproduksi Pupuk Organik Paramagnetik Pelepasan Lambat (Slow Release Organic Paramagnetic), *Paten Indonesia*, P00201401530
- Kuncaka, A., Rambe, M.R., Islam, H.P., Suherman, Suratman, A. dan Muslem, 2021, Preparation and Characterization of Composite from Poly(vinyl chloride) Hydrochar and Hydrolyzate of Keratin from Chicken Feather by Hydrothermal Carbonization, *Asian J. Chem.*, 33(10), 2483-2488.
- Kusmiadi, R., Khodijah, N. S., dan Royalaitani, R., 2015, Penambahan Gedebong Pisang Pada Kompos Bulu Ayam Dengan Berbagai Jenis Aktivator, *Enviagro: Jurnal Pertanian dan Lingkungan*, 8(1), 19-30.
- Lensoni, Nurdin, A., and Ismaturrehmi., 2023, Identification of Mercury Content

- In Children Stunting Patients Aged 0 – 24 Months in The Regions Small Scale Gold Mine in Krueng Sabee District, Aceh Jaya Regency, *Journal of Research in Science Education*, 9(9), 6962– 6966.
- Lestari, A.Z., dan Maulida, N., 2024, Analisis Kandungan Logam dan Ftalat pada Komponen Elektronik menggunakan XRF dan Py/GC-MS, *JRSKT*, 10(1), 99-106.
- Lima, F.R.D., Martins, G.C., Silva, A.O., Vasques, I.C.F., Engelhardt, M.M., Cândido, G.S., Pereira, P., Reis, R.H.C.L. Carvalho, G.S., Windmoler, C.C., Moreira, F.M.S., Guiherme, L.R.G., and Marques, J.J., 2019, Critical Mercury Concentration in Tropical Soils: Impact on Plants and Soil Biological Attributes, *Sci. Total Environ.*, 666, 472-479.
- Lindner, T., Bonebeau, S., Drehmann, R., Grund, T., Pawlowski, L., and Lampke, T., 2016, Analytical Methods to Characterize Heterogeneous Raw Material for Thermal Spray Process: Cored Wire Inconel 625, *IOP Conf Ser Mater Sci Eng*, 118, 012009.
- Lisdiyanti, M., dan Guchi, H., 2018, Pengaruh Pemberian Bahan Humat dan Pupuk SP-36 untuk Meningkatkan Ketersediaan Fosfor pada Tanah Ultisol, *Petrop*, 5(2), 192-198.
- Madlool, D.T., Al-Ani, I., Ata, T.E., and Dayyih, W.A., 2024, Solubility, pH-Solubility Profile, pH-Rate Profile, and Kinetic Stability of the Tyrosine Kinase Inhibitor, Alectinib, *Pharmaceuticals*, 17(6), 776.
- Maniscalco, M.P., Volpe, M., dan Messineo, A., 2020, Hydrothermal Carbonization as a Valuable Tool for Energy and Environmental Applications: A Review, *Energies*, 13(16), 4098.
- Mardiah, M. dan Fathoni, R., 2016, Adsorpsi Logam Cu (II) dan Fe (II) Menggunakan Kertas Koran Bekas. *J.I Integrasi Proses*, 6(2).
- Masilionytė, L., Kriaučiūnienė, Z., Šarauskis, E., Arlauskienė, A., Krikštolaitis, R., Šlepetienė, A., Jablonskyte-Rašce. D., and van Lier, Q.D.J., 2021, Effect of Long-term Crop Rotation and Fertilisation Management on Soil Humus Dynamics in Organic and Sustainable Agricultural Management Systems, *Soil Res.*, 59(6), 573-585.
- Masood, S., Hussain, A., Javid, A., Rashid, M., Bukahri, S.M., Ali, W., Aslam, S., Amin, H.M.A., Ghaffar, I., Imtiaz, A., Salahuddin, H., Sughra, F., Sarwar, M.S. Sharif, A., and Aslam, K., 2022. Fungal Conversion of Chicken-Feather Waste Into Biofortified Compost. *Braz. J. Biol.*, 83.
- Mautuka, Z.A., Maifa, A., dan Karbeka, M., 2022, Pemanfaatan Biochar Tongkol Jagung Guna Perbaikan Sifat Kimia Tanah Lahan Kering, *JlWP*, 8(1), 201-208.
- Mazotto, A.M., de Melo, A.C.N., Macrae, A., Rosado, A.S., Peixoto, R., Cedrola, S.M.L., Couri, S., Zingali, R.B., Villa, A.L.V., Rabinovitch, L., Chaves, J.Q., and Vermelho, A.B., 2011, Biodegradation of Feather Waste by Extracellular Keratinases and Gelatinases from *Bacillus* spp, *World J. Microbiol. Biotechnol.*, 27, 1355-1365.
- Mirdayanti, R., 2018, Identifikasi Keratin Dari Ekstraksi Limbah Bulu Ayam, *Jurnal Ilmiah Sains, Teknologi, Ekonomi, Sosial dan Budaya*, 2(2), 33-36.

- Morton, C.M., Pullabhotla, H., Bevis, L., and Lobell, D.B., 2023, Soil micronutrients linked to human health in India. *Sci. Rep.*, 13(1), 13591.
- Mukromin, A. dan Wibowo, Y.M., 2023, Penentuan Kadar Ion Klorida (Cl⁻) pada Sampel Air Sumur Gali di Kecamatan Kaliwungu, Kendal Menggunakan Metode Argentometri Mohr, *J. Kireka*, 4(1), 17-22.
- Mulyaningsih, T. R., Kuntoro, I., & Alfian, A. (2012). Distribusi Unsur Makro dan Mikro dalam Abu Gunung Merapi Yogyakarta. *J. Penelit. Sos. Ekon. Kehutan*, 6(1), 12-22.
- Muna, N., Prasetyo, Y., dan Sasmito, B. 2019 Analisis Perbandingan Metode PCA (Principal Component Analysis) dan Indeks Mineral Lempung Untuk Pemodelan Sebaran Kandungan Bahan Organik Tanah Menggunakan Citra Satelit Landsat di Kabupaten Kendal, *Jurnal Geodesi Undip*, 9(1), 325-334.
- Murnita, M., dan Taher, Y.A., 2021, Dampak Pupuk Organik dan Anorganik Terhadap Perubahan Sifat Kimia Tanah dan Produksi Tanaman Padi (*Oriza sativa* L.), *Menara Ilmu: Jurnal Penelitian dan Kajian Ilmiah*, 15(2).
- Naibaho, M., dan Muliani, F., 2023, Proyeksi Jumlah Penduduk dan Analisis Faktor yang Mempengaruhi Pertumbuhan Penduduk Kabupaten Samosir. *Jurnal Ilmiah Matematika dan Terapan*, 20(1), 56-65.
- Nainggolan, N., Sjojfan, J., dan Anom, E., 2016, Pengaruh Abu Sekam Padi dan Beberapa Jenis Pupuk Kandang Terhadap Pertumbuhan dan Produksi Tanaman Jagung (*Zea mays saccharata* Sturt.) di Lahan Gambut, *JOM FAPERTA*, 3(2), 1-12.
- Nangaro, R. A., Tamond, Z. E., dan Titah, T., 2020, Analisis Kandungan Bahan Organik Tanah Di Kebun Tradisional Desa Sereh Kabupaten Kepulauan Talaud, *In Cocos*, 12(4).
- Nento, P.R., dan Aries, M., 2024, Gambaran Prevalensi Stunting di Lokus dan Non-Lokus Stunting di Kota Bogor Tahun 2021-2023, *J. Gizi Dietetik*, 3(1), 13-20.
- Ngibad, K., dan Herawati, D., 2019, Analisis Kadar Klorida Dalam Air Sumur dan PDAM Di Desa Ngelom Sidoarjo, *JKPK*, 1-9.
- Nor, F., Sunarto, W., dan Prasetya, A.T., 2014, Sintesis Biomassa Bulu Ayam Teraktivasi NaOH/Na₂SO₃ Aplikasinya Penurun Kadar Tembaga Limbah Elektroplating, *Indones. J. Chem.*, 3(2).
- Novotny, E.H., Hayes, M.H., Madari, B.E., Bonagamba, T.J., Azevedo, E.R.D., Souza, A.A.D., de Souza A.A., Song, G. and Mangrich, A.S., 2009 Lessons from the Terra Preta de Índios of the Amazon Region for The Utilisation of Charcoal for Soil Amendment, *J. Braz. Chem. Soc.*, 20, 1003-1010.
- Nunes da Silva, M., Machado, J., Osorio, J., Duarte, R., and Santos, C.S., 2022, Non-Essential Elements and Their Role in Sustainable Agriculture, *Agronomy*, 12(4), 888.
- Nurhayati, D.R., 2021, *Pengantar Nutrisi Tanaman*, Surakarta: UNISRI Press.
- Nurlina, N., Syahbanu, I., Tamnasi, M.T., Nabela, C., dan Furnata, M.D., 2018, Ekstraksi dan Penentuan Gugus Fungsi Asam Humat dari Pupuk Kotoran Sapi, *IJoPAC*, 1(1), 30-38.
- Olesen, K. and L. Andréasson., 2003, The Function of The Chloride Ion in Photosynthetic Oxygen Evolution, *Biochemistry*, 42:2025–2035

- Ouellette, R.J., and Rawn, J.D., 2014, *Organic Chemistry Study Guide: Key Concepts, Problems, and Solutions*, Amsterdam, Elsevier.
- Pamungkas, B.A., De Fretes, C.H., dan Hergianasari, P., 2023, Kebijakan Pemerintah Indonesia Dalam Impor Beras Tahun 2021, *Administratus*, 7(2), 1-13.
- Pauline, A.L., and Joseph, K., 2020, Hydrothermal Carbonization of Organic Wastes to Carbonaceous Solid Fuel—A Review of Mechanisms and Process Parameters, *Fuel*, 279, 118472.
- Piccolo, A., 2002, The Supramolecular Structure of Humic Substances: A Novel Understanding of Humus Chemistry and Implications in Soil Science, *Adv. Agron.*, 57–134.
- Pohan, M.S.A., Sutarno, S., dan Suyanta, S., 2017, Studi Adsorpsi-Desorpsi Anion Fosfat pada Zeolit Termodifikasi CTAB. *Jurnal Penelitian Sains*, 18(3), 123-135.
- Poole, A.J., Lyons, R.E. and Church, J.S., 2011, Dissolving Feather Keratin Using Sodium Sulfide for Bio-Polymer Applications, *J. Polym. Environ.*, 19, 995-1004.
- Priyadarshini, S., Rachna, V., Shah, J.T., Kumar, D.M., Irshath, A.A., and Rajan, A. P. 2023. Solving Hidden Hunger: Contributions Of Various Sectors—A, *IJAR*, 10(2).
- Puspita, D., Patmasari, D., Sella, S., dan Purbayanti, D., 2020, Review: Risiko Stunting Pada Anak yang Tinggal di Area Pertambangan Emas Skala Kecil, *Borneo Journal of Medical Laboratory Technology*, 3(1), 161–167.
- Putro, A.L. dan Prasetyoko, D., 2007, Abu Sekam Padi Sebagai Sumber Silika Pada Sintesis Zeolit ZSM-5 Tanpa Menggunakan Templat Organik, *Akta kimindo*, 3(1) 33-36.
- Rahayu, Y.S., Yuliani., dan Dewi, S.K., 2022, *Penyakit Tanaman Akibat Defisiensi Unsur Hara*. Surabaya: Universitas Negeri Surabaya
- Rahman, H., Rahmah, M., dan Saribulan, N., 2023, Upaya Penanganan Stunting di Indonesia: Analisis Bibliometrik Dan Analisis Konten, *JIPSK*, 8(1),44-59
- Rahmawati, A., 2011, Isolasi dan Karakterisasi Asam Humat Dari Tanah Gambut, *Jurnal Phenomenon*, 2(1), 128-129.
- Rajabi, M., Ali, A., McConnell, M., and Cabral, J., 2020, Keratinous Materials: Structures and Functions in Biomedical Applications, *Mater. Sci. Eng. C*, 110, 110612.
- Ramadani, H.R.R., 2022, Hidrochar Ampas Kopi Termodifikasi H₂O₂ Sebagai Adsorben Untuk Ion Logam Berat Cd (II): Hydrochar; Spent Coffee Grounds; H₂O₂; Cd (II), *ICAJ*, 5(1), 21-32.
- Rasyid, R, 2011, Perbandingan X-Ray Fluorescence (XRF) Dan Inductively Coupled Plasma-Optical Emission Spectrophotometer (ICP-OES) Untuk Analisis Nikel Dan Besi Dalam Sampel Converter Slag Pada Industri Pertambangan Nikel, *Skripsi*, Universitas Islam Indonesia.
- Riono, Y. dan Apriyanto, M., 2020, Pemanfaatan Abu Sekam Padi dalam Inovasi Pemupukan Kacang Hijau (*Vigna radiata* L) Di Lahan Gambut, Selodang Mayang: *Jurnal Ilmiah Badan Perencanaan Pembangunan Daerah Kabupaten Indragiri Hilir*, 6(2), 60.

- Runkle, B.R., Seyfferth, A.L., Reid, M.C., Limmer, M.A., Moreno-García, B., Reavis, C.W., Peña, J., Reba, M.L., Adviento-Borbe, M.A.A., Pinson, S.R.M., and Isbell, C., 2021, Socio-technical Changes for Sustainable Rice Production : Rice Husk Amendment, Conservation Irrigation, and System Changes, *Front. Agron.*, 3, 741557.
- Sagwal, A., Wadhwa, P., and Kaushal, S., 2023, Essentiality of Micronutrients in Soil: A Review, *International Journal of Plant & Soil Science*, 35(24), 56-65.
- Sakya, A.T., 2016, Peningkatan Ketersediaan Nutrisi Mikro pada Tanaman: Upaya Mengurangi Malnutrisi pada Manusia, *Caraka Tani: J. Sustain. Agric.*, 31(2), 118-128.
- Sanjaya, A.S., dan Agustine, R.P., 2015, Studi Kinetika Adsorpsi Pb Menggunakan Arang Aktif Dari Kulit Pisang, *Konversi*, 4(1), 17-24.
- Santoso, F.J., Wahyudi, H.I., Isrun, 2014, Evaluasi Kandungan Logam Berat Merkuri (Hg) Pada beberapa tanaman Pangan Dan Palawija DI Sekitar Areal Pengolahan Tambang Emas Di Kelurahan Poboya, Kota Palu, *Jurnal Agrotekbis*, 2(2), 138-145.
- Saputra, D.M., Wahyudi, D., dan Sari, D.P., 2024, Karakterisasi Hidrolisat Keratin Bulu Ayam Menggunakan Ekstraksi Enzim Kasar Keratinase Dari Bakteri *Bacillus thuringiensis*, *Lambung Farmasi: Jurnal Ilmu Kefarmasian*, 5(1), 61-69.
- Saputra, M. F. W., dan Munir, M., 2024, Estimasi Kandungan Bahan Organik Tanah Di Lahan Tanaman Jeruk, Kecamatan Dau, Kabupaten Malang Menggunakan Indeks Vegerasi Dan Sistem Informasi Geografis, *JTSL*, 11(1), 183-192.
- Saraswati, F., 2009, Formulasi Sediaan Lepas Lambat Tablet Teofilin Dengan Matriks Hidroksi Propil Metil Selulosa dan Avicel pH 102 Dengan Metode Granulasi Basah, *Skripsi*, Universitas Muhammadiyah Surakarta
- Sari, R.J., Mansyur, S., Nugroho, A.P., dan Sukandaru, F.B., 2024, Pemanfaatan Limbah Abu Sekam Padi Dalam Peningkatan Ekonomi Masyarakat Desa Kemudo Kecamatan Prambanan. *BERNAS: Jurnal Pengabdian Kepada Masyarakat*, 5(1), 857-865.
- Setiabudi, A., Hardian, R., dan Muzakir, A 2012, *Karakterisasi Material; Prinsip dan Aplikasinya dalam Penelitian Kimia*. Bandung, UPI Press.
- Setyorini, D., 2005, Pupuk Organik Tingkatkan Produksi Pertanian, *Warta Penelitian dan Pengembangan Pertanian*, 27(6), 13-15.
- Sharma, R., Jasrotia, K., Singh, N., Ghosh, P., Srivastava, S., Sharma, N.R., Singh, K., and Kumar, A., 2020, A Comprehensive Review on Hydrothermal Carbonization of Biomass and Its Applications. *Chem. Afr.*, 3, 1-19.
- Shavandi, A., Silva, T.H., Bekhit, A.A., and Bekhit, A.E.D.A., 2017, Keratin: Dissolution, Extraction and Biomedical Application, *Biomater. Sci.*, 5(9), 1699-1735.
- Shukla, A.K., Behera, S.K., Pakhre, A., and Chaudhari, S.K., 2018, Micronutrients in Soils, Plants, Animals and Humans, *Indian Journal of Fertilisers*, 14(3), 30-54.

- Signorelli, G.C., Bianchetti, M.G., Jermini, L.M., Agostoni, C., Milani, G.P., Simonetti, G.D., and Lava, S.A., 2020, Dietary Chloride Deficiency Syndrome: Pathophysiology, History, and Systematic Literature Review, *Nutrients*, 12(11), 3436.
- Sodhi, G.P.S., Beri, V., and Benbi, D. K., 2009, Soil Aggregation and Distribution of Carbon and Nitrogen in Different Fractions Under Long-Term Application of Compost in Rice–Wheat System, *Soil Till Res*, 103(2), 412-418.
- Song, S., Peng, W., and Li, H., 2021, Surface Chemistry of Mineral Adsorbents, *Adsorption at Natural Minerals/Water Interfaces*, 55-91.
- Stevenson, 1994, *Humus Chemistry: Genesis, Composition*, 2nd ed. John Wiley and Sons, New York.
- Strutt, A., 2009, *Indonesia in A Reforming World Economy*, CASER, Bogor
- Suci, W.P., Mariwy, A., dan Manuhutu, J.B., 2020, Analisis Kadar Merkuri (Hg) Pada Tanaman Padi (*oryza sativa* L.) di Area Persawahan Desa Grandeng Kecamatan Lolong Guba Pulau Buru, *MJoCE*, 10(1), 8-18.
- Sukasih, N.S., Kurniawati, H., Sinaga, M., dan Saputra, K., 2023, Peranan Kompos Sekam Padi Terhadap Pertumbuhan Dan Hasil Baawang Kucai (*Allium schoenoprasum* L), *PIPER*, 19(2), 116-124.
- Sukendro, P.B., Indrawati, T., dan Rahmat, D., 2021, Optimasi Proses Hidrolisis Protein Dari Limbah Bulu Ayam, *Farmasains*, 8(1), 7-14.
- Sumardiharta, D.A., dan Ardi., 2001, Penggunaan Pupuk Dalam Rangka Peningkatan Produktivitas Lahan Sawah, *Jurnal Penelitian dan Pengembangan Pertanian*, 20,(4).
- Sumiati, Salsabila, M.F., and Surur, M.A., 2023, Determination of Chlorophyll Levels of Water Kale Plants (*Ipomoea aquatica* Forkss) Experiencing Nutrient Deficiencies, *Jurnal Biologi Tropis*, 23 (1)186-191.
- Supriyadi, S., 2008, Kandungan Bahan Organik Sebagai Dasar Pengelolaan, Tanah Di Lahan Kering Madura, *EMBRYO*, 5(2), 176-183.
- Suprianto, S., 2016, Analisis Kinetika Pelepasan Teofilin Dari Granul Matriks Kitosan, *Jurnal Ilmiah Manuntung: Sains Farmasi Dan Kesehatan*, 2(1), 70-80.
- Suryani, I., 2014, Kapasitas Tukar Kation (KTK) Berbagai Kedalaman Tanah Pada Areal Konversi Lahan Hutan, *Jurnal Agrisistem*, 10(2), 99-106.
- Susanti, I., 2017, Faktor-Faktor yang Mempengaruhi Volume Beras Impor di Jawa Timur. *JPENSI*, 2(1), 25.
- Susila, D.K., 2013, Studi Keharaan Tanaman dan Evaluasi Kesuburan Tanah Di Lahan Pertanian Jeruk Desa Cengiling, Kecamatan Kuta Selatan. *Jurnal Agrotrop*, 3(2), 13-20.
- Syachroni, S.H., 2020, Kajian Beberapa Sifat Kimia Tanah pada Tanah Sawah di Berbagai Lokasi di Kota Palembang, *Sylva: Jurnal Penelitian Ilmu-Ilmu Kehutanan*, 8(2), 60-65.
- Takaya, C.A., Fletcher, L.A., Singh, S., Anyikude, K.U., and Ross, A.B., 2016, Phosphate and Ammonium Sorption Capacity of Biochar and Hydrochar From Different Wastes, *Chemosphere*, 145, 518-527.
- Terry, N., 1977, Photosynthesis, Growth, and The Role of Chloride, *Plant Physiol.*

60(1), 69–75.

- Tiwari, H., Bhatt, R., Singh, P.K., Das, D., Vihan, S., Tomar, T., Singh, A.K. and Kumar, S., 2024, Micronutrients in the Plant-Soil-Environment Continuum: A Comprehensive Review, *European J. Nutr. Food Saf.*, 16(7), 171-178.
- Tkacheva, N., and Eliseeva, T., 2022, Chlorine (Cl)–Importance For The Body and Health, Where it is Contained, *J Acad Nutr Diet*, 2(20), 28-34.
- Umam, J., and Rosyidah, A., 2013, Sintesis dan Karakterisasi Aurivillius CaBi₂Nb₂O₉ dan LaBi₂TiNbO₉ dengan Metode Solid State, *Jurnal Sains dan Seni ITS*, 2(1), C7-C10.
- Utami, R.P., Hastuti, R., dan Khabibi, K., 2015, Pengaruh H₂SO₄ pada PVA dalam Modifikasi Tongkol Jagung-Bulu Ayam sebagai Adsorben Campuran Logam Pb (II) dan Cd (II), *J. Kim. Sains Apl.*, 18(2), 44-49.
- Vavrova, K., Wimmerova, L., Knapek, J., Weger, J., Keken, Z., Kastanek, F., and Solcova, O., 2022, Waste Feathers Processing to Liquid Fertilizers for Sustainable Agriculture LCA, Economic Evaluation, and Case Study, *Processes*, 10(12), 2478.
- Vetterlein, D., Kühn, T., Kaiser, K., and Jahn, R., 2013, Illite Transformation and Potassium Release Upon Changes in Composition of The Rhizosphere Soil Solution, *Plant and soil*, 371, 267-279.
- Vilcins, D., Sly, P.D., and Jagals, P., 2018, Environmental Risk Factors Associated With Child Stunting: A Systematic Review of The Literature, *Ann. Glob. Health*, 84(4), 551.
- Voss, R.E., 1998, *Micronutrients: Functions, Deficiency Symptoms, and Soil Management*, College Park: University of Maryland Extension.
- Wahyudi, D., Saputra, D.M. dan Sari, D.P., 2024, Karakterisasi Hidrolisat Keratin Bulu Ayam Menggunakan Ekstraksi Enzim Kasar Keratinase Dari Bakteri *Bacillus thuringiensis*, *Lambung Farmasi: Jurnal Ilmu Kefarmasian*, 5(1), 61-69.
- Wang, T., Zhai, Y., Zhu, Y., Li, C., and Zeng, G., 2018, A Review of The Hydrothermal Carbonization of Biomass Waste for Hydrochar Formation: Process Conditions, Fundamentals, and Physicochemical Properties, *Renew. Sustain. Energy Rev.*, 90, 223-247.
- Widiastuti, I.M., 2019, Respon Cacing Tubifex Terhadap Limbah Yang Mengandung Merkuri, *Doctor thesis, Universitas Brawijaya*.
- Widiastuti, N.L.G.K., 2019, Pendidikan Sains Terintegrasi Keterkaitan Konsep Ikatan Kimia Dengan Berbagai Bidang Ilmu, *Widya Accarya*, 10(2).
- Widiyaningrum, P., dan Lisdiana, L., 2013, Perbedaan Fisik Dan Kimia Kompos Daun Yang Menggunakan Bioaktivator Mol Dan EM 4, *Saintekno: Jurnal Sains dan Teknologi*, 11(1).
- Winarsih, Y.R. dan Baharudin, R., 2022, Pemanfaatan Limbah Bulu Ayam Sebagai Kompos Dan NPK Grower Untuk Meningkatkan Pertumbuhan Dan Produksi Tanaman Kubis (*Brassica Oleracea Var. Capitata*), *Jurnal Dinamika Pertanian*, 37(1), 67-74.
- Wyatt, L., Ortiz, E.J., Feingold, B., Berky, A., Diringler, S., Morales, A.M., Jurado, E.R., HsuKim, H., and Pan, W., 2017, Spatial, Temporal, and Dietary Variables Associated With Elevated Mercury Exposure in Peruvian

- Riverine Communities Upstream and Downstream of Artisanal and Small-Scale Gold Mining, *Int. J. Environ. Res. Public Health*, 14.
- Xu, G., Magen, H., Tarchitzky, J., and Kafkafi, U., 1999, Advances in Chloride Nutrition of Plants, *Adv. Agron.*, 68, 97-150.
- Yang, F., Zhang, S., Cheng, K., and Antonietti, M., 2019, A Hydrothermal Process to Turn Waste Biomass Into Artificial Fulvic and Humic Acids for Soil Remediation, *Sci. Total Environ*, 686, 1140-1151.
- Yasser, M., Syahrir, M., Nurdin, M. I., dan Riyadi, N. A., 2021, Pembuatan Pupuk Berbasis Limbah Sekam Padi Kelompok Tani Batu Tire Desa Sangrego Kecamatan Kahu Kabupaten Bone, In *Seminar Nasional Hasil Penelitian dan Pengabdian Kepada Masyarakat (SNP2M)*, 6(1) 152-155.
- Zikra, F., Oktavia, B., Putra, A., dan Kurniawati, D., 2022, Desorpsi Anion Klorida (Cl⁻) dari Adsorben Silika Mesopori Template CTAB (Cetiltrimetilammoniumbromida) Termodifikasi Dimethylamine, *Chemistry Journal of Universitas Negeri Padang*, 12(2).
- Zulaikhah, S.T., Wahyuwibowo, J., and Pratama, A.A., 2020, Mercury and its Effect on Human Health: A review of the literature, *Int. J. of Health Sci*, 9(2), 103–114.