

DAFTAR PUSTAKA

- Abed, I. J., Al-Moula, R., & Abdulhasan, G. A. 2015. Antibacterial effect of flavonoids extracted from seeds of *Silybum marianum* against common pathogenic bacteria. *World J. Exp. Biosci*, 3(1), 36-39.
- Agusta A. 2000. Minyak Atsiri Tumbuhan Tropika Indonesia. Bandung: ITB-Press.
- Alalade, O. A., & Iyayi, E. A. 2006. Chemical composition and the feeding value of *Azolla* (*Azolla pinnata*) meal for egg-type chicks. *International Journal of Poultry Science*, 5(2), 137-141.
- Alberts S. C., Archie E. A., Gesquiere L. R. 2002. *Molecular Biology of The Cell*. 4th ed. New York: Garland Science.
- Alrawaiq, N. S., & Abdullah, A. 2014. A review of flavonoid quercetin: metabolism, bioactivity and antioxidant properties. *International Journal of PharmTech Research*, 6(3), 933-941.
- Arshadi, M., Abdolmaleki, M. K., Mousavinia, F., Foroughifard, S., & Karimzadeh, A. 2017. Nano modification of NZVI with an aquatic plant *Azolla filiculoides* to remove Pb (II) and Hg (II) from water: Aging time and mechanism study. *Journal of colloid and interface science*, 486, 296-308.
- Baker, J. A., Entsch, B., & McKay, D. B. 2003. The cyanobiont in an *Azolla* fern is neither *Anabaena* nor *Nostoc*. *FEMS microbiology letters*, 229(1), 43-47.
- Balasundram, N., Sundram, K., & Samman, S. 2006. Phenolic compounds in plants and agri-industrial by-products: Antioxidant activity, occurrence, and potential uses. *Food chemistry*, 99(1), 191-203.
- Barufi, J. B., Carvalho, V., Scherner, F., Xavier, L. R. C. C., Junior, E. G. M., da Silva Costa, M. M., & Castro, N. M. C. R. 2017. Effects of salinity on the physiology of *Salvinia auriculata* Aubl. (Salviniales, Pteridophyta). *Biotemas*, 30 (3), 25-36.
- Bennett T, Scheres B. 2010. Root development-two meristems for the price of one?. *Curr Top Dev Biol*. 91:67-102.
- Bennett, R. N., & Wallsgrave, R. M. 1994. Secondary metabolites in plant defence mechanisms. *New phytologist*, 127 (4), 617-633.

- Bernstein, N., Eshel, A., & Beeckman, T. 2013. Effects of salinity on root growth. *Plant roots: the hidden half*, 1-784.
- Bohlmann, J., Meyer-Gauen, G., & Croteau, R. 1998. Plant terpenoid synthases: molecular biology and phylogenetic analysis. *Proceedings of the National Academy of Sciences*, 95(8), 4126-4133.
- Carrapico, F. J. 2002. *Azolla-anabaena-bacteria* system as a natural microcosm. In *Instruments, Methods, and Missions for Astrobiology IV* (Vol. 4495, pp. 261-266). International Society for Optics and Photonics.
- Cassaniti, C., & J.Flowers, D. R. 2012. The Response of Ornamental plants to Saline Irrigation Water.
- Cassaniti, C., Romano, D., & Flowers, T. J. 2012. The response of ornamental plants to saline irrigation water. *Irrigation: Water Management, Pollution and Alternative Strategies*, 131-158.
- Djojokuswito, S. 2000. *Azolla Pertanian Dan Multiguna*. Penerbit Kanisius. Yogyakarta.
- Dzulkarnain B, Dian S, Au C. 1996. Tanaman Obat Bersifat Antibakteri di Indonesia. *Cermin Dunia Kedokteran* No. 110: 35-47.
- Elisabetsky, E., & Costa-Campos, L. 2006. The alkaloid alstonine: a review of its pharmacological properties. *Evidence-Based Complementary and Alternative Medicine*, 3(1), 39-48.
- Erel, R., T Le, T., Eshel, A., Cohen, S., Offenbach, R., Strijker, T., & Shtein, I. 2020. Root Development of Bell Pepper (*Capsicum annuum* L.) as Affected by Water Salinity and Sink Strength. *Plants*, 9(1), 35.
- Estuningtyas A, Arif A, Setiabudy R. 2007. *Farmakologi dan Terapi*. Ed ke-5. Jakarta. UI.
- Evrard, C., & Van Hove, C. 2004. Taxonomy of the American *Azolla* species (Azollaceae): a critical review. *Systematics and geography of plants*, 301-318.
- Farhana S, Rashid P, Karmoker JL. 2014. Salinity induced anatomical changes in maize (*Zea mays* L. CV. BARI-7). *J Biol Sci*. 1: 93-95.
- Fitter AH. 1992. *Fisiologi Lingkungan Tanaman*. Gajahmada University Press. Yogyakarta.
- Follet R, Danahue R, Murphy L. 1981. *Soil and Soil Amendments*. New Jersey (US): Prentice Hall.

- Francis, G., Kerem, Z., Makkar, H. P., & Becker, K. 2002. The biological action of saponins in animal systems: a review. *British journal of Nutrition*, 88(6), 587-605.
- Giehl RFH, Gruber BD, Wirén NV. 2014. It's time to make changes: modulation of root system architecture by nutrient signals. *J Exp Botany*. 65:769-778.
- Gomes, M. A. D. C., Pestana, I. A., Santa-Catarina, C., Hauser-Davis, R. A., & Suzuki, M. S. 2017. Salinity effects on photosynthetic pigments, proline, biomass and nitric oxide in *Salvinia auriculata* Aubl. *Acta Limnologica Brasiliensia*, 29.
- Gomez, K. A., & Gomez, A. A. 2015. *Prosedur Statistik Untuk Penelitian Pertanian*. Edisi Kedua. Penerjemah: Endang Sjamsuddin dan Justika S. Baharsjah. Jakarta.
- Gupta, B., & Huang, B. 2014. Mechanism of Salinity Tolerance in Plants: Physiological, Biochemical, and Molecular Characterization. *International Journal of Genomics*, Volume 2014, Article ID 701596, , 18.
- Gurung, S., Cohen, M. F., Fukuto, J., & Yamasaki, H. 2012. Polyamine-induced rapid root abscission in *Azolla pinnata*. *Journal of amino acids*, 2012.
- Harborne JB. 1987. *Metode Fitokimia*. Padmawinata K, Soediri I, penerjemah; Niksolihin S, editor. Bandung: ITB. Terjemahan dari: *Phytochemical Method*.
- Haswira CS. 2006. Isolasi dan identifikasi senyawa antibakteri daun terong Pungo (*Solanum sp.*) hasil pelapisan tanaman dan hewan obat Aceh. [tesis]. Bogor: Fakultas Perikanan dan Kelautan, Institut Pertanian Bogor.
- Julkowska MM, Hoefsloot HCJ, Mol S, Feron R, Boer GJ, Haring MA, Testerink C. 2014. Capturing Arabidopsis root architecture dynamics with ROOTFIT reveals diversity in responses to salinity. *Plant Physiol*. 166:1387- 1402.
- Karuppusamy, S. 2009. A review on trends in production of secondary metabolites from higher plants by in vitro tissue, organ and cell cultures. *Journal of Medicinal Plants Research*, 3(13), 1222-1239.
- Kempen, M. M. V., Smolders, A. J., Bögemann, G. M., Lamers, L. L., Visser, E. J., & Roelofs, J. G. 2013. Responses of the *Azolla filiculoides* Stras.–*Anabaena azollae* Lam. association to elevated sodium chloride concentrations: Amino acids as indicators for salt stress and tipping point. *Aquatic botany*, 106, 20-28.

- Khopkar SM. 2003. *Konsep Dasar kimia Analitik*. Saptoraharjo A, penerjemah; Jakarta: UI-Press; terjemahan dari *Basic Concepts of Analytical Chemistry*.
- Kimani, S. M., Bimantara, P. O., Hattori, S., Tawaraya, K., Sudo, S., & Cheng, W. 2020. *Azolla* incorporation and dual cropping influences CH₄ and N₂O emissions from flooded paddy ecosystems. *Soil Science and Plant Nutrition*, 66(1), 152-162.
- Kumar, V., Kumar, P., Singh, J., & Kumar, P. 2020. Potential of water fern (*Azolla pinnata* R. Br.) in phytoremediation of integrated industrial effluent of SIIDCUL, Haridwar, India: removal of physicochemical and heavy metal pollutants. *International Journal of Phytoremediation*, 22(4), 392-403.
- Kupper H., Kupper F., Spiller M. 1998. In Situ Detection of Heavy Metal Substituted Chlorophylls in Water Plants. *Photosynthesis Research* 58: 123–133.
- Lalitha MK. 2004. *Manual on Antimicrobial Susceptibility Testing*. Vellore: Department of Microbiology Christian Medical College.
- Leao, G. A., Oliveira, J. A. D., Felipe, R. T. A., & Farnese, F. S. 2017. Phytoremediation of arsenic-contaminated water: the role of antioxidant metabolism of *Azolla caroliniana* Willd (Salviniales). *Acta Botanica Brasiliica*, 31(2), 161-168.
- Leclercq, R., Cantón, R., Brown, D. F., Giske, C. G., Heisig, P., MacGowan, A. P., & Soussy, C. J. 2013. EUCAST expert rules in antimicrobial susceptibility testing. *Clinical Microbiology and Infection*, 19(2), 141-160.
- Leifert, C., & Cassells, A. C. 2001. Microbial hazards in plant tissue and cell cultures. *In Vitro Cellular & Developmental Biology-Plant*, 37(2), 133-138.
- Liu, D., Wang, X., Chen, Z., Xu, H., Wang, Y. 2010. Influence of Mercury on Chlorophyll Content in Winter Wheat and Mercury Bioaccumulation. *Plant Soil Environ*. 56(3): 139–143.
- Lu, J., & Li, X. 2006. Review of rice–fish-farming systems in China—one of the globally important ingenious agricultural heritage systems (GIAHS). *Aquaculture*, 260(1-4), 106-113.
- Lumpkin, T. A., & Plucknett, D. L. 1980. *Azolla*: botany, physiology, and use as a green manure. *Economic Botany*, 34(2), 111-153.
- Magouz, F. I., Dawood, M. A., Salem, M. F., & Mohamed, A. A. 2020. The effects of fish feed supplemented with *Azolla* meal on the growth performance, digestive enzyme activity, and health condition of genetically-improved farmed tilapia (*Oreochromis niloticus*). *Annals of Animal Science*,

- Masood, A., Shah, N. A., Zeeshan, M., & Abraham, G. 2006. Differential response of antioxidant enzymes to salinity stress in two varieties of *Azolla* (*Azolla pinnata* and *Azolla filiculoides*). *Environmental and Experimental Botany*, 58(1-3), 216-222.
- Mathius, N.T, Wijana, G., Guharja, E., Aswidinnoor, H., & Yahya, S. 2001. Response of oil palm (*Elaeis guineensis* Jacq) to water stress. *Menara Perkebunan*, 69(2), 29-45.
- McGarvey, D. J., & Croteau, R. 1995. Terpenoid metabolism. *The plant cell*, 7(7), 1015.
- Mithraja, M. J., Marimuthu, J., Mahesh, M., Paul, Z. M., & Jeeva, S. 2011. Phytochemical studies on *Azolla pinnata* R. Br., *Marsilea minuta* L. and *Salvinia molesta* Mitch. *Asian Pacific Journal of Tropical Biomedicine*, 1(1), S26-S29.
- Mukhopadhyay M. 2002. *Natural Extract Using Supercritical carbondioxide*. London: John Willey.
- Munns R, Tester M. 2008. Mechanisms of salinity tolerance. *Annu Rev Plant Biol*. 59: 651-681.
- Musco A, Sidari M, Santonoceto C, De Santis C. 2004. Kikuyu grass: effects of salinity and acidity on growth, biochemistry, and root morphology. *Recent Research Development in Agron Hort*. 1:89-101.
- Namdeo, A. G. 2007. Plant cell elicitation for production of secondary metabolites: a review. *Pharmacogn Rev*, 1(1), 69-79.
- Nayak, N., & Padhy, R. N. 2017. GC-MS Analysis of Bioactive Compounds and Host-toxicity Studies of *Azolla caroliniana* Symbiotic with the Cyanobacterium *Anabaena azollae*. *Indian Journal Of Pharmaceutical Education And Research*, 51(2), S24-S33.
- Nayak, N., Padhy, R. N., & Singh, P. K. 2015. Evaluation of antibacterial and antioxidant efficacy of the fern *Azolla caroliniana* symbiotic with the cyanobacterium *Anabaena azollae*. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, 85(2), 555-569.
- Negin, B., & Moshelion, M. 2016. The evolution of the role of ABA in the regulation of water-use efficiency: From biochemical mechanisms to stomatal conductance. *Plant Science*, 251, 82-89.
- Noor Nawaz, A. S., Syed, J., Dileep, N., Rakesh, K. N., & Prashith Kekuda, T. R. 2014. Antioxidant activity of *Azolla pinnata* and *Azolla rubra*—A comparative study. *Sch Acad J Biosci*, 2(10), 719-23.

- Nur M.A & Adjuwana. 1987. *Teknik Separasi Dalam Analisis Pangan*. Pusat Antar Universitas IPB, Bogor.
- Olivares, E. 2003. The Effect of Lead on Phytochemistry of *Tithonia diversifolia*: Exposed to Roadside Automotive Pollution or Grown in Pots of Pb Supplemented Soil. *Brazilian Journal Plant Physiology* 15(3): 149-158.
- Olivares, E. 2003. The Effect of Lead on Phytochemistry of *Tithonia diversifolia*: Exposed to Roadside Automotive Pollution or Grown in Pots of Pb Supplemented Soil. *Brazilian Journal Plant Physiology* 15(3): 149-158.
- Oppermann, U. C., Nagel, G., Belai, I., Bueld, J. E., Genti-Raimondi, S., Koolman, J., & Maser, E. (1998). Carbonyl reduction of an anti-insect agent imidazole analogue of metyrapone in soil bacteria, invertebrate and vertebrate species. *Chemico-biological interactions*, 114(3), 211-224.
- Pandolfia, C., Mancuso, S., & Shabalab, S. 2012. Physiology of acclimation to salinity stress in pea (*Pisum sativum*). *Environmental and Experimental Botany* 84 (2012) 44– 51.
- Parida, A., Das, A.B. and Das, P. NaCl stress causes changes in photosynthetic pigments, proteins and other metabolic components in the leaves of a true Mangrove, *Bruguiera parviflora*, in hydroponics cultures. *Journal of Plant Biology*, 2002, 45(1), 28-36.
- Pelczar MJ Jr, Chan ECS. 1986. *Dasar-Dasar Mikrobiologi*. Volume ke-1, 2. Hadioetomo RS, Imas T, Tjitrosomo SS, Angka SL, penerjemah; Jakarta: UI Press. Terjemahan dari: *Elements of Microbiology*.
- Pereira, A. L., Bessa, L. J., Leão, P. N., Vasconcelos, V., & da Costa, P. M. 2015. Bioactivity of *Azolla* aqueous and organic extracts against bacteria and fungi. *Symbiosis*, 65(1), 17-21.
- Peters, G. A., Calvert, H. E., Kaplan, D., Ito, O., & Toia Jr, R. E. 1982. The *Azolla*-*Anabaena* symbiosis: morphology, physiology and use. *Israel Journal of Botany*, 31(1-4), 305-323.
- Petricka JJ, Winter CM, Benfey PN. 2012. Control of Arabidopsis root development. *Annu Rev Plant Biol*. 63: 563-590.
- Rai, V., Sharma, N. K., & Rai, A. K. 2006. Growth and cellular ion content of a salt-sensitive symbiotic system *Azolla pinnata*-*Anabaena azollae* under NaCl stress. *Journal of plant physiology*, 163(9), 937-944.
- Rana, D., Katoch, S., Mane, B. G., Rani, D., & Sankhyan, V. 2017. Carcass Characteristic and Physico-chemical Properties of Broiler Chicken Meat Supplemented with *Azolla pinnata*. *Journal of Animal Research*, 7(6), 1035-1041.

- Rhodes, D. 2009. Proline, Ornithin and Arginine Metabolism Main Pathway of Proline Synthesis In Higher Plants. Department of Horticulture and Landscape Architecture. Purdue University, West Lafayette.
- Salisbury FB, Ross CW. 1995. Plant Physiology. 4th Ed. California (US): Wadsworth.
- Samad, F. A., Idris, L. H., Abu Hassim, H., Goh, Y. M., & Loh, T. C. 2020. Effects of *Azolla* spp. as feed ingredient on the growth performance and nutrient digestibility of broiler chicken. *Journal of Animal Physiology and Animal Nutrition*.
- Sasidharan, S., Chen, Y., Saravanan, D., Sundram, K. M., & Latha, L. Y. 2011. Extraction, isolation and characterization of bioactive compounds from plants' extracts. *African Journal of Traditional, Complementary and Alternative Medicines*, 8(1).
- Sathammaipriya, N., Thamilmalaiselvi, B., Steffi, P. F., & Sangeetha, K. 2018. Investigation of phytochemical constituents in *Azolla microphylla* for antibacterial activity. *National Journal of Physiology, Pharmacy and Pharmacology*, 8(11), 1500-1504.
- Schunack W, Mayer K, Haake M. 1990. *Senyawa Obat*. Ed. Ke-2. Wattimena JR, Subino, penerjemah; Yogyakarta: UGM Press.
- Selvaraj, K., Chowdhury, R., & Bhattacharjee, C. 2013. Isolation and structural elucidation of flavonoids from aquatic fern *Azolla microphylla* and evaluation of free radical scavenging activity. *Int J Pharm Sci*, 5(3), 743-9.
- Shahid, M., Saleem, M. F., Anjum, S. A., Shahid, M., & Afzal, I. 2017. Effect of Terminal Heat Stress on Proline, Secondary Metabolites and Yield Components of Wheat (*Triticum aestivum* L.) Genotypes. *Philippine Agricultural Scientist*, 100(3), 278-286.
- Stoeva, N. and Kaymakanova, M. Effect of salt stress on the growth and photosynthesis rate of bean plants (*Phaseolus vulgaris* L.). 2008. *Journal of Central European Agriculture*, 9(3), 385-392.
- Szekely, G. 2004. The Role of Proline in Arabidopsis thaliana Osmotic Stress Response. *Acta Biologica Szegediensis* 48 : 81.
- Talreja, T., Kumar, M., Goswami, A., & Sharma, T. 2017. In vitro Screening of Antibacterial Potentials of *Achyranthes aspera*, *Azolla pinnata* and *Cissus quadrangularis*. *Int. J. Curr. Microbiol. App. Sci*, 6(4), 483-488.
- Taylor, C.B. 1996. Proline and water deficit ; ups, downs, ins, and outs. *The plant cell*. 8 : 1221-1224

- Thagela, P., Yadav, R. K., Dahuja, A., Singh, P. K., & Abraham, G. 2016. Physiological and proteomic changes in *Azolla microphylla* roots upon exposure to salinity.
- Thagela, P., Yadav, R. K., Mishra, V., Dahuja, A., Ahmad, A., Singh, P. K., & Abraham, G. 2017. Salinity-induced inhibition of growth in the aquatic pteridophyte *Azolla microphylla* primarily involves inhibition of photosynthetic components and signaling molecules as revealed by proteome analysis. *Protoplasma*, 254(1), 303-313.
- Tuteja N. 2007. Abscisic acid and abiotic stress signaling. *Plant Signal Behav.* 3: 135-138.
- Verpoorte, R., & Memelink, J. 2002. Engineering secondary metabolite production in plants. *Current opinion in biotechnology*, 13(2), 181-187.
- Vuorinen U, Luukkonen A, Ervanne H. 2006. Effects of salinity and high pH on crushed rock and bentonite – experimental work and modelling. *Posiva Report.* 1: 33-39.
- Wagner, G. M. 1997. *Azolla*: a review of its biology and utilization. *The Botanical Review*, 63(1), 1-26.
- Wang, W., Vinocur, B., & Altman, A. 2003. Plant responses to drought, salinity and extreme temperatures: towards genetic engineering for stress tolerance. *Planta*, 218(1), 1-14.
- Wattimena, J. R., Sugiarto, N. C, Widiyanto, M. B, Sukandar, E. Y, Soemardji, A. 1991. *Farmakodinamika dan Terapi Antibiotik*. Yogyakarta: UGM Press.
- Winarno, Fardiaz D, Fardiaz S. 1973. *Ekstraksi, Kromatografi, dan Elektroforesis*. Bogor: Fakultas Teknologi Pertanian, Institut Pertanian Bogor.
- Wink, M. 1988. Plant breeding: importance of plant secondary metabolites for protection against pathogens and herbivores. *Theoretical and applied genetics*, 75(2), 225-233.
- Winkel-Shirley, B. 2001. Flavonoid biosynthesis. A colorful model for genetics, biochemistry, cell biology, and biotechnology. *Plant physiology*, 126(2), 485-493.
- Yadav, R. K., Sangwan, R. S., Srivastava, A. K., & Sangwan, N. S. 2017. Prolonged exposure to salt stress affects specialized metabolites-artemisinin and essential oil accumulation in *Artemisia annua* L.: metabolic acclimation in preferential favour of enhanced terpenoid accumulation accompanying vegetative to reproductive phase transition. *Protoplasma*, 254(1), 505-522.

- Yao, Y., Zhang, M., Tian, Y., Zhao, M., Zeng, K., Zhang, B., & Yin, B. 2018. *Azolla* biofertilizer for improving low nitrogen use efficiency in an intensive rice cropping system. *Field Crops Research*, 216, 158-164.
- Yusnira. 2005. Metode pemisahan untuk penentuan kurkuminoid pada rimbang temulawak (*Curcuma xanthorrhiza Roxb.*) dan korelasinya dengan spektrum FTIR [tesis]. Bogor: Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Pertanian Bogor.