

REFERENCES

- Abasi, S., Minaei, S., Jamshidi, B., and Fathi, D. 2018. Dedicated Non-destructive Devices for Food Quality Measurement: A Review. *Trends in Food Science & Technology*, 78; 197–205.
- Abuhelwa, A.Y.M, Williams, D.B., Upton, R.N., and Foster, D.J.R. 2017. Food, Gastrointestinal pH, and Models of Oral Drug Absorption, Review Article. *European Journal of Pharmaceutics and Biopharmaceutics*, 112: 234-248.
- Anggraeni, F.D, Takahashi, N., Kono, M., Takayama, K., Nishina, H., Falah, M.A.F., Kudo, R., Nakanishi, Y., Yamamoto, K., and Matuura, H. 2018. Effect of Storage Temperatures on High Soluble Solids Tomato Fruit Quality after Long-term Storage. *Joint Conference on Environmental Engineering in Agriculture, Japan*.
- Anggraeni, F.D., Nishina, H., Takayama, K., Takahashi, N., Khuriyati, N., and Falah, M.A.F. 2019. System Application of Water Stress Treatment to Produce High Soluble Solids Tomato (*Solanum lycopersicum* Mill. cv Rinka 409). *Telkonnika*. (Submitted paper).
- Anthon, G.E., LeStrange, M., and Barret, D.M. 2011. Changes in pH, Acids, Sugars and Other Quality Parameters During Extended Vine Holding of Ripe Processing Tomatoes. *J Sci Food Agric*, DOI 10.1002/jsfa.4312 (wileyonlinelibrary.com).
- Ashraf, M., and Harris, P.J.C. 2004. Potential Biochemical Indicators of Salinity Tolerance in Plants. *Plant Science*, 166(1): 3-16.
- Atherton, J.G. and Rudich, J. 1986. *The Tomato Crops, A Scientific for Improvement*. Chapman and Hall Ltd. New York.
- Badan Pusat Statistik. 2017. Konsumsi Buah dan Sayur Susenas Maret 2016 Dalam Rangka Hari Gizi Nasional 25 Januari 2017. [Cited 2018 February 12]. Available from <http://gizi.depkes.go.id/wp-content/uploads/2017/01/Paparan-BPS-Konsumsi-Buah-Dan-Sayur.pdf>.
- Balaso, S.D., Arima, S., Ueka, Y., Kono, M., Nishina, H., Kenji, H., Takayama, K., and Takahashi, N. 2013. Development of a Multi-Operation System for Intelligent Greenhouses. *IFAC Proceedings*, Volume 46, Issue 4, 287-292.
- Baudoin, W., Castilla, N., and Qaryouti, M. 2013. *Good Agricultural Practices for Greenhouse Vegetable Crops: Principles for Mediterranean Climate Areas*. Food and Agriculture Organization of The United Nations. Rome.
- Bergevin, M., L'Heureux, G.P., and Willemot, C. 1993. Tomato Fruit Chilling Tolerance in Relation to Internal Atmosphere After Return to Ambient Temperature. *Hortscience*, 28: 138–140.

- Brunso, K., Fjord, T.A., and Grunert, K.G. 2002. Consumer's Food Choice and Quality Perception. Working paper, 77: June 2002. ISSN 0907 2101.
- Chang, C.H., Lin, H.Y., Chang, C.Y., and Liu, Y.C. 2006. Comparisons On The Antioxidant Properties of Fresh, Freeze-dried and Hot-air-dried tomatoes. *Journal of Food Engineering*, 77: 478–485.
- Ciptaningtyas, D. 2014. Development of Water Stress Treatment System for Long-term High Brix Tomato Production in Hydroponic Culture. Thesis. Bogor. IPB University.
- Coyago-Cruz, E., Corell, M., Moriana, A., Hernanz, D., Benitez-Gonzalez, A. M., Stinco, C. M., Melendez-Martinez, A. J. 2018. Antioxidants (Carotenoids and Phenolics) Profile of Cherry Tomatoes as Influenced by Deficit Irrigation, Ripening and Cluster. *Food Chemistry*, 240: 870–884.
- Cramer, M.D., Oberholzer, J.A., and Combrink, N.J. 2001. The Effect of Supplementation of Root Zone Dissolved Inorganic Carbon on Fruit Yield and Quality of Tomatoes (cv 'Daniela') Grown with Salinity. *Sci. Hortic.* 89: 269–289.
- Diouf, I.A., Derivot, L., Bitton, F., Pascual, L., and Causse, M. 2018. Water Deficit and Salinity Stress Reveal Many Specific QTL for Plant Growth and Fruit Quality Traits in Tomato. *Front. Plant Sci.*, 9:279. doi: 10.3389/fpls.2018.00279
- Enouch, H.Z., and Enouch, Y. 1998. The History and Geography of The Greenhouse, In: *Greenhouse Ecosystems*, eds: Stanhill, G and Enouch HZ, Elsevier, Amsterdam, 1-16.
- Erba, D., Casirahi, M.C., Ribas-Agusti, A., Caceres, R., Marfa, O., Castellari, M. 2013. Nutritional Value of Tomatoes (*Solanum lycopersicum* L.) Grown in Greenhouse by Different Agronomic Techniques. *Journal of Food Consumption and Analysis*, 31: 245-251.
- Efiuvwevwere, B.J.O., and Thorne, S.N., 1988. Development of Chilling Injury Symptoms in Stored Tomato Fruit (*Lycopersicon esculentum* Mill). *Journal Science Food Agriculture*, 44: 215–226.
- Evans, D.F., Pye, G., Bramley, R., Clark, A.G., Dyson, T.J., and Hardcastle, J.D. 1988. Measurement of Gastrointestinal pH Profiles in Normal Ambulant Human Subjects. *Gut*, 1988, 29, 1035-1041.
- Gauglitz, G. and Vo-Dinh, T. 2003. *Handbook of Spectroscopy*. Wiley-Vch Verlag GmbH & Co. KGaA, Weinheim, Germany.
- Gerszberg, A., Hnatuszko-Konka, K., Kowalczyk, T., and Kononowicz, A, K. 2015. Tomato (*Solanum lycopersicum* L.) in The Service of Biotechnology. *Plant Cell Tiss Organ Cult.* 2015; 120: 881–902.

- Goula, A.M., Adamopoulos, K.G., Chatzitakis, P.C., Nikas, V.A. 2006. Prediction of Lycopene Degradation During A Drying Process of Tomato Pulp. *Journal of Food Engineering*, 74: 37–46.
- Graves, C.J. 1983. The Nutrient Film Technique. *Horticultural Reviews*, 5: 1-37.
- Hanin, M., Ebel, C., Ngom, M., Laplaze, L., and Masmoudi, K. 2016. New Insights on Plant Salt Tolerance Mechanisms and Their Potential Use for Breeding. *Frontiers in Plant Science*, 7:1787. doi: 10.3389/fpls.2016.01787
- Hao, S., Cao, H., Wang, H., and Pan, X. 2019. The Physiological Responses of Tomato to Water Stress and Re-water In Different Growth Periods. *Scientia Horticulturae*, 249: 142-154.
- Hochmuth, G. and Hochmuth, R. 2015. Design Suggestions and Greenhouse Management for Vegetable Production in Perlite and Rockwool Media in Florida. [Cited 2018 February 20]. BULLETIN 327 of Horticultural Sciences Departement, UF/IFAS Extension On http://edis.ifas.ufl.edu/pdffiles/CV/CV_19500.pdf.
- Hui, Y. H. 2006. *Handbook of Food Science Technology and Engineering*, Volume I. CRC Press. USA.
- Hulme, A.C. 1971. *The Biochemistry of Fruits and Their Products* Vol. 2. Academic Press. London.
- Hussein, M., Silva, A., and Fraser, I. 2015. Linking Intrinsic Quality Attributes of Agricultural Produce to Revealed Consumer Preferences. *Food Quality and Preference*, 41: 180-188.
- Ihuoma, S. O., and Madramootoo, C.A. 2017. Recent Advance in Water Stress Detection, Review. *Journal of Computers and Electronics in Agriculture* 141 (2017) 267-275.
- Ihouma, S.O., and Madramooto, C.A. 2019. Sensitivity of Spectral Vegetation Indices for Monitoring Water Stress in Tomato Plants. *Computers and Electronics in Agriculture*, 163:104860.
- Ito, H and Horie, H. 2009. Proper Solvent Selection for Lycopene Extracton in Tomatoes and Application to A Rapid Determination. *Bulletin of The National Institute of Vegetable and Tea Science*, 8: 165-173.
- Javanmardi, J.; Kubota, C. 2006. Variation of Lycopene, Antioxidant Activity, Total Soluble Solids and Weight Loss of Tomato During Postharvest Storage. *Postharvest Biol. Technol.* 41: 151–155.
- Johnson, E. J. 2002. The Role of Carotenoids in Human Health. *Nutrition in Clinical Care: An Official Publication of Tufts University* Ed Mar-Apr; 5(2): 56-65.

- Jones, J. Benton Jr. 1999. *Tomato Plant Culture: In the Field, Greenhouse, and Home Garden*. CRC Press LLC. USA.
- Kamaruddin, R. A. 1999. *Naturally Ventillated Crop Protection Structure for Tropical Conditions*. PhD Thesis. Cranfield University, Silsoe, Bedford, UK.
- Kawamura, K., Tsujimoto, Y., Rabenarivo, M., Asai, H., Andriamanjara, A., and Rakotoson, T. 2017. Vis-NIR Spectroscopy and PLS Regression with Waveband Selection for Estimating the Total C and N of Paddy Soils in Madagascar. *Remote Sensing*, 9, 1081.
- Khapte, P, S., Kumar, P., Burman, U., and Kumar, P. 2019. Deficit Irrigation in Tomato: Agronomical and Physio-biochemical Implications, Review. *Scientia Horticulturae*, 248: 256-264.
- Khuriyati, N., Matsuoka, T., and Kawano, S. 2004. Precise Near Infrared Spectral Acquisition of Intact Tomatoes in Interactance Mode. *Journal of Near Infrared Spectroscopy*, vol. 12, pp. 391-396.
- Kirk, J.T.O., and Tilney-Basset, R.A.E. 1978. *The Plastids, Their Chemistry, Structure, Growth, and Inheritance*, 2nd ed. Elsevier. Amsterdam.
- Klunkin, G and Savage, G. 2017. Effect on Quality Characteristics of Tomatoes Grown Under Well-Watered and Drought Stress Conditions. *Foods Journal (MDPI)* 6, 56.
- Kooten, Olaf van, Heuvelink, Ep., and Stanghellini, C. 2004. Nutrient Supply in Soilless Culture: On-Demand Strategies. Proc. VII IS on Prot. Cult. Mild Winter Climates. *Acta Hort*, 659, ISHS.
- Kong, K.W., Khoo, H.E., Prasad, K.N., Ismail, A., Tan, C.P., and Rajab, N.F. 2010. Revealing the Power of the Natural Red Pigment Lycopene. *Molecules Journal*, 15: 959-987.
- Kopsell, D.A. and D.E. Kopsell. 2006. Accumulation and Bioavailability of Dietary Carotenoids in Vegetable Crops. *Plant Science Journal*, 11: 499-507.
- Kumar, S., Singh, S.K., and Mishra, P. 2013. Multivariate Analysis: An Overview., *Journal of Dentofacial Sciences*, Review Article Volume 2 Issue 3: 19-26.
- Kuscu, H., Turhan, A., and Demir, A.O. 2014. The Response of Processing Tomato to Deficit Irrigation at Various Phenological Stages in A Sub-humid Environment. *Agricultural Water Management*, 133: 92– 103.
- Lahoz, I., Perez-de-Castro, A., Valcarcel, M., Macua, J.I., Beltran, J., Rosello, S., and Cebolla-Cornejo, J. 2016. Effect of Water Deficit on The Agronomical Performance and Quality of Processing Tomato. *Jurnal of Scientia Horticulturae*, 200: 55 – 65.

- Lana, M.M., Tijskens, L.M.M., and Van Kooten, O. 2005. Effects of Storage Temperature and Fruit Ripening on Firmness of Fresh Cut Tomatoes. *Postharvest Biology Technology*, 35 (1): 87–95.
- Li, J., Cang, Z., Jiao, F., Bai, X., Zhang, D., and Zhang, R. 2017. Influence of Drought Stress On Photosynthetic Characteristics and Protective Enzymes of Potato at Seedling Stage. *Journal of Saudi Soc. Agric. Sci.* 16: 82-88.
- Li, S., Luo, Z., Lu, B., Xia, S., Li, C., Guan, X., Zhang, J., Huang, K., and Xian, F. 2019. Protective Effects of Lycopene on Kainin Acid-induced Seizures. *Journal of Epilepsy Research.* 151: 1-6.
- Liang, M.H., He, Y.F., Chen, L.J., and Du, S.F. 2018. Greenhouse Environment Dynamic Monitoring System Based. *IFAC Papers Online* 51-17: 736–740.
- Liu, L., Shao, Z., Zhang, M., and Wang, Q. 2015. Regulation of Carotenoid Metabolism in Tomato. *Molecular Plant*, 8: 28-39.
- Lurie, S., Handros, A., Fallik, E., and Shapira, R. 1996. Reversible Inhibition of Tomato Fruit Gene Expression at High Temperature (Effects on Tomato Fruit Ripening). *Plant Physiology*, 110: 1207–1214.
- Marti, R., Valcarcel, M., Leiva-Brondo, M., Lahoz, I., Campillo, C., Rosello, S., and Cebolla-Cornejo. 2018. Influence of Controlled Deficit Irrigation on Tomato Functional Value. *Food Chemistry.* 252: 250-257
- Monfared, A.M.T. and Anis, H. 2017. An Improved Partial Least-Squares Regression Method for Raman Spectroscopy. *Journal of Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 185: 98 – 103.
- Nagata, M., Noguchi, Y., Ito, H., Imanishi, S., and Sugiyama, K. 2007. A Simple Spectrophotometric Method for The Estimation of α -Carotene, β -Carotene and Lycopene Concentrations in Carrot Acetone Extracts. (in Japanese text with English Summary) *Nippon Shokuhin Kagaku Kogaku Kaishi* 54:351-355.
- Nagata, M. and Yamashita, I. 1992. Simple Method for Simultaneous Determination of Chlorophyll and Carotenoids in Tomato Fruit. (in Japanese text with English summary) *Nippon Shokuhin Kogyo Gakkaishi* 39: 925-928.
- Nangare, D.D., Singh, Y., Kumar, P.S., and Minhas, P.S. 2016. Growth, Fruit Yield and Quality of Tomato (*Lycopersicon esculentum* Mill.) as Affected by Deficit Irrigation Regulated on Phenological Basis. *Agricultural Water Management*, 171: 73–79.

- Nishina, Hiroshige. 2015. Development of Speaking Plant Approach Technique for Intelligent Greenhouse. *Agriculture and Agricultural Science Procedia* 3, 9–13.
- Nunes, Maria Cecilia do Nascimento. 2008. *Color Atlas of Postharvest: Quality of Fruits and Vegetables*. Blackwell Publishing. USA.
- de Oliveira, A.B., Alencar, N.L.M., and Gomes-Filho, E. 2013. Comparison Between the Water and Salt Stress Effects on Plant Growth and Development. Sener Akinci, IntechOpen, DOI: 10.5772/54223. Available from: <https://www.intechopen.com/books/responses-of-organisms-to-water-stress/comparison-between-the-water-and-salt-stress-effects-on-plant-growth-and-development>.
- Owen, Tony. 1996. *Fundamentals of UV-Visible Spectroscopy: A Primer*. Hewlett-Packard Company. Germany.
- Park, M.H., Sangwanangkul, P., and Baek, D.R. 2018. Changes in Carotenoid and Chlorophyll Content of Black Tomatoes (*Lycopersicon esculentum* L.) During Storage at Various Temperatures. *Saudi Journal of Biological Sciences*, 25: 57–65.
- Pessarakli, Mohammad. 1999. *Handbook of Plant and Crop Stress Second Edition, Revised and Expanded*. Marcel Dekker, Inc. USA.
- Pirouz, Dante. 2006. An Overview of Partial Least Square. Article in *SSRN Electronic Journal* · October 2006. [Cited 2019 April 15] On <https://www.researchgate.net/publication/228296847>.
- Preedy, V.R. and Watson, R.R. 2008a. *Lycopene: Nutritional, Medicinal and Therapeutic Properties*. Science Publishers. USA.
- Preedy, V.R. and Watson, R.R. 2008b. *Tomatoes and Tomato Products: Nutritional, Medicinal and Therapeutic Properties*. Science Publishers. USA.
- Raiola, A., Rigano, M.M., Calafiore, R., Frusciante, L., and Barone, A. 2014. Enhancing the Human-promoting Effects of Tomato Fruit for Biofortified Food. *Hindawi Publishing Corporation Mediators of Inflammation*, Review Article. 2014. doi:10.1155/2014/139873.
- Ripoll, J., Urban, L., Brunel, B., and Bertin, N. 2016. Water Deficit Effects on Tomato Quality Depend on Fruit Developmental Stage and Genotype. *Journal of Plant Physiology*, 190: 26–35.
- Reddy, P.P. 2016. *Sustainable Crop under Protected Cultivation*. Springer. Singapore.
- Rodriguez-Amaya, D.B. and Kimura, M. 2004. *Harvestplus Handbook for Carotenoid Analysis*. International Food Policy Research Institute (IFPRI) and International Center for Tropical Agriculture (CIAT). USA.

- Romanchik, J.E. and D.W. Morel, and E.H. Harrison. 1995. Distributions of Carotenoids and A-tocopherol Among Lipoproteins Do Not Change When Human Plasma Is Incubated In Vitro. *J. Nutr.*, 125: 2610-2617.
- Rubatzky, V.E. and Yamaguchi, M. 1997. *World Vegetables: Principles, Production, and Nutritive Values*. Chapman Hall. New York.
- Salama, M.F., Seliem, E.I., Mahmoud, K.F., and Amin, A.A. 2015. Physiochemical Characterization and Oxidative Stability of Encapsulated Nano Lycopene Pigments Extracted By CO₂ Fluid Extraction. *Int.J.Curr.Microbiol.App.Sci.*, 4(3): 307-320.
- Selahle, M.K.; Sivakumar, D.; Soundy, P. 2014. Effect of Photo-selective Nettings on Post-harvest Quality and Bioactive Compounds in Selected Tomato Cultivars. *J. Sci. Food Agric.*, 94: 2187–2195.
- Shi, John and Maguer, Marc Le. 2000. Lycopene in Tomatoes: Chemical and Physical Properties Affected by Food Processing. *Critical Reviews in Biotechnology Journal*, 20 (4): 293-334.
- Sheng, R., Cheng, W., Li, H., Ali, S., Agyekum, A.A., and Chen, Q. 2019. Model Development for Soluble Solids and Lycopene Contents of Cherry Tomato at Different Temperatures Using Near-infrared Spectroscopy. *Postharvest Biology and Technology*, vol. 156.
- Shoemaker, James S. 1953. *Vegetable Growing*. John Wiley & Sons, Inc. New York.
- Sirisomboon, P., Tanaka, M., Kojima, T., and Williams, P. 2012. Nondestructive Estimation of Maturity and Textural Properties on Tomato 'Momotaro' by Near Infrared Spectroscopy. *Journal of Food Engineering*, 112: 218-226.
- Souci, S.W., Fachmann, W., and Kraut H. 2008. *Food Composition and Nutrition Tables, 7th Revised and Completed Edition*. Taylor and Francis Group, CRC Press. USA.
- Straten, G.V., Wiligenburg, G.V., Henten, E.V., Ooteghem, R.V. 2011. *Optimal Control of Greenhouse Technology*. CRC Press. Boca Raton, USA.
- Suárez, M.H.; Rodríguez, E.M.R.; Romero, C.D. 2008. Chemical Composition of Tomato (*Lycopersicon esculentum*) from Tenerife, the Canary Islands. *Food Chem.*, 106: 1046–1056.
- Takahashi, N., Takayama, K., Nishina, H. 2017. Non-destructive Measurement for Lycopene Content in Tomato Fruit Using Visible/Near-infrared Spectroscopy. *Proceedings of the International Conference on Agro-industry 2017 in Japan*.

- Takayama, K & Nishina, H. 2007. Early Detection of Water Stress in Tomato Plants Based on Projected Plant Area. *Journal of Environmental Control Biology, A Review*, 45 (4), 241-249.
- Tim Penulis PS. 1993. *Tomat: Pembudidayaan Secara Komersial*. Jakarta: PT Penebar Swadaya.
- Timm, Neil H. 2002. *Applied Multivariate Analysis*. Springer. New-York.
- Uniyal, B., and Dietrich, J. 2019. Modifying Automatic Irrigation in SWAT for Plant Water Stress Scheduling. *Agricultural Water Management* 223: 105714.
- Uyanık, G.K. and Güler, N. 2013. A Study on Multiple Linear Regression Analysis. *Procedia – Social and Behavioral Sciences* 106 (2013) 234 – 240.
- Van Straten, G., and Th.H. Gieling. 2002. Controller Settings for Closed System Ion Control in Greenhouses. 2002 ASAE Annual International Meeting/ CIGR XVth World Congress, Chicago, Paper No. 023031, 9pp.
- Villareal, Ruben L. 1980. *Tomatoes in The Tropics*. International Agricultural Development Service. USA.
- Wang, F., Kang, S., Du, T., Li, F., and Qiu, R. 2011. Determination of Comprehensive Quality Index for Tomato and Its Response to Different Irrigation Treatments. *Agricultural Water Management*. 98(8): 1228–1238.
- Wang, Xiang-Dong. 2012. Lycopene Metabolism and Biological Activity. *The American Journal of Clinical Nutrition*, 9:1214–1222.
- Wang, X., Zhao, C., Guo, N., Li, Y., Jian, S., Yu, K., 2015. Determining the Canopy Water Stress for Spring Wheat Using Canopy Hyperspectral Reflectance Data in Loess Plateau Semiarid Regions. *Spectrosc. Lett.*, 48: 492–498.
- Wu, Z., Sun, S., Wang, F., and Guo, D. 2011. Establishment of Regeneration and Transformation System of *Lycopersicon esculentum* Micro tom. *Br Biotechnol J.*, 3: 53–60.
- Yang, H., Du, T., Mao, X., Ding, R., and Shukla, M.K. 2019. A Comprehensive Method of Evaluating The Impact of Drought and Salt Stress on Tomato Growth and Fruit Quality Based on EPIC Growth Model. *Agricultural Water Management*, 213: 116–127.
- Yeniay, O and Göktaş, A. 2002. A Comparison of Partial Least Squares Regression with Other Prediction Methods. *Hacettepe Journal of Mathematics and Statistics*, 31: 99 -111.
- Zhang, H., Xiong, Y., Huang, G., Xu, X., Huang, Q. 2017. Effects of Water Stress on Processing Tomatoes Yield, Quality and Water Use Efficiency with Plastic Mulched Drip Irrigation in Sandy Soil of the Hetao Irrigation District. *Journal of Agricultural Water Management*, 179: 205-2014.