

DAFTAR PUSTAKA

- Abd Elhalim, M. E., Abo-Alatta, O. K., Habib, S. A., & Abd Elbar, O. H. 2016. The anatomical features of the desert halophytes *Zygophyllum album* L.F. and *Nitraria retusa* (Forssk.) Asch. *Annals of Agricultural Science*, 61(1):97–104
- Adegbaju, O. D., Otunola, G. A., & Afolayan, A. J. 2019. Foliar micromorphology and histochemical localization of specific metabolites in the leaves of *celosia argentea* L. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, 47(4): 1128–1135.
- Ahmad, P., Abdel Latef, A. A., Abd-Allah, E. F., Hashem, A., Sarwat, M., Anjum, N. A., & Gucel, S. 2016. Calcium and potassium supplementation enhanced growth, osmolyte secondary metabolite production, and enzymatic antioxidant machinery in cadmium-exposed chickpea (*Cicer arietinum* L.). *Frontiers in Plant Science*. 7:513
- Akmalia, H. A. 2021. Adaptasi Anatomis Tumbuhan Terhadap Perbedaan Stress Lingkungan. *STIGMA: Jurnal Matematika dan Ilmu Pengetahuan Alam Unipa*, 14(01):18-27.
- Alka, D., Kumar, P., Kumar, Y., Sharma, Y. K. & Kayastha, A. M. 2017. Soil Sensors: Detailed Insight Into Research Updates, Significance, and Future Prospects In: New Pesticides and Soil Sensors. *Grumezescu A. M.* 2(1): 561-594.
- Amada, G., Kobayashi, K., Izuno, A., Mukai, M., Ostertag, R., Kitayama, K. and Onoda, Y. 2019. Leaf Trichomes In *Metrosideros Polymorphacan* Contribute To Avoiding Extra Water Stress By Impeding Gall Formation. *Ann. Bot.* 125: 533-542.
- Ankure, S., Tah, M., Mondal, S., Murmu, A. K., & Naskar, S. 2023. Adaptive evolution of leaf anatomical features in mangrove Rhizophoraceae cues differential strategies of salt tolerance. *Flora*. 300 (152225): 1-9.
- Apriliani, N.Z & Yuliani. 2020. Respons Anatomi dan Kadar Asam Oksalat Tumbuhan *Amorphophallus muelleri* Blume pada Lingkungan yang Berbeda. *LenteraBio*. 9 (2): 137-145.
- Arifin, S. Z. 2012. Pengaruh Jenis Tanah Terhadap Pertumbuhan Bibit Srikaya (*Annonasquamosa*). *Seminar Nasional Pangan UPN "Veteran" Yogyakarta*.
- Arnoldi, J-F, Coq, S, Kéfi, S, Ibanez, S. 2020. Positive plant–soil feedback trigger tannin evolution by niche construction: A spatial stoichiometric model. *J Ecol*. 108: 378– 391.
- Arsyad. S. 2010. *Konservasi Tanah dan Air*. IPB Press. Bogor.
- Aryati, H., Anggarwulan, E., dan Solichatun. 2005. Pengaruh Penambahan DL-Triptofan terhadap Pertumbuhan Kalus dan Produksi Alkaloid-Reserpin Pule Pandak (*Rauvolfia serpentina* (L.) Bentham ex Kurz.) secara *In Vitro*. *Biofarmasi*. 3(2): 52-56.
- Avivi, S., Syamsunihar, A., Soeparjono, S., Chozin, M. 2018. Toleransi Berbagai Varietas Tebu terhadap Penggenangan pada Fase Bibit Berdasarkan Karakter

- Morfologi dan Anatomi. *J. Agron. Indonesia*. 46(1):103-110.
- Babychan, N., & Jk, D. R. 2017. Analysis of antioxidant properties of *Moringa oleifera* Lam in urban and coastal area. *International Journal of Applied Research*. 3(6) :1098–1101.
- Badria FA, Aboelmaaty WS. 2019. Plant Histochemistry: A versatile and indispensable tool in localization of gene expression, enzymes, cytokines, secondary metabolites and detection of plants infection and pollution. *Acta Scientific Pharmaceutical Sciences*.3(7):88-100.
- Beckman, C.H. & Mueller, W.C. 1970. “Distribution of Phenol in Specialized Cell of Banana Roots. *Phytopathology*. 60:79-82.
- Benelli G, Canale A, Toniolo C, Higuchi A, Murugan K, Pavela R, Nicoletti M. 2016. Neem (*Azadirachta indica*): towards the ideal insecticide?. *Nat Prod Res*.31(4):369-386.
- Bodkin F, 1991. *Encyclopedia Botanica. The essential reference guide to native and exotic plants in Australia*. North Ryde, New South Wales. Australia: Cornstalk Publishing.
- Brisson, L. 1989. “Immunological Localization of Plant Secondary Metabolites”. Ph.D.Thesis. Departement Of Biology, Concordial University. Canada.
- Buckman, H.O. dan N.C. Brady. 1982.*Ilmu Tanah*. Bhratara Karya Aksara. Jakarta.788 hal
- Burkhardt, A., Gawde, A., Cantrell, C. L., Baxter, H., Joyce, B. L., Stewart, C. N., Zheljazkov, V. D. 2015. Effects of Produced Water on Soil Characteristics, Plant Biomass, and Secondary Metabolites. *Journal of Environmental Quality*. 44(6):1938–1947.
- Cahyani, N.KM.D., Nurhatika, S., Muhibuddin, A. 2014. Eksplorasi Mikoriza Vesikular Arbuskular (MVA) Indigenous pada Tanah Aluvial di Kabupaten Pamekasan Madura. *Jurnal Sains dan Seni Pomits*. 3(1): 2337-3520.
- Cahyono, E., Hindun, I., Rahardjanto, A., & Nurrohman, E. 2022. Exploration Characteristics of Trichomes Shading Plant at Melati Bungur Park Malang City. *Jurnal Pembelajaran Dan Biologi Nukleus*, 8(2), 459–469.
- Cai, M. T., Zhou, Y., Ding, W. L., Huang, Y. H., Ren, Y. S., Yang, Z. Y., Zhang, L., Sun, F., Guo, H. B., Zhou, L. Y., Gong, Z. H., Piao, X. H., Wang, S. M., & Ge, Y. W. 2023. Identification and localization of morphological feature-specific metabolites in *Reynoutria multiflora* roots. *Phytochemistry*, 206.
- Chang, Y., Fan, Y., Li, Z., & Lv, G. 2022. Relationship between Photosynthetic Characteristics, Anatomical Structure, and Physiological Indexes of Two Halophytes in Different Habitats. *Forests*, 13(12): 1-13.
- Chairiyah, N., Murtalaksono, A., Adiwena, M., & Fratama, R. 2022. Pengaruh Dosis Pupuk NPK Terhadap Pertumbuhan Vegetatif Tanaman Cabai Rawit (*Capsicum frutescens* L.) di Tanah Marginal. *Jurnal Ilmiah Respati*. 13(1):1-8.
- Chimungu J.G., Brown K.M., Lynch J.P. 2014. Large root cortical cell size improves drought tolerance in maize (*Zea mays* L.).*Plant Physiology*.
- Cox-Georgian, D., Ramadoss, N., Dona, C., & Basu, C. 2019. Therapeutic and medicinal uses of terpenes. *Medicinal plants: from farm to pharmacy*, 333-

359.

- Danladi, S., Wan-Azemin, A., Sani, Y. N., Mohd, K. S., Mahadeva Rao, U. S., Mansor, S. M., & Dharmaraj, S. 2015. Phytochemical Screening, Total Phenolic And Total Flavonoid Content, And Antioxidant Activity Of Different Parts Of *Melastoma malabathricum*. *Jurnal Teknologi*, 77(2), 63–68.
- Darmayanti, F.D.T. & Sutikto, T. 2019. Estimasi Total Air Tersedia Bagi Tanaman pada Berbagai Tekstur Tanah Menggunakan Metode Pengukuran Kandungan Air Jenuh. *Berkala Ilmiah Pertanian*. 2(4): 164-168
- Das S., Sarkar, S., Das, M., Banik, P., Bhattacharya, S. S. 2021. Influence of Soil Quality Factors on Capsaicin Biosynthesis, Pungency, Yield, and Produce Quality of Chili: An Insight on Csy1, Pun1, And Pun12 Signaling Responses. *Plant Physiology and Biochemistry*. 166: 427–436.
- Devipriya D. & Radhamany. 2021. *Plant Genetic Resource Utilization: An Appraisal*. Department of Botany, University of Kerala
- Dewi, F. A., Widyasunu, P., & Maryanto, J. (2021). Distribusi Unsur Hara Kalium Tanah dan Kadarnya pada Tanaman Padi Sawah di Wilayah Sub Das Serayu Hilir Kecamatan Sampang Kabupaten Cilacap. *Proceedings Series on Physical & Formal Sciences*, 2, 117-123.
- Dharma, I. G. A., Waspodo, R. S. B., & Pandjaitan, N. 2021. Analisis Pengaruh Perubahan Penggunaan Lahan terhadap Debit Sungai (Studi Kasus : Sub DAS Cikeas). *Jurnal Teknik Sipil Dan Lingkungan*, 6(2):121–132.
- Dinas Pertanahan dan Tata Ruang DIY. 2021. *Jenis Tanah DIY* diakses dari http://geoportal.jogjaprovo.go.id/layers/geonode:Jenis_Tanah_ar
- Effendi Y .2008. Kajian resistensi beberapa varietas padi gogo (*Oryza sativa* L.) terhadap cekaman kekeringan. *Tesis*. Universitas Sebelas Maret. Surakarta
- El-Alam, I., Zgheib, R., Iriti, M., Beyrouthy, M. el, Hattouny, P., Verdin, A., Fontaine, J., Chahine, R., Sahraoui, A. L. H., & Makhoul, H. 2019. *Origanum syriacum* Essential Oil Chemical Polymorphism According to Soil Type. *Foods*, 8(3): 1-11.
- El-Shemy, H. 2017. *Aromatic and Medicinal Plants - Back to Nature*. London: IntechOpen.
- El-Sherbeny, G. A., Dakhil, M. A., Eid, E. M., & Abdelaal, M. 2021. Structural and chemical adaptations of artemisia monosperma delile and *Limbarda crithmoides* (L.) dumort. in response to arid coastal environments along the mediterranean coast of egypt. *Plants*. 10(3), 1–16.
- Endress & Bryan A. 2002. The Importance Of Endeic Species To Forest Succession In Plants. *Micronesica*, 34 (2):141-153.
- Fahmi, A., Syamsudin, Utami, S. N. H., & Radjagukguk, B. 2010. The Effect of Interaction of Nitrogen and Phosphorus Nutrients on Maize (*Zea Mays* L.) Grown In Regosol and Latosol Soils. *Berita Biologi*, 10(3), 297–304.
- Fajrina, C., Arabia, T. & Sufardi 2019. Distribusi Fe-dan Al-humus serta C organik Tanah pada Entisol dan Inceptisol di Lahan Kering Jantho, di, Aceh Besar. *Jurnal Ilmiah Mahasiswa Pertanian Unsyiah*. 4(1):667-676. www.jim.unsyiah.ac.id/JFP
- Faridah, E., Supriyo, H., Wibisono, M.G., Kristinawati., Afiani. D., Hartanti, D.

2012. Akselerasi Pertumbuhan Cendana (*Santalum album*) dengan Aplikasi Unsur Hara Makro Esensial Pada Tiga Jenis Tanah. *Jurnal Ilmu Kehutanan*. 6 (1) : 1-17.
- Fathimah, A. 2015. *Isolasi dan Karakterisasi Alkaloid dari Daun Sirih Merah (Piper Crocatum Ruiz & Pav)*. Prodi Farmasi, Fakultas MIPA, Unisba
- Firmansyah, E. 2018. Perubahan Morfologis dan Anatomis Kelapa Sawit pada Rezim Air dan Salinitas Berbeda. *Jurnal Agro*. 5(1): 13-29.
- Ferdous & Rahman. 2018. Secondary Metabolites and Bioactivities of *Melastoma Malabathricum* (L.) Smith: An Anti-Diarrheal Plant of Bangladesh. *To Chemistry Journal*. 1(3): 256-262.
- Fiantis. Dian. 2017. Morfologi dan Klasifikasi Tanah. Padang: Lembaga Pengembangan Teknologi Informasi dan Komunikasi (LPTIK), Universitas Andalas.
- Giri, D. P., & Rajbhandari, M. 2018. Phytochemical Analysis And Constituents Of Hexane Extract Of *Melastoma malabathricum* L. *Journal of Institute of Science and Technology*, 23(1), 18–25.
- Gratani, L., Catoni, R., & Varone, L. 2013. Morphological, anatomical and physiological leaf traits of *Q. ilex*, *P. latifolia*, *P. lentiscus*, and *M. communis* and their response to Mediterranean climat stress factors. *Botanical Studies*, 54(1), 1–12. <https://doi.org/10.1186/1999-3110-54-35>
- Goławska S, Sprawka I, Łukasik I, Goławski A. 2014. Are Naringenin And Quercetin Useful Chemicals In Pest-Management Strategies?. *Journal of Pest Science*. 87(1):173-180
- Gunawan, Wijayanto, N., & Wilarso Budi, S. R. 2019. Characteristics of Soil Chemical Properties and Soil Fertility Status of Vegetables Agroforestry Based on *Eucalyptus* Sp. *Jurnal Silvikultur Tropika*, 10(02), 63–69.
- Haberstroh, S., Kreuzwieser, J., Lobo-Do-Vale, R., Caldeira, M. C., Dubbert, M., & Werner, C. 2018. Terpenoid emissions of two mediterranean woody species in response to drought stress. *Frontiers in Plant Science*, 9.
- Hakam, A. Yuliet, R. Donal R. 2010. Studi Pengaruh Penambahan Tanah Lempung dan Tanah Pasir Pantai terhadap Kekuatan Geser Tanah. *Jurnal Rakayasa Sipil*. 6 (1): 1- 22.
- Handayani, M., Lambui, O., Suwastika, I.N. 2017. Potensi Tumbuhan *Melastoma malabathricum* L. Sebagai Bahan Antibakteri Salmonellosis. *Natural Science: Journal of Science and Technology*. 6(2) :165-174
- Hanifah, H. N., Hadisoebroto, G., & Dewi, L. 2021. Comparison of phenolic, flavonoid, and tannin contents from ethanol extract of Kratom stem (*Mitragyna speciosa* Korth.) and senggani flower (*Melastoma malabathrium* L.). *Journal of Physics: Conference Series*, 1869(1).
- Hanafiah, K. A., 2009. Dasar-Dasar Ilmu Tanah. Rajawali Press, Jakarta.
- Harborne JB, Baxter H, Moss GP. 1999. *Phytochemical Dictionary: A Handbook of Bioactive Compounds from Plants*. 2nd ed. London: Taylor & Francis.
- Haridjaja, O., Baskoro, D. P.T., Setianingsih, M. 2013. Perbedaan Nilai Kadar Air Kapasitas Lapang Berdasarkan Metode Alhricks, Drainase Bebas, Dan Pressure Plate Pada Berbagai Tekstur Tanah dan Hubungannya Dengan Pertumbuhan Bunga Matahari (*Helianthus annuus* L.). *J. Tanah Lingk*. 15 (2)

:52-59.

- Hawari, Pujiasmanto, B., Triharyanti, E. 2022. Morfologi dan kandungan flavonoid total bunga telang di berbagai ketinggian tempat tumbuh berbeda. *Jurnal Kultivasi*. 21 (1): 88-96.
- Hendawy, S. F., Hussein, M. S., Amer, H. M., El-Gohary, A. E., Soliman, W. S. 2017. Effect of soil type on growth, productivity, and essential oil constituents of rosemary, *Rosmarinus officinalis*. *Asian J Agri & Biol*. 5(4):303-311.
- Heriyan, I. M. D., Widnyana, K. D., Darma, K. D. S. A., Swardika, I. K., Purnawa, I. B. I. 2022. Analisis Monitoring dan Kontrol Nilai Kelembaban Tanah Dengan Sistem Smart Farming Dan Soil Meter. *Jurnal Teknologi Pertanian Andalas*. 26(1): 92-101
- Hasanuzzaman, M., Bhuyan, M. B., Nahar, K., Hossain, M. S., Mahmud, J. A., Hossen, M. S., ... & Fujita, M. 2018. Potassium: a vital regulator of plant responses and tolerance to abiotic stresses. *Agronomy*, 8(3):31
- Hidayati, N., Hendrati, L. R., Triani, Arie., Sudjino. 2017. Pengaruh Kekeringan Terhadap Pertumbuhan dan Perkembangan Tanaman Nyamplung (*Calophyllum inophyllum* L.) dan Johar (*Cassia florida* Vahl.) Dari Provenan yang Berbeda. *Jurnal Pemuliaan Tanaman Hutan*. 11(2): 99 -111
- Hoffmann D. 2003. *Medical Herbalism : The Science and Practice of Herbal Medicine*. Healing Arts Press One Park Street, Rochester, Vermont; ISBN: 978- 089281749-8.
- Honório, A.B.M., De-la-Cruz-Chacón, I., Martínez-Vázquez, M.; da Silva, M.R.; Campos, F.G., Martin, B.C., da Silva, G.C.; Fernandes Boaro, C.S.; Ferreira, G. 2021. Impact of Drought and Flooding on Alkaloid Production in *Annona crassiflora* Mart. *Horticulturae*. 7(414) : 1-14.
- Hussein, R. A., El-Anssary, A. A., 2018, 'Plants Secondary Metabolites: The Key Drivers of the Pharmacological Actions of Medicinal Plants', in P. F. Builders (ed.), *Herbal Medicine*. IntechOpen, London. 10.5772/intechopen.76139.
- Hui, W., Zhao, F., Wang, J., Chen, X., Li, J., Zhong, Y., Li, H., Zheng, J., Zhang, L., Que, Q., Wu, A., Gong, W. 2020. De Novo Transcriptome Assembly For The Five Major Organs Of *Zanthoxylum Armatum* and The Identification Of Genes Involved In Terpenoid Compound And Fatty Acid Metabolism. *BMC Genom*. 21:81.
- Hussain, S., Iqbal, N., Pang, T., Naeem Khan, M., Liu, W. guo, & Yang, W. 2019. Weak Stem Under Shade Reveals The Lignin Reduction Behavior. In *Journal of Integrative Agriculture*. 18(3):496–505.
- Hutapea, E.M., Anwar, G., & Suharto, E. 2022. Respon Pertumbuhan Semai Mahoni (*Swietenia Macrophylla* King) Terhadap Pemberian Dosis Dolomit Pada Komposisi Media Tanam Kompos Tandan Kosong Kelapa Sawit. *Journal of Global Forest and Environmental Science*. 2(2): 92-105
- Ipek, M., Arikan, S., Esitken, A., Prilak, L., Donmez, N.F., Turan, N. 2021. Influence of Bacterial Inoculation on Growth and Plant Nutrition of Peach Grafted in Different Rootstocks in Calcareous Soil. *Sains Malaysiana*. 50(9): 2615-2624.
- Irawan, W., & Putra, E. T. S. 2020. The Effect of Potassium Addition on Oil Palm

- (*Elaeis guineensis* Jacq.) Roots Anatomic Properties under Drought Stress. *Caraka Tani: Journal of Sustainable Agriculture*. 35(1):54.
- Irwan, A.W. & Wicaksono, F.Y. 2017. Perbandingan Pengukuran Luas Daun Kedelai Dengan Metode, Gravimetri, Regresi dan Scanner. *Jurnal Kultivasi*. 16(3): 423- 429.
- Isnindar, Wahyuono, S., & Setyowati, E. P. 2011. Isolasi dan identifikasi senyawa antioksidan daun kesemek (*Diospyros kaki* Thunb.) dengan metode DPPH (2,2-difenil1-pikrilhidrazil). *Majalah Obat Tradisional*, 16(3), 157-1
- Isnatin, U., Muhammad, M., Rahayu, R., & Purnomo. D. 2019. Pertumbuhan Dan Kadar Klorofil Kedelai (*Glycine max* L.) Pada Lahan Berkapur Yang Diaplikasi Kompos Limbah Kayu Putih dan Pupuk NPK. *Prosiding SNasPPM*, 4(1): 71- 74.
- Izzati, M. 2016. Perubahan pH dan Salinitas Tanah Pasir dan Tanah Liat Setelah Penambahan Pembenh Tanah Dari Bahan Dasar Tumbuhan Akuatik. *Buletin Anatomi dan Fisiologi*. 24(1):1-6.
- Janas, K. M., Zielińska-Tomaszewska, J., Rybaczek, D., Maszewski, J., Posmyk, M. M., Amarowicz, R., & Kosińska, A. 2010. The impact of copper ions on growth, lipid peroxidation, and phenolic compound accumulation and localization in lentil (*Lens culinaris* Medic.) seedlings. *Journal of Plant Physiology*, 167(4), 270–276.
- Jawang, P. U. 2021. Penilaian Status Kesuburan dan Pengelolaan Tanah Sawah Tadah Hujan di Desa Umbu Pabal Selatan, Kecamatan Umbu Ratu Nggay Barat. *Jurnal Ilmu Pertanian Indonesia*. 26(3): 421–427.
- Jaya, R. 2017. Eksistensi Unsur Hara Tanah Terhadap Kerentanan Lahan Kritis di Kawasan DAS Alo Kabupaten Gorontalo. *Bindhe: Jurnal Ilmiah Program Studi Agribisnis*. 2(1): 100-106
- Julianto, T. S. 2019. *Fitokimia Tinjauan Metabolit Sekunder dan Skrining Fitokimia*, Universitas Islam Indonesia: Yogyakarta.
- Jofrry, S.M., Yob, N.J., Rofiee, M.S., Affandi, M.M., Suhali, Z., Othman F., Abdah, M.A., Mohd, M.N. Mohd. Zakaria, Z.A. 2012. *Melastoma malabathricum* (L.) Smith Ethnomedicinal Uses, Chemical Constituents and Pharmacological Properties: A Review. *Evidence-based Complimentary and Alternative Medicine*. 1(2) : 34-37.
- Johnson, R., Vishwakarma, K., Hossen, M. S., Kumar, V., Shackira, A. M., Puthur, J. T., Abdi, G., Sarraf, M., & Hasanuzzaman, M. 2022. Potassium in plants: Growth regulation, signaling, and environmental stress tolerance. In *Plant Physiology and Biochemistry*. 172:56–69.
- Karabourniotis, G., Liakopoulos, G., Nikolopoulos, D., & Bresta, P. 2020. Protective and defensive roles of non-glandular trichomes against multiple stresses: structure–function coordination. In *Journal of Forestry Research* 1(1):1-13
- Karimah, . *IOP Conf. Ser.: Earth Environ. Sci.* **481** 012007
- Karimi A, Krähmer A, Herwig N, Schulz H, Hadian J and Meiners T. 2020. Variation of Secondary Metabolite Profile of *Zataria multiflora* Boiss. Populations Linked to Geographic, Climatic, and Edaphic Factors. *Frontiers in Plant Science*. 11 (969):1-11.

- Karou D, Dicko MH, Simpore J, Traore AS. 2005. Antioxidant and antibacterial activities of polyphenols from ethnomedicinal plants of Burkina Faso. *Afr J Biotechnol.* 4(8):823–831.
- Kahkashan P, Najat B, Iram S and Iffat S. 2016. Influence of soil type on the growth parameters, essential oil yield and biochemical contents of *Mentha arvensis* L. *J. Essent. Oil. Bearing Plants.* 19(1): 76-81
- Khairil, M & Burslem, D. F. R. P. 2018. Controls on foliar aluminium accumulation among populations of the tropical shrub *Melastoma malabathricum* L. (Melastomataceae). *Tree Physiology.* 38 : 1754-1760
- Kanchana, S.N.P., Nayagam, A.A.J., Horta, S. 2019. Pharmacognostic Profile of Root and Stem of *Indigofera Tirunelvelica* Sanjappa. *Pharmacog J.* 11(6): 1580-1586.
- Kartina., Agang, M.W., Adiwena, M. 2019. Karakterisasi Kandungan Fitokimia Estrak Daun Karamunting (*Melastoma malabathricum* L.) Menggunakan Metode Gas Chromatography Mass Spectrometry (GC-MS). *Biota : Jurnal Ilmiah Ilmu-Ilmu Hayati*, 4(1), pp. 16–23.
- Kisman, Sumarjan, Hemon, A. F., Dewi, S. M., Susilowati, L. E., & Gunawan, B. W. 2022. Changes in the anatomical characters of root and stem of three large-seeded soybean (*Glycine max* (L.) Merrill) under drought stress. *IOP Conference Series: Earth and Environmental Science*, 1107(1):1-10.
- Kopaczky, J. M., Warguła, J., & Jelonek, T. 2020. The variability of terpenes in conifers under developmental and environmental stimuli. In *Environmental and Experimental Botany*. 180(20):1-12.
- Kumar, V., Sachan, R., Rahman, M., Rub, R.A., Patel, D.K., Sharma, K., Gahtori, P., Al-abbasi, F.A., Alhayyani, S., Anwar, F., Kim, H.S. 2021. Chemopreventive effects of *Melastoma malabathricum* L. extract in mammary tumor model via inhibition of oxidative stress and inflammatory cytokines. *Biomedicine & Pharmacotherapy*. 137 (1): 1-10.
- Kuntorini, E.M., Nugroho, L.H., Maryani, Nuringtyas, T. R. 2022. Maturity effect on the antioxidant activity of leaves and fruits of *Rhodomyrtus tomentosa* (Aiton.) Hassk.[J]. *AIMS Agriculture and Food*. 7(2): 282-296.
- Kuthanova, A., Gemperlova, L., Zelenkova, S., Eder, J., Machackovai Opatrny, Z., and Cvikrova, M. 2004. Cytological changes and alterations in polyamine contents induced by cadmium in tobacco BY-2 cells. *Plant Physiol. Biochem.* 42(2):149–156.
- Lawarence B and Murugan K. 2019. Morphological and anatomical variations of the selected species of *Osbeckia* L. (Melastomataceae). *Int J Pharm Sci & Res.* 10(1): 320-328.
- Liu, M. Y., Liu, G. L., Kang, Y. X., Zhang, S., Wu, Y., & Wang, Y. 2018. Responses of leaf morphological and anatomical structure to elevation in an alpine plant *Meconopsis integrifolia*. *Chinese Journal of Ecology* 37:35–42.
- Liu, W., Zheng, L., & Qi, D. 2020. Variation in leaf traits at different altitudes reflects the adaptive strategy of plants to environmental changes. *Ecology and Evolution*, 10(15), 8166–8175.
- Lu, Z., Ren, T., Li, J., Hu, W., Zhang, J., Yan, J., Li, X., Cong, R., Guo, S., & Lu, J. (2020). Nutrition-mediated cell and tissue-level anatomy triggers the

- covariation of leaf photosynthesis and leaf mass per area. *Journal of Experimental Botany*. 71:20: 6524–6537.
- Liu, Y., Meng, Q., Duan, x., Zhang, z., Li, D. 2017. Effects of PEG induced drought stress on regulation of indole alkaloid biosynthesis in *Catharanthus roseus*. *J. Plant Interact.* 12: 87–91.
- Lynch, J.P. 2015. New roots for agriculture. *Plant Cell Environ.* 38: 1775-1784.
- Ma'ruf, A. 2016. Respon beberapa kultivar tanaman pangan terhadap salinitas. *Bernas: Jurnal Penelitian Pertanian*, 12(3):11-19.
- Mace, M. E., A. B. A., & Stipanovic, R. D. 1974. Histochemistry and Isolation of Gossypol and Related Terpenoids in Roots of Cotton Seedlings. *Phytopathology*. 64(10):1297:1302.
- Mahmud K, & Burslem D. 2018. Contrasting growth responses to Al addition among populations of the Al hyper-accumulator *M. malabathricum* L. In: Jahan S, Mohamed NAB (eds). *International Conference On Agriculture, Animal Sciences & Food Technology 2018. University of Sultan Zainal Abidin, Terengganu, Malaysia 30-31 October 2018*.
- Maisirah, S., Z, Amri CN, Rozilawati S, Noor-Syaheera M Y. 2020. Systematic significance of the foliar trichomes in selected *Melastoma* L. species from Fraser Hill, Pahang. *Matrix Sci Pharma*. 4:9-12.
- Majumder, P., & Rudrappa, H. C. 2015. Micrometric evaluation of *Melastoma Malabathricum* L. flower. *International Journal of Pharmacy and Pharmaceutical Sciences*. 7(7):359–363.
- Mamari, H. H. A. , 2021, '*Phenolic Compounds: Classification, Chemistry, and Updated Techniques of Analysis and Synthesis*', in F. A. Badria (ed.), *Phenolic Compounds - Chemistry, Synthesis, Diversity, Non-Conventional Industrial, Pharmaceutical and Therapeutic Applications*. IntechOpen, London. 10.5772/intechopen.98958
- Mangena, P. 2018. Water Stress: Morphological and Anatomical Changes in Soybean (*Glycine max* L.) Plants. In *Plant, Abiotic Stress and Responses to Climate Change*. InTech. <https://doi.org/10.5772/intechopen.72899>
- Maryani, Prabawani, R.L., Daryono, B.S. 2009. Struktur Anatomi Epidermis Daun Lima Kultivar Melon (*Cucumis melo* L.) Berdasarkan Resistensinya terhadap Jamur Tepung (*Sphaerotheca fuliginea* Poll). *Biota*. 14 (2): 105-114.
- Master, J., Qayim, I., Setiadi, D., Santoso, N. 2020. Autecology of *Melastoma malabathricum*, an invasive species in the Way Kambas National Park, Indonesia. *Biodiversitas*. 2 (5): 2303-2310.
- Mayasari, D., Murti, Y.B., Sylvia U.T.P., Sudarsono. 2021. Metabolic fingerprinting of *Melastoma malabathricum* L. extracts using high-performance liquid chromatography-diode array detector combined with chemometric data analysis. *Journal of Applied Pharmaceutical Science* 11 (09): 048-056
- Mei, Y., Wei, L., Chai, C., Zou, L., Liu, X., Chen, J., Tan, M., Wang, C., Cai, Z., Zhang, F., & Yin, S. 2020. A method to study the distribution patterns for metabolites in xylem and phloem of *spatholobi caulis*. *Molecules*, 25(1): 167-176.
- Metlen, K. L., Aschehoug, E. T., & Callaway, R. M. 2009. Plant behavioural

- ecology: Dynamic plasticity in secondary metabolites. *Plant, Cell and Environment*, 32(6):641–653.
- Muliyah, E., Sulistijorini, Sulistyaningsih, Y.C., Rafi, M. 2017. *Tetracera scandens* as a Medicinal Plant: Secretory Structures, Histochemistry, and Antibacterial Activity. *The Journal Of Tropical Life Science*. 8(1):68-74.
- Minatel, I. O. et al., 2017, 'Phenolic Compounds: Functional Properties, Impact of Processing and Bioavailability', in M. Soto-Hernandez, M. Palma-Tenango, M.d. Rosario (eds.), *Phenolic Compounds - Biological Activity*, IntechOpen, London. 10.5772/66368.
- Mohd, N.N. P., Abdu, A., Jusop, S., Hamid, H.A., Karim, M.R., Nazrin, M., Akbar, M.H., Jamaludin, A.S. 2016. Potentiality of *Melastoma malabathricum* as Phytoremediators of soil. *Sci. Agric.* 75 (1): 27-35.
- Moudi M, Go R, Yong Seok Yien C, Nazre M. 2013. Vinca alkaloids. *International Journal of Preventive Medicine*. 4(11):1231-1235
- Mownika s, Ramya EK and Sharmila S. 2020. Anatomical and histochemical characteristics of *Morinda citrifolia* L. (Rubiaceae). *Int J Pharm Sci & Res*. 11(2): 669-77.
- Muhaemin. 2008. Analisis Pertumbuhan *Melastoma* (*Melastoma malabathricum* auct.non L. dan *M. affine* D. Don.) Yang Mendapat Cekaman pH Rendah Dan Aluminium. *Thesis*. Bogor, IPB.
- Mulyani, S & Laksana, T. 2011. Analisis Flavonoid Dan Tanin Dengan Metoda Mikroskopimikrokimiawi. *Majalah Obat Tradisional*. 16(3):109 – 114.
- Mulyanto, D., Subroto, P.S., Lukito, H. 2011. Genesis Pedon Tanah yang Berkembang di Atas Batuan Karbonat Wonosari Gunungkidul. *Forum Geografi*. 25(2): 100– 115.
- Mulyono. 2015. Pengaruh Penggunaan Mulsa Alang-Alang, Kenikir dan Kirinyu terhadap Pertumbuhan dan Hasil Bawang Merah Di Tanah Mediteran pada Musim Penghujan. *Planta Tropika Journal of Agro Science*. 3(2): 72-77.
- Munir, M. 1996. *Tanah-Tanah Utama Indonesia*. Dunia Pustaka Jaya. Jakarta.
- Nazirah N., Mohd,P., Abdu, A., Jusop, H., Hamid, A., Karim4, R., Nazrin, M., Akbar,M.H., Jamaluddin, S. 2020. Potentiality of *Melastoma malabathricum* as Phytoremediators of soil contaminated with sewage sludge. *Sci. Agric.* 75(1):27-35
- Mustapha, J., Jai, F., Hamidon, Z.I. Md. Sharif, N. Yusof, M. 2017. Antimicrobial agents from Malaysian plants and their potential use in food packaging material: Review. *Chemical Engineering Research Bulletin*. 19(2017) 57-66
- Mutmainna, N. D., Achmad, M., & Suhardi, S. 2017. Pendugaan Lugas Tanah Inceptisol Pada Tanaman Hortikultura Menggunakan Citra Landsat 8. *Jurnal Agritechno*. 10(2): 135–151.
- Nikiyuluw, V., Soplanit, R., Siregar, A. 2018. Efisiensi Pemberian Air dan Kompos Terhadap Mineralisasi NPK Pada Tanah Regosol. *J. Budidaya Pertanian*. 14(2): 105-112
- Ningrum, R., Purwanti, E., Sukarsono. 2016. Identifikasi Senyawa Alkaloid dari Batang Karamunting (*Rhodomirtus tomentosa*) sebagai Bahan Ajar Biologi untuk SMA Kelas X. *Jurnal Pendidikan Biologi Indonesia*. 2 (3): 231-236.
- Noviyanti, Y. and Linda, A. 2020. Profile Of Phytochemistry Compounds

- Metabolite Secondary Extract Of South Flower Extract (*Melastoma malabathricum* L.). *Journal of Pharmaceutical And Sciences*.3(1): 1-6.
- Nugroho, L. H. 2017. *Struktur dan Produk Jaringan Sekretori Tumbuhan*. Yogyakarta: UGM Press.
- Nugroho, L.H. 2019. *Panduan Praktikum Struktur dan Produk Jaringan Sekretori Tumbuhan*. Laboratorium Struktur dan Perkembangan Tumbuhan, Fakultas Biologi, UGM.
- Nunung, L.S., & Apridamayanti, P. 2019. Identifikasi Senyawa Flavonoid Ekstrak Daun Senggani (*Melastoma Malabathricum* L.) Menggunakan Metode Kromatografi Lapis Tipis (KLT). *Jurnal Farmasi Kalbar*. 4(1): 1-10.
- Nuryanti, Y. Yulanda, dan L. Riniwadih. 2017. Uji Aktivitas Antibakteri Ekstrak Etanol 96% Akar Karamunting (*Melastoma malabathricum* L.) Terhadap Pertumbuhan Bakteri *Escherechia coli*. *Indones. Nat Res Pharm*. 2(1): .91–97.
- Qaderi, M., Martel, A., & Dixon, S. 2019. Environmental Factors Influence Plant Vascular System and Water Regulation. *Plants* 8(3):65-76.
- Pandiangan, B., Iswan, Jafri, M. 2016. Pengaruh Variasi Waktu Pemeraman Terhadap Daya Dukung Tanah Lempung dan Lanau yang Distabilisasi Menggunakan Semen pada Kondisi Tanpa Rendaman (*Unsoaked*). *JRSDD (Jurnal Rekayasa Sipil dan Desain)*. 4(2): 256 – 275.
- Pant, P., Pandey, S., & Dall’Acqua, S. 2021. The Influence of Environmental Conditions on Secondary Metabolites in Medicinal Plants: A Literature Review. *Chemistry and Biodiversity* 18(11):18-32.
- Pavela, R. 2016. History, presence and perspective of using plant extracts as commercial botanical insecticides and farm products for protection against insects—A review. *Plant Prot. Sci*. 52: 229–241.
- Peniwiratri, L., Ruslan Afany Ilmu Tanah, M., & Pertanian, F. 2022. Potential Of Paitan (*Tithonia diversifolia*) And Cow Manure To Increase The Nitrogen Uptake Of Red Spinach (*Amaranthus tricolor* L.) On Sandy Beach Soil. *Jurnal Pertanian Agros*, 24(1):77-86.
- Permadi, Elpri E., Khoirunnisaa, P., Nugroho, L.H. 2019. Mapping of neolignan, taninand phenolic compound at the vegetative organs of green betel (*Piper betle* L.), red betel (*Piper crocatum* L.), and black pepper (*Piper nigrum* L.) with histochemistry analysis. *Agrotechnology*.1 (2): 95-98.
- Prabowo, I., & Rachmawati, D. 2020. Respons Fisiologis dan Anatomi Akar Tanaman Bayam (*Amaranthus tricolor* L.) Terhadap Cekaman NaCl. *Jurnal Penelitian Saintek*, 25(1), 36–43. <https://doi.org/10.21831/jps.v25i1.27357>
- Prasad, Kamal. 2015. Effect of Dual Inoculation of Arbuscular Mycorrhiza Fungus and Cultivar Specific *Bradyrhizobium japonicum* On the Growth, Yield, Chlorophyll, Nitrogen and Phosphorus Contents of Soybean (*Glycine max* (L.) Merrill.) Grown on Aluvial Soil. *Journal of Innovation in Applied Research*. 4(1): 1-12.
- Prasetyo, U.B., Rohmiyati, S. M., Hastuti, P. B. 2018. Pengaruh Dosis Pupuk Organik(Senyawa Humat) terhadap Pertumbuhan Bibit Kelapa Sawit Pada Jenis Tanahyang Berbeda. *Jurnal Agromast*. 3 (1) : 1-10.
- Pratiwi, D. R., Sulistyaningsih, Y. C., & Ratnadewi, D. 2020. Localization of alkaloid and other secondary metabolites in *Cinchona ledgeriana* moens:

- Anatomical and histochemical studies on fresh tissues and cultured cells. *HAYATI Journal of Biosciences*, 27(1), 1–7. <https://doi.org/10.4308/hjb.27.1.1>
- Priyadi, Jamaludi, Mangiring, W. 2018. Aplikasi Kompos dan Arang Aktif Sebagai Bahan Amelioran di Tanah Berpasir Terhadap Pertumbuhan Tanaman Caisim (*Brassica juncea* L.). *Jurnal Penelitian Pertanian Terapan* .18 (2): 81-86.
- Purba, T., Ningsih, H., Purwaningsih, Junaedi, A. S., Gunawan B., Junairiah, Firgiyanto, R., & Arsi. 2021. *Tanah dan Nutrisi Tanaman*. Medan: Yayasan Kita Menulis.
- Rahayu, A., Utami, S.R., Rayes M.L. 2016. Karakteristik dan Klasifikasi Tanah pada Lahan Kering dan Lahan yang Disawahkan di Kecamatan Perak Kabupaten Jombang. *Jurnal Tanah dan Sumberdaya Lahan*. 1(2): 79-87.
- Rajiman. 2014. Pengaruh bahan pembenah tanah di lahan pasir pantai terhadap kualitas tanah. *Prosiding seminar nasional lahan suboptimal 2014, Palembang*. ISBN: 979-587-529-9.
- Ramadhani R, Octarya Z. 2017. Pemanfaatan Ekstrak Buah Senduduk (*Melastoma malabathricum* L.) sebagai Alternatif Indikator Alami Titrasi Asam Basa dan Implementasinya dalam Praktikum di Sekolah. *Jurnal Pendidikan Kimia dan Terapan*. 1(1): 58.
- Rayos, A.L. & Hadsall, A. S. 2018. Comparative Leaf Blade Anatomy of Selected Philippine Melastomataceae. *Asian Journal of Biodiversity*. 9 (1): 1-11
- Reduan, F.H., Shaari, R.M., Sayuti, N.S.A., Mustapha, N.M., Bakar, M.Z.A., Sithambaram, S., Hamzah, H. 2020. Acute and subacute dermal toxicity of ethanolic extract of *Melastoma malabathricum* leaves in Sprague-Dawley rats. *Toxicol Res*. 36:203–210
- Reginato, M., Boeger M.R.T., Goldenberg, R. 2009. Comparative anatomy of the vegetative organs *Pleiochiton* A. Gray (Melastomataceae), With Emphasis on Adaptations to Epiphytism. *Flora*. 204: 782–790.
- Ridwan, A., & Awaludin. 2021. Karamunting (*Melastoma malabathricum*) Extracts On White Shrimp (*Litopenaeus vannamei*) Maturity. *Biotropia*, 28, 165–175.
- Risnah, S., Yudono, P., & Syukur, A. (2013). Pengaruh abu sabut kelapa terhadap ketersediaan k di tanah dan serapan k pada pertumbuhan bibit kakao. *J Ilmu Pertanian*, 16, 79-91.
- Rosleine D, Suzuki E. 2012. Secondary succession at abandoned grazing sites, Pangandaran Nature Reserve, West Java, Indonesia. *Tropics*. 21 (3): 91-104.
- Roswanti, P., Ghulamahdi, M., Khumaida, N. 2015. Respon Anatomi dan Fisiologi Akar Kedelai terhadap Cekaman Kekeringan. *J Agron Indonesia*. 43(3): 186–192
- Ruzin, SE, 1999, Plant Microtechnique And Microscopy, Oxford University Press, NewYork
- Sagayaraj, I. M & Nandhita, M. 2019. Morpho-anatomical and histochemical studies on *Coccinia grandis* (L.). *Journal of Pharmacognosy and Phytochemistry*. 8(3): 4296-4301
- Sagiarti, T.N, Okalia, D., & Marlina, G. 2020. Analisis C-Organik, Nitrogen dan C/N Tanah Pada Lahan Agrowisata Beken Jaya di Kabupaten Kuantan

- Singingi. *Jurnal Agrosains dan Teknologi*. 5(1):11-18.
- Saibi, N., & Tolangara, D. A. R. 2017. Dekomposisi Serasah *Avecennia lanata* pada Berbagai Tingkat Kedalaman Tanah. *TECHNO*: 06 (01): 11-17, <http://ejournal.unkhair.ac.id/index.php/Techno>
- Saidi, D., & Charibaldi, N. 2021. Utilization of Information and Communication Technology with the Internet of Things on Regosol Soil Characteristics. *Ijses.Com*. 5(10): 30-33.
- Salim, M., H. Sitorus, and T. Ni. 2016. Hubungan kandungan hara tanah dengan produksi senyawa metabolit sekunder pada tanamanduku (*Lansium domesticum* Corr var Duku) dan potensinya sebagai larvasida. *Jurnal Vektor Penyakit*, 10(1): 11–18
- Salisbury EJ. 1928. On the causes and ecological significance of stomatal frequency, with special reference to the woodland flora. *PhilTrans*. B(216): 1-65.
- Santhi, K and Sengottuvel, R. 2016. Qualitative and Quantitative Phytochemical analysis of *Moringa concanensis* Nimmo. *Int.J.Curr.Microbiol.App.Sci*. 5(1): 633-640
- Saptiningsih, E & Haryani, S. 2015. Kandungan Selulosa Dan Lignin Berbagai SumberBahan Organik Setelah Dekomposisi Pada Tanah Latosol. *Buletin Anatomi danFisiologi*. 28 (2):34-42.
- Saputri, Y. V., Nour Sholichah, R., Solichah, L., Ainun Najah, M., Su, M., & Kunci, K. (n.d.). Translokasi asimilat pada Anggrek Akar. *Jurnal Penelitian Sains*, 22(1), 1–8.
- Sari, N. M., Kuspradini, H., Amirta, R., & Kusuma, I. W. 2018. Antioxidant activity of an invasive plant, *Melastoma malabathricum* and its potential as herbal tea product. *IOP Conference Series: Earth and Environmental Science*, 144(1): 101-113.
- Sasmita, M.W. S., Nurhatika S, Muhibuddin A. 2020. Pengaruh dosis mikoriza arbuskular pada media AMB-P0K terhadap pertumbuhan tanaman tembakau (*Nicotiana tabacum* var. Somporis). *Jurnal Sains dan Seni ITS*.8(2):43–48.
- Schneider, H. M., Klein, S. P., Hanlon, M. T., Kaeppler, S., Brown, K. M., & Lynch, J. P. 2020. Genetic control of root anatomical plasticity in maize. *Plant Genome*, 13(1).
- Sembiring EN, Elya B, Sauriasari R. 2018. Inhibitory Effect On Arginase and Total Phenolic Content Determination Of Extracts From Different Parts Of *Melastoma malabathricum* L. *Journal of Young Pharmacists*. 10(2): 114–117.
- Setiaki. 2002. Karakteristik Tanah Merah Dari Bangkalan Madura. Undergraduate Thesis. Universitas Kristen Petra, Surabaya.
- Setyanti, M. 2018. Pertumbuhan dan Potensi Antibakteri *Melastoma malabathricum* Akibat Cekaman Kekeringan. *Thesis*. IPB, Bogor.
- Shi, J., Fei, X., Hu, Y., Liu, Y., Wei, A., 2019. Identification of key genes in the synthesis pathway of volatile terpenoids in fruit of *Zanthoxylum bungeanum* Maxim. *Forests*. 10(4):328-344.
- Silva, M. 2015. Systematic wood anatomy of *Huberia*, *Miconia* and *Tibouchina* (Melastomataceae). *IAWA Journal*. 36(3), 326-337,

- Silva, C.R., O. J. G. Almeida & L. A. Souza .2019. Leaf structural characters of *Leandra* and *Miconia* (*Miconieae*: Melastomataceae): taxonomic and ecological significance. *Boletim do Museu Paraense Emílio Goeldi. Ciências Naturais* 14(3): 425-437.
- Simpson, M. G. 2019. *Plant systematics Third Edition*. Elsevier Academic Press Publication, London.
- Slima, D. F., Turki, Z. A., Alhobishi, H. A., & Ahmed, D. A. (2021). Structural Adaptation of *Deverra tortuosa* (Desf.) DC. to Its Natural Habitats in Egypt. *Egyptian Journal of Botany*. 61(3): 781–794.
- Soedradjad, R., & Soeparjono, S. 2022. Respon Pertumbuhan Tanaman Jagung Terhadap Aplikasi Biochar Pada Lahan Kering Dengan Dua Sistem Irigasi. *Jurnal Ilmiah Hijau Cendekia*. 7(1):26-34.
- Stevovic, S., Mikovilvic, V.S., Dragosavac, D.C., 2010. Environmental impact on morphological and anatomical structure of Tansy. *African Journal of Biotechnology*. 9(16): 2413-2421
- Subardja, D., S. Ritung, M. Anda, Sukarman, E. Suryani, dan R.E. Subandiono. 2014. *Petunjuk Teknis Klasifikasi Tanah Nasional*. Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian. Badan Penelitian dan Pengembangan Pertanian, Bogor.
- Suharti, M & Gusmalawati, D. 2017. Struktur Anatomi Akar, Batang dan Daun Gaharu (*Aquilaria malaccensis* Lamk.) yang Mengalami Cekaman Kekeringan. *Protobiont* (2017) Vol. 6 (2) : 38 – 44.
- Sun, Y., Tao, W., Huang, H., Ye, X., & Sun, P. (2019). Flavonoids, phenolic acids, carotenoids and antioxidant activity of fresh eating citrus fruits, using the coupled in vitro digestion and human intestinal HepG2 cells model. *Food Chemistry*, 279, 321–327. <https://doi.org/10.1016/j.foodchem.2018.12.019>
- Sutardi. 2016. Kajian Minus One Test Dan Kesuburan Lahan Pasir Untuk Budidaya Tanaman Bawang Merah. *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian*. 20 (1): 25-34.
- Syarif, M., .2018. Analysis Of The Physical Properties of Alternative Cement Made From Recycled Waste Material. *International Journal of Civil Engineering and Technology (IJCET)*. 9 (9): 1441-1450.
- Syahputra, E., Fauzi., Razali. 2015. Karakteristik Sifat Kimia Sub Grup Tanah Ultisol di Beberapa Wilayah Sumatera Utara. *Jurnal Agroekoteknologi*. 4 (1): 2337- 6597
- Tadeusz A. 2015. *Alkaloids: Chemistry, Biology, Ecology, and Applications*. 2nd ed. Amsterdam. Netherlands: Elsevier; ISBN: 13: 978-0444594334
- Tambaru, Elis. 2017. Keragaman Jenis Tumbuhan Obat Indigenous di Sulawesi Selatan. *Jurnal Ilmu Alam dan Lingkungan*. 8 (15): 7 – 13
- Tian, J., Ge, F., Zhang, D., Deng, S., Liu, X. 2021. Roles of Phosphate Solubilizing Microorganisms from Managing Soil Phosphorus Deficiency to Mediating Biogeochemical P Cycle. *Biology*. 10(2):158-177.
- Triadiawarman, D., Aryanto, D., & Krisbiyantoro, J. 2022. Peran unsur hara makro terhadap pertumbuhan dan hasil bawang merah (*Allium cepa* L.). *Agrifor: Jurnal Ilmu Pertanian dan Kehutanan*. 21(1):27-32.
- Tufaila. M, A. S. 2014. Karakteristik Tanah dan Evaluasi Lahan untuk

- Pengembangan Tanaman Padi Sawah Di Kecamatan Oheo Kabupaten Konawe Utara . *Jurnal Agriplus*, 24(1):34-37
- Ulfah, D & Supiani . 2012. Pengaruh Jenis Tanah Terhadap Dimensi Serat dan Nilai Turunan Serat Kayu Akasia Daun Lebar (*Acacia mangium* Willd). *Jurnal Hutan Tropis*. 13(1): 1-10.
- Utami, S. W., Sunarminto, B. H., & Hanudin, E. (2018). Pengaruh limbah biogas sapi terhadap ketersediaan hara makro-mikro inceptisol. *Jurnal Tanah dan Air (Soil and Water Journal)*, 14(2), 50-59
- Uzelac, Branka & Janošević, Dušica & Stojičić, Dragana & Budimir, Snezana. 2015. In vitro morphogenesis and secretion of secondary metabolites of *Nicotiana tabacum* tall glandular trichomes. *Botanica Serbica*. 39. 103-110
- Yuliani & Rahayu, Y. S. 2016. Pemberian Seresah Daun Jati Dalam Meningkatkan Kadar Hara Dan Sifat Fisika Tanah Pada Tanah Kapur. *Prosiding Seminar Nasional Biologi 2016* ISBN: 978-602-0951-11-9: 213-217.
- Yulianto, Y & Purnama, A. S. 2019. Evaluasi Kesesuaian Lahan Untuk Tanaman Pala (*Myristica fragrans* Houtt.) di Kecamatan Cikalong Kulon, Sukaresmi dan Mande, Kabupaten Cianjur. *Media Pertanian*. 4(1): 13-20
- Yusuf, E.Y. 2021. Pemberian Tanah Aluvial Terhadap Pertumbuhan dan Produksi Bawang Merah (*Allium ascalonicum* L) di Media Gambut. *Jurnal Inovasi Penelitian*. 2(3): 1047-1052.
- Vattekkatte, A., Stefan Garms, A., Wolfgang, B., Wilhelm, B. 2018, Enhanced structural diversity in terpenoid biosynthesis: enzymes, substrates and cofactors', *Org. Biomol. Chem.*, 16 :348–362.
- Wagner, G.J., Wang, E. and Shepherd, R.W. 2004. New approaches for studying and exploiting an old protuberance, the Plant Trichome. *Annals of Botany*. 93 (1): 3-11.
- Wenkai, H., Jingyan, W., Wei, G., 2021. Identification of key genes in the biosynthesis pathways related to terpenoids, alkaloids and flavonoids in fruits of *Zanthoxylum armatum*. *Scientia Horticulturae*. 290(15):110523-110533.
- Widowati, R., Handayani, S., & al Fikri, A. R. 2021. Phytochemical Screening and Antibacterial Activities of Senggani (*Melastoma malabathricum* L.) Ethanolic Extract Leaves. *Jurnal Ilmu Pertanian Indonesia*. 26(4):562–568.
- Wiryo, A. B., Nurfaizah, I., & Nidyasari, R. S. 2015. Struktur Sekretori dan Uji Histokimia Tumbuhan Obat Anggota Suku Asteraceae di Hutan Pendidikan Gunung Walat. *Seminar Nasional XII Pendidikan Biologi FKIP UNS 2015*, 12(1), 667–673. <https://jurnal.uns.ac.id/prosbi/article/viewFile/7044/627>
- Wu R, Zou P, Tan G. 2019. Molecular identification of natural hybridization between *Melastoma malabathricum* and *Melastoma beccarianum* in Sarawak, Malaysia. *Ecol Evol*. 9(10):5766–5776.
- Xu, W., Peng, H., Yang, T., Whitaker, B., Huang, L., Sun, J., et al. 2014. Effect of calcium on strawberry fruit flavonoid pathway gene expression and anthocyanin accumulation. *Plant Physiol. Biochem*. 82, 289–298. doi: 10.1016/j.plaphy.2014.06.015
- Zainudin & Kesumaningwati, R. 2021. Assessment Of Soil Fertility Status On Multiple Land Uses In Samarinda. *Jurnal Agroekoteknologi Tropika Lembab*.

3(2) :106-111

- Zakaria, Z. A., Zainol, A. S. N., Sahmat, A., Salleh, N. I., Hizami, A., Mahmood, N. D., ... & Salleh, M. Z. 2016. Gastroprotective activity of chloroform extract of *Muntingia calabura* and *Melastoma malabathricum* leaves. *Pharmaceutical biology*, 54(5):812-826.
- Zheng, W.J.; Ren, Y.S.; Wu, M.L.; Yang, Y.L.; Fan, Y.; Piao, X.H.; Ge, Y.W.; Wang, S.M. 2020. A review of the traditional uses, phytochemistry and biological activities of the melastoma genus. *J. Ethnopharmacol.* 264, 113322
- Zhu, Y., Zheng, J., Kang, H., Hui, N., Yin, S., Chen, Z., Du, B. and Liu, C., 2023. Spatial variations in leaf trichomes and their coordination with stomata in *Quercus variabilis* across Eastern Asia. *Authorea Preprints*:1-9.
- Ziegler, J and Peter J.F. 2008. Alkaloid Biosynthesis: Metabolism and Trafficking. *Annu. Rev. Plant Biol.*59:735–69
- Zuraida, Sulistiyani, Sajuthi, D., & Suparto, I. H. 2017. Fenol, Flavonoid, dan Aktivitas Antioksidan pada Ekstrak Kulit Batang Pulai (*Alstonia scholaris* R.Br). *Penelitian Hasil Hutan*. 35(3):211-219