



DAFTAR PUSTAKA

- Ahmed, I.M., Cao., F., Han, Y., Nadira., U.A., Zhang, G & Wu, F. 2013. Differential changes in grain ultrastructure, amylase, protein and amino acid profile between Tibetan wild and cultivated barleys under drought and salinity alone and combined stress. *Food Chemistry* 141:2743–2750
- Amirjani, M.R., 2010. Effect of salinity stress on growth, mineral composition, proline content, antioxidant enzymes of soybean. *J. Plant Physiol.*, 5: 350-360.
- Amzallag, G.N., Seligmann, H., & Lerner, H.R. 1993. A Developmental Window for Salt-Adaptation In Sorghum bicolor. *J.Experimental Botany*, 44(260):645-652
- Anjum, N.A., Sofo, A., Scopa, A. 2015. Lipids and proteins—Major targets of oxidative modifications in abiotic stressed plants. *Environ. Sci. Pollut. Res.* 22: 4099–4121
- Anonim^a, 2019. <http://www.agronet.co.id/detail/indeks/info-agro/3962-Peluang-Pasar-padi-Hitam-Terbuka-Luas>. diakses 20 Desember 2019
- Anonim^b, 2019. <http://bbpadi.litbang.pertanian.go.id/index.php/info-berita/info-teknologi/padi-hitam-jeliteng-kaya-manfaat>. diakses pada 9 Januari 2020.
- Anonim^c. 2017. Peta Jenis Tanah Kabupaten Sleman. https://bappeda.slemankab.go.id/wp-content/uploads/2017/04/11_Jenis-Tanah.pdf. diakses 26 Januari 2020 diakses 20 Desember 2019.
- Anonim^d. 2019. Balai Besar Penelitian Tanaman Padi Balitbangtan Kementerian Pertanian<http://bbpadi.litbang.pertanian.go.id/index.php/varietas-padi/inbrida-padi-sawah-inpari/jeliteng> diakses pada 20 Desember 2019.
- Arini, N., Kurniasih, B & Waluyo, S. 2019. Effect of Salt Pretreatment on the Growth and Yield of *Oryza sativa* L. (cv. Dendang) under Saline Condition. *Jurnal Ilmu Pertanian (Agricultural Science)*. 4(2):65-70.
- Aslam, M., Ahmad, K., Akhtar, M.A., & Maqbool, M.A. 2017. Salinity Stress in Crop Plants: Effects of stress, Tolerance Mechanisms and Breeding Strategies for Improvement. *Journal of Agriculture and Basic Science*. 2(1):70-76
- Bartels, D & Sunkar, R. 2005. Drought and salt tolerance in plants. *Critical Reviews in Plant Science* 24:23–58.
- Basu, S., V. Ramegowda, A. Kumar, dan A. Pereira. 2016. Plant adaptation to drought stress. *F1000Research*. 1:1-10
- Bohn, H.L., McNeal, B.L., dan O'Connor, G.A. 2001. *Soil Chemistry. Third Edition*. John Wiley & Sons, Inc. New York.
- Blum, A. 2005. Drought resistance, water-use efficiency, and yield potential — are they compatible, dissonant, or mutually exclusive? *Aust. Journal of Agricultural Resource*. 2:10-15



- Chaiyasut, C., Sivamaruthi, B.S., Pengkumsri, N., Sirilun, S., Peerajan,S., Chaiyasut, K. & Kesika, P. 2016. Anthocyanin profile and its antioxidant activity of widely used fruits, vegetables, and flowers in Thailand. *Asian Journal of Pharmaceutical and Clinical Research* 9:218 – 224.
- Chakuton, K., Puangpropintag, D. dan Nakornriab, M. 2012. Phytochemical content and antioxidant activity of colored and non-colored Thai rice cultivars. *Journal Asian Journal of Plant Sciences* 11: 285-293
- Chaudhary, R.C. 2003. Speciality rices of the world: Effect of WTO and IPR on its production trend & marketing. *Journal of Food, Agriculture and Environment*. 1(2): 34–41.
- Chen, P. N., Kuo, W. H., Chiang, C. L., Chiou, H. L., Hsieh, Y. S., & Chu, S. C. 2006. Black rice anthocyanins inhibit cancer cells invasion via repressions of MMPs and u-PA expression. *Chemico-Biological Interactions*. 163(3), 218-229
- Chen, K & Arora, R. 2013. Priming memory invokes seed stress-tolerance. *Environmental and Experimental Botany*. 94: 33-45.
- Choi, Y., H.S. Jeong & J. Lee, 2007. Antioxidant activity of methanolic extracts from some grains consumed in Korea. *Food Chem.*, 103: 130-138.
- Chunthaburee, S., Dongsansuk, a., Sanitchon, J., Pattanagul, W & Theerakulpisut, P. 2016. Physiological and biochemical parameters for evaluation and clustering of rice cultivars differing in salt tolerance at seedling stage. *Saudi Journal of Biological Science*. 23:467-477
- Chunthaburee, S., Pattangul, w & Sanitchon, J. 2016. Changes in Anthocyanin Content and Expression of Anthocyanin Synthesis Genes in Seedlings of Black Glutinous Rice in Response to Salt Stress. *Asian Journal of Plant Sciences*, 57-64
- Chutipaijit, S., S. Cha-Um & K. Sompornpailin, 2011. High contents of proline and anthocyanin increase protective response to salinity in *Oryza sativa* L. spp. *indica*. *Aust. J. Crop Sci.*, 5: 1191-1198.
- Counce, P.A & Moldenhauer, K.A.K. 2018. *Morphology of Rice Seed Development and Its Influence on Grain Quality*. Humana Press, New York. P. 15
- Dionisio, S. M. L & Tobita, S. 2000. Effects of salinity on sodium content and photosynthetic responses of rice seedlings differing in salt tolerance. *Journal of Plant Physiology*. 157: 54–8.
- Food and Agricultural Organization (FAO) of United Nations. 2005. Panduan Lapang FAO. 20 hal untuk diketahui tentang dampak air laut pada lahan pertanian di Propinsi NAD. FAO
- Gebreegziabher, B.G. and C.A. Qufa. 2017. Plant physiological stimulation by seeds salt priming in maize (*Zea mays*): Prospect forsalt tolerance. *African Journal of Biotechnology*. 17: 154–162.



Grattan, S & Davis, R. 1999. *Irrigation Water Salinity and Crop Production*. University of California. USA

Grist, D. H. 1986. *Rice*. 6th ed. Longman Group Ltd., Singapore.

Hariadi, Y.C., Nurhayati, A.Y & Akbar, R.R. dalam McLellan, B. 2018. Effect of Salt Stress on Growth Performance and Antioxidant Status of Local Black Rice (*Oryza sativa* L.). *Sustainable Future for Human Security*. pp. 161-173. Springer Nature, Singapore.

Hasegawa, P. M., Bressan, R. A., Zhu, J. K., & Bohnert, H. J. 2000. Plant cellular and molecular responses to high salinity. *Annual Review of Plant Physiology and Plant Molecular Biology*, 51, 463-499.

Heenan, D.P., Lewin, L.G., & McCaffery, D.W. 1988. Salinity tolerance in rice varieties at different growth stages. *Australian Journal of Experimental Agriculture* 28, 343-9.

Ichikawa, H., Ichiyanagi, T., Xu, B., Yoshii, Y., Nakajima, M., & Konishi, T. 2001. Antioxidant activity of anthocyanin extract from purple black rice. *Journal of Medicinal Food*, 4(4): 211-218

İşeri Ö.D, Sahin F.I, Haberal, M. 2014. Sodium chloride priming improves salinity response of tomato at seedling stage. *J Plant Nutr.* 37:374–392

Khan M S A, Hamid A and Karim M A. 1997. Effect of sodium chloride on germination and seedling characters of different types of rice (*Oryza sativa* L.). *Journal Agronomy of Crop Science*. 179:163–9.

Khunpon, B., Cha-um, S., Fiyue, B., Uthaibura, J & Saengnil K. 2017. Influence of paclobutrazol on growth performance, photosynthetic pigments, and antioxidant efficiency of Pathumthani 1 rice seedlings grown under salt stress. *J. ScienceAsia*, 43:70-81

Kooyers, N.J. 2015. The evolution of drought escape and avoidance in natural herbaceous populations. *Plant Science*. 234: 155-162

Kristamtini. 2009. Mengenal padi hitam dari Bantul, *Tabloid Sinar Tani*. Edisi 13 Mei 2009. Indonesia

Kubala, S., Wojtyla, L., Quinet, M., Lechowska, K., Lutts, S., & Garnczarska. 2015. Enhanced expression of the proline synthesis gene P5CSA in relation to seed osmopriming improvement of *Brassica napus* germination under salinity stress. *Journal of Plant Physiology*. 183:1–12

Kumar, V., Shriram, V., Nikam, T.D., Jawaliand, N., dan Shitole, M.G. 2008. Sodium chloride induced changes in mineral elements in indica rice varieties differing in salt tolerance. *Journal of Plant Nutrition*. 3:1999-2017.

Lee, A.N., Wu, H.I., Yeh, C.S., Chu, H.C. 2006. Antioxidant effects of black rice extract through the induction of superoxide dismutase and catalase activities. *Lipids. Food Chem.* 41: 797-803.

Levitt, J. 1980. Responses of plants to environmental stressed. *Journal of Range Management*. 38(5):440-448



Lutts, S., Kinet, J.M., & Bouharmont, J. 1995. Changes in plant response to NaCl during development of rice (*Oryza sativa* L.) varieties differing in salinity resistance. *Journal of Experimental Botany*, 46(293): 1843-1852

Marxen, K., Klaus, H.V & Ulf, P.H. 2007. Determination of DPPH radical oxidation caused by methanolic extracts of some microalgal species by linear regression analysis of spectrophotometric measurements. *J. Sensors*. 7: 2080-2095

Mittler, R., 2002. Oxidative stress, antioxidants and stress tolerance. *Trends Plant Sci.*, 7: 405-410.

Munns, R. 2002. Comparative physiology of salt and water stress. *Plant Cell and Environment*. 25:239–50

Munns, R. dan M. Tester. 2008. *Mechanisms of Salinity Tolerance*. CSIRO Plant Industry, Canberra pp 651-672

Narwidina, P. 2009. Pengembangan Minuman Isotonik Antosianin padi Hitam (*Oryza sativa* L.indica) dan Efeknya Terhadap Kebugaran dan Aktivitas Antioksidan pada Manusia Pasca Stres Fisik: A Case Control Study. Program Pascasarjana Fakultas Teknologi Pertanian. Universitas Gadjah Mada. *Tesis*.

Patnayak, A., Tripathi, A.K., & Munda, G.C. 2008. *Rice seed production manual under IRRI project*. ICAR Research Complex NEH Region. Meghalaya. India.

Pengkumsri, N., Chaiyasut, C., Saenjum, C., Sirilun, SM Peerajan, S., Suwannalert, P., Sirisattha, S., Sivamaruthi, B.S. 2015. Physicochemical and antioxidative properties of black, brown and red rice varieties of northern Thailand. *J. Food Science and Technology*. 35(2): 331-338.

Prasetyo, B.H & D. Setyorini. 2008. Karakteristik Tanah Sawah dari Endapan Aluvial dan Pengelolaannya. *Sumberdaya Lahan*, 2 (1) : 1 – 14.

Rahman, A., Houssain, s., Mahmud, J., Nahar, K., Hassanuzaman, M & Fujita, M. 2016. Manganese-induced salt stress tolerance in rice seedlings: regulation of ion homeostasis, antioxidant defense and glyoxalasesystem. *J. Physiol Mol Biol Plants*, 22(3):291–306

Ryu, S.N., Park, S.Z., & Ho, C.T. 1998. High performance liquid chromatographic determination of anthocyanin pigments in some varieties of black rice. *Journal of Food and Drug Analysis*. 6(4): 729-736.

Sarker, U., Islam & Oba, S. 2018. Salinity stress accelerates nutrients, dietary fiber, minerals, phytochemicals and antioxidant activity in Amaranthus tricolor leaves. *PLoS ONE* 13(11):e0206388

Scherer, R & Godoy, R. 2009. Antioxidant activity index (AAI) by the 2,2-diphenyl-1-picrylhydrazyl method. *J. Food Chemistry*. 112(3): 654-658.

Scherer, R. & Godoy, H.T., 2009. Antioxidant activity index (AAI) by the 2,2-diphenyl-1-picrylhydrazyl method. *J. Food Chemistry*, 112(3):654-658



- Sharma, N., Gupta, N.K., Hsegawa, H. 2005. Effect of NaCl salinity on photosynthetic rate, transpiration rate, and oxidative stress tolerance in contrasting wheat genotype. *Photosynthetica*. 43(94): 609-13
- Shi, Z., M. Lin, F.J. Prancis, 1992. Stability of Anthocyanin from *Trandescantia pallida*. *J. Food Sci.* 57: 758-780
- Sivritepe, H.O., Sivritepe, N., Eris, A., Turhan, E. 2005. The effects of NaCl pre-treatments on salt tolerance of melons grown under long-term salinity. *Sci Hortic.* 106:568-581
- Sposito, G. 2008. *The Chemistry of Soils. Second Edition*. Oxford University Press, Inc. New York, USA
- Srivastava, A.K., Kumar, J.S., & Suprasanna, P. 2021. Seed 'primeomics': plants memorize their germination under stress. *Biological Reviews*. 1-15
- Suardi, D. & I. Ridwan. 2009. padi hitam, pangan berkhasiat yang belum populer. *Warta Penelitian dan Pengembangan Pertanian*. 31(2): 9-10.
- Suhartini, T., Zulchi, T., Harjosudarmo, P. 2017. Toleransi Plasma Nutfah Padi Lokal terhadap salinitas. *Buletin Plasma Nutfah*. 23(1): 51-58.
- Sulistyani, Y., S. Andrianto, N. Indraswati dan A. Ayucitra. 2011. Ekstraksi senyawa fenolik dari limbah kulit kacang tanah (*Arachis hypogea L.*) sebagai antioksidan alami. *Jurnal Teknik Kimia Indonesia*. 10 (3): 112-119
- Suwignyo, R., Hayati, R., & Mardiyanto. 2009. Pengaruh Salinitas Awal Rendah Terhadap Pertumbuhan dan Toleransi Salinitas Tanaman Jagung. *Agritrop Jurnal Ilmu-Ilmu Pertanian*. 5:13-19
- Tamat, S.R., Wikanta, T., Maulina, L.S. 2007. Aktivitas antioksidan dan toksisitas senyawa bioaktif dari ekstrak rumput laut hijau *Ulva reticulata*. *Jurnal Ilmu Kefarmasian Indonesia*. 5(1): 31-36.
- Thomas, R., Wan-Nadiah, W.A., & Bhat, R. 2013. Physiochemical properties, proximate composition, and cooking qualities of locally grown and imported rice varieties marketed in Penang, Malaysia. *International Food Research Journal* 20(3): 1345-1351
- Vasic, S., Olgica, D., & Stevanovic, D. 2012. Biological activities of extracts from cultivated *Granadilla passiflora alata*. *EXCLI Journal*. 29(2):67-75
- Villagra, P.E & Cavagnaro, J.B. 2005. Water stress effects on the seedling growth of *Prosopis argentina* and *Prosopis alpataco*. *Journal of Arid Environments* 64(26):390-400.
- Wani, S.H., Tripathi, P., Zaid, A., Challa, G., Kumar, A., Upadhyay, J., Joshi, R & Bhatt, M. 2018. Transcriptional regulation of osmotic stress tolerance in wheat (*Triticum aestivum L.*). *Plant Molecular Biology*. 97:469-487
- Winarsi, H. 2007. *Antioksidan alami dan radikal bebas*. Kanisius. Yogyakarta.
- Yanuarti, A.R., & Afsari, M.D. 2016. Profil Komoditas: Barang Kebutuhan Pokok dan Barang Penting: Komoditas padi. Kementerian Perdaganganews <https://ews.kemendag.go.id/> diakses 12 Januari 2020



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RIMA IZATUN NISA, Ir. Budiastuti Kurniasih, M.Sc., Ph.D.; Rani Agustina Wulandari, S.P., M.P., Ph.D.

Universitas Gadjah Mada, 2022 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Yildrim K & Kaya, Z. 2017. Gene regulation network behind drought escape, avoidance and tolerance strategies in black poplar (*Populus nigra* L.). *Plant Physiology and Biochemistry*. 115:183-189

Yokoi S, Quintero F J, Cubero B, Ruiz M T, Bressan R A, Hasegawa P. M & Pardo J M. 2002. Differential expression and function of *Arabidopsis thaliana* NHX Na⁺/H⁺ antiporters in the salt stress response. *Plant Journal* 30: 529–39.

Yousfi, S., Wassal., Mahmoudi, H., Abdelly, C., Gharsalli, M. 2007. Effect of salt on physiological responses of barley to iron deficiency. *Journal Plant Physiol Biochem* 4(5): 309-314.

Zhang, J.Z., Creelman, R.A. & Zhu, J.K. 2004. From laboratory to field. Using information from *Arabidopsis* to engineer salt, cold and drought tolerance in crops. *Plant Physiol* 135: 615-621.