DAFTAR PUSTAKA

Abubakar El-Ishaq, S. O. (2015) 'Effect of Temperature and Storage on Vitamin C Content in Fruits Juice', *International Journal of Chemical and Biomolecular Science*, 1(2), pp. 17–21.

Ahmed, D. M. and Ali, R. M. (2016) 'Determination of vitamin C in different natural juices', (February).

Alexandra, Y. and Nurlina (2014) 'APLIKASI EDIBLE COATING DARI PEKTINJERUK SONGHI PONTIANAK (Citrus nobilis var Microcarpa) PADA PENYIMPANAN BUAH TOMAT', *JKK*, 3(4), pp. 11–20.

Do Amarante, C. V. T., Steffens, C. A. and Argenta, L. C. (2011) 'Yield and fruit quality of "Gala" and "Fuji" apple trees protected by white anti-hail net', *Scientia Horticulturae*, 129(1), pp. 79–85. doi: 10.1016/j.scienta.2011.03.010.

Anand David, A. V., Arulmoli, R. and Parasuraman, S. (2016) 'Overviews of biological importance of quercetin: A bioactive flavonoid', *Pharmacognosy Reviews*, 10(20), pp. 84–89. doi: 10.4103/0973-7847.194044.

Arjuan, H. (2008) 'Aplikasi pewarna bubuk ekstrak umbi bit (beta vulgaris) sebagai pengganti pewarna tekstil pada produk terasi Kabupaten Berau, Kalimantan Timur.' Available at: http://repository.ipb.ac.id/handle/123456789/50496 (Accessed: 31 December 2021).

Badan Ketahanan Pangan dan Badan Pusat Statistik (2019) *Anlalisis Ketersediaan Pangan Neraca Bahan Makanan Indonesia 2017-2019*. Available at: http://bkp.pertanian.go.id/storage/app/media/Bahan 2020/FA BUKU NBM 2017-2019.pdf (Accessed: 23 September 2021).

Balakrishnan, H. N. *et al.* (2019) 'ChaosNet: A chaos based artificial neural network architecture for classification', *Chaos*, 29(11). doi: 10.1063/1.5120831.

Bartsch, H. *et al.* (1990) 'Exposure of humans to endogenous N-nitroso compounds: implications in cancer etiology', *Mutation Research/Reviews in Genetic Toxicology*, 238(3), pp. 255–267. doi: 10.1016/0165-1110(90)90017-6.

Bieniasz, M., Dziedzic, E. and Kaczmarczyk, E. (2017) 'The effect of storage and processing on Vitamin C content in Japanese quince fruit', *Folia Horticulturae*, 29(1), pp. 83–93. doi: 10.1515/fhort-2017-0009.

Billy, L. *et al.* (2008) 'Relationship between texture and pectin composition of two apple cultivars during storage', *Postharvest Biology and Technology*, 47(3), pp. 315–324. doi: 10.1016/j.postharvbio.2007.07.011.

Bradbury, K. E., Appleby, P. N. and Key, T. J. (2014) 'Fruit, vegetable, and fiber intake in relation to cancer risk: findings from the European Prospective Investigation into Cancer and Nutrition (EPIC) 1-4', *Am J Clin Nutr*, 100, pp. 394–402. doi: 10.3945/ajcn.113.071357.

Bre, F., Gimenez, J. M. and Fachinotti, V. D. (2018) 'Prediction of wind pressure coefficients on building surfaces using artificial neural networks', *Energy and Buildings*, 158(April 2018), pp. 1429–1441. doi: 10.1016/j.enbuild.2017.11.045.

Cempaka, A. R., Santoso, S. and Tanuwijaya, L. K. (2017) 'Pengaruh Metode Pengolahan Terhadap Kandungan Quercetin Berbagai Kualitas Apel Lokal dan Impor', *Indonesian Journal of Human Nutrition*, 4(1), pp. 48–58. Available at: file:///C:/Users/user/AppData/Local/Temp/54961-205-131827-1-10-20191128.pdf.

Chen, M. *et al.* (2019) 'Artificial Neural Networks-Based Machine Learning for Wireless Networks: A Tutorial', *IEEE Communications Surveys and Tutorials*, 21(4), pp. 3039–3071. doi: 10.1109/COMST.2019.2926625.

Devaki, S. J. and Raveendran, R. L. (2017) 'Vitamin C: Sources, Functions, Sensing and Analysis', *Vitamin C*, (August). doi: 10.5772/intechopen.70162.

Direktori Perkembangan Konsumsi Pangan (2019). Jakarta. Available at: http://bkp.pertanian.go.id/storage/app/media/PPID 2019/PRINT DIREKTORI KONSUMSI PANGAN 2019.pdf (Accessed: 24 September 2021).

Dirpan, a. *et al.* (2018) 'The use of colour indicator as a smart packaging system for evaluating mangoes Arummanis (Mangifera indica L. var. Arummanisa) freshness', *IOP Conference Series: Earth and Environmental Science*, 157(1). doi: 10.1088/1755-1315/157/1/012031.

Dobrzański, B. *et al.* (2020) 'Some physical and nutritional quality parameters of storage apple', *International Agrophysics*, 15(1), pp. 13–18.

Dobrzański, B. J. and Rybczyński, R. (2002) 'Colour change of apple as a result of storage, shelf-life, and bruising', *International Agrophysics*, 16(4), pp. 261–268.

El-Nahhal, Y. and El-Nahhal, Y. (2018) 'Nitrate Residues in Fruits, Vegetables and Bread Samples and Their Health Consequences', *Health*, 10(4), pp. 487–501. doi: 10.4236/HEALTH.2018.104039.

Endrizzi, I. *et al.* (2015) 'A conjoint study on apple acceptability: Sensory characteristics and nutritional information', *Food Quality and Preference*, 40(PA), pp. 39–48. doi: 10.1016/J.FOODQUAL.2014.08.007.

Fellman, J. K. *et al.* (2000) 'Factors that influence biosynthesis of volatile flavor compounds in apple fruits', *HortScience*, 35(6), pp. 1026–1033. doi: 10.21273/hortsci.35.6.1026.

Fernenddy, F., Restuhady, F. and Edwina, S. (2006) 'IMPACTS OF AGRICULTURE MINISTER FOR TRADE', (37).

Galani, J. H. Y. *et al.* (2017) 'Storage of fruits and vegetables in refrigerator increases their phenolic acids but decreases the total phenolics, anthocyanins and vitamin C with subsequent loss of their antioxidant capacity', *Antioxidants*, 6(3). doi: 10.3390/antiox6030059.

Gerven, M. Van and Bohte, S. (2017) 'Deep learning', *Nature*, 521(7553), pp. 436–444. doi: 10.1038/nature14539.

Gil-Muñoz, R. *et al.* (1997) 'Evolution of the CIELAB and other spectrophotometric parameters during wine fermentation. Influence of some pre and postfermentative factors', *Food Research International*, 30(9), pp. 699–705. doi: 10.1016/S0963-9969(98)00029-5.

Gomes, M. H. *et al.* (2014) 'Polyphenoloxidase activity and browning in fresh-cut "Rocha" pear as affected by pH, phenolic substrates, and antibrowning additives', *Postharvest Biology and Technology*, 91, pp. 32–38. doi: 10.1016/j.postharvbio.2013.12.013.

Guiné, R. P. F. *et al.* (2011) 'Evaluation of Textural Properties in Apples of Regional Varieties', *International Journal of Food Properties*, 14(2), pp. 331–338. doi: 10.1080/10942910903177848.

Halin, H. (2018) 'PENGARUH KUALITAS PRODUK TERHADAP KEPUASAN PELANGGAN SEMEN BATURAJA DI PALEMBANG PADA PT SEMEN BATURAJA (PERSERO) Tbk', *Jurnal Ecoment Global*, 3(2), p. 79. doi: 10.35908/jeg.v3i2.477.

Hasanah, U. (2018) 'Penentuan Kadar Vitamin C Pada Mangga Kweni Dengan Menggunakan Metode Iodometri', *Jurnal Keluarga Sehat Sejahtera*, 16(31), pp. 90–95. doi: 10.24114/jkss.v16i31.10176.

Iwase, H. (2000) 'Use of nucleic acids in the mobile phase for the determination of ascorbic acid in foods by high-performance liquid chromatography with electrochemical detection', *Journal of Chromatography A*, 881(1-2), pp. 327–330. doi: 10.1016/S0021-9673(00)00057-1.

Jakopic, J., Veberic, R. and Stampar, F. (2007) 'The effect of reflective foil and hail nets on the lighting, color and anthocyanins of "Fuji" apple', *Scientia Horticulturae*, 115(1), pp. 40–46. doi: 10.1016/j.scienta.2007.07.014.

Jones, R. B., Stefanelli, D. and Tomkins, R. B. (2015) 'Pre-harvest and post-harvest factors affecting ascorbic acid and carotenoid content in fruits and vegetables', *Acta Hortic. 1106. ISHS*. doi: 10.17660/ActaHortic.2015.1106.6.

Kakiuchi, N. *et al.* (1986) 'Composition of Volatile in Relation Compounds to Cultivarsl of Apple Fruits', *Japan Soc. Hort. Sci.*, 55(3), pp. 280–289.

Kalsum, U. (2015) 'PERBAIKAN KUALITAS JERUK PAMELO (Citrus maxima (Burm.) Merr.) MELALUI PENGATURAN NISBAH JUMLAH DAUN:BUAH DAN PEMBERONGSONGAN BUAH', *tesis*.

Kashyap, G. and Gautam, M. D. (2012) 'Analysis of Vitamin C in Commercial and Naturals substances by Iodometric Titration found in Nimar and Malwa regeion', *Journal of Scientific Research in Pharmacy*, 1(2), pp. 77–78.

Katan, M. B. (2009) 'Nitrate in foods: harmful or healthy?', *The American Journal of Clinical Nutrition*, 90(1), pp. 11–12. doi: 10.3945/AJCN.2009.28014.

Khuriyati, N., Fibriato, M. B. and Nugroho, D. A. (2018) 'PENENTUAN KUALITAS BUAH NAGA (Hylocereus undatus) DENGAN METODE NON-DESTRUKTIF [Non-destructive Determination of Dragon Fruit (Hylocereus undatus) Quality]', *Jurnal Teknologi & Industri Hasil Pertanian*, 23(2), pp. 65–74. doi: 10.23960/JTIHP.V23I2.65-74.

Kim, I. *et al.* (2019) 'A comparison of the chemical composition and antioxidant activity of several new early- to mid-season apple cultivars for a warmer climate with traditional cultivars', *Journal of the Science of Food and Agriculture*, 99(10), pp. 4712–4724. doi: 10.1002/jsfa.9712.

Knechtges, P. L. (2014) 'Keamanan Pangan: Teori & Praktek', in. Jakarta: Penerbit Buku Kedokteran EGC.

Kohmsan, A. (2006) *Sehat dengan Makanan Berkhasiat*. Edited by I. Suhanda. Jakarta: Penerbit Buku Kompas. Available at:

https://scholar.google.co.id/citations?view_op=view_citation&hl=id&user=m7sRYbYAAAAJ&citation_for_view=m7sRYbYAAAAJ:EYYDruWGBe4C (Accessed: 23 September 2021).

Kusumiyati *et al.* (2017) 'Mutu Buah Sawo selama Periode Simpan Berbeda', *Jurnal Kultivasi*, 16(3), pp. 451–455.

Kusumiyati, Munawar, A. A. and Suhandy, D. (2020) 'Prediksi Vitamin C, Total Asam Tertitrasi, Dan Total Padatan Terlarut Pada Buah Mangga Menggunakan Near-Infrared Reflectance Spectroscopy', *Jurnal Teknologi Pertanian*, 21(3), pp. 145–154. doi: 10.21776/ub.jtp.2020.021.03.1.

Lancaster, J. E. *et al.* (1994) 'Influence of Pigment Composition on Skin Color in a Wide Range of Fruit and Vegetables.pdf', *Journal of the American Society for Horticultural Science*, 119(1), pp. 63–69.

Łozowicka, B. *et al.* (2013) 'Evaluation of pesticide residues in fruit from Poland and health risk assessment', *Agricultural Sciences*, 4(5B), pp. 106–111. doi: 10.4236/as.2013.45B020.

Lubis, D. A. (2019) *Analisis Perilaku Konsumen terhadap Permintaan Buah Apel Fuji Impor di Brastagi Supermarket Medan*.

Maajid, L. A., Sunarmi, S. and Kirwanto, A. (2018) 'Pengaruh Lama Penyimpanan Terhadap Kadar Vitamin C Buah Apel (Malus Sylvestris Mill)', *Jurnal Kebidanan dan Kesehatan Tradisional*, 3(2), pp. 90–94. doi: 10.37341/jkkt.v3i2.88.

Magwaza, L. S. *et al.* (2011) 'Non-destructive quality assessment of "Valencia" orange using FT-NIR spectroscopy', *Proceedings of the 15th International conference on NIR spectroscopy*, (May), p. 375. Available at: https://www.researchgate.net/profile/Lembe_Magwaza/publication/262413637_Non-destructive_quality_assessment_of_'Valencia'_orange_using_FT-NIR_spectroscopy/links/00463537a2fdd446bf000000.pdf.

Nanda, Y. T. (2016) *KAJIAN ALTERNATIF PEWARNA ALAMI BUNGA MAWAR MERAH (Rosa Hybrida L.) DAN BUNGA KANA MERAH (Canna Indica) DENGAN PERBEDAAN KONSENTRASI SUKROSA PADA PERMEN JELLY APEL*.

Nisfiyah, D. L. (2018) 'EFEKTIFITAS MULTIPLIKASI TUNAS BEBERAPA VARIETAS APEL (Malus sylvestris Mill) PADA VARIASI KONSENTRASI TDZ DAN IBA SECARA IN VITRO', *Skripsi*. Available at: http://eprints.umm.ac.id/id/eprint/38793.

NOVA, N. (2011) 'PENDUGAAN MUTU FISIK BIJI JAGUNG DENGAN MENGGUNAKAN CITRA DIGITAL DAN JARINGAN SYARAF TIRUAN', *Tesis*.

Novita, M. *et al.* (2012) '(Lycopersicum pyriforme) PADA BERBAGAI TINGKAT KEMATANGAN EFFECTS OF CHITOSAN COATING ON PHYSICO - CHEMICAL CHARACTERISTICS OF FRESH TOMATOES (Lycopersicum pyriforme) IN DIFFERENT MATURITY STAGES', *Jurnal Teknologi dan Industri Pertanian Indonesia*, 4(3), pp. 1–32.

Nugraheni, A. R. (2017) 'PENGARUH PEMBERIAN EDIBLE COATING CMC DIPERKAYA MINYAK ATSIRI DAUN SIRIH DAN LEMON SEBAGAI ANTI

MIKROBA UNTUK MEMPERPANJANG UMUR SIMPAN FRESH-CUT APEL MANALAGI (Malus sylvestris Mill)', *Skripsi*, (Universitas Muhammadiyah Yogyakarta), p. 2017.

Nuning Damayanti, M. (2016) 'APEL MANALAGI SEBAGAI PENURUN KADAR KOLESTEROL PENDUDUK DUSUN SEMARANGAN SIDOKARTO GODEAN SLEMAN YOGYAKARTA[1]', *Naskah Publikasi*.

Plesa, A. *et al.* (2016) 'We are IntechOpen , the world ' s leading publisher of Open Access books Built by scientists , for scientists TOP 1 %', *Intech*, i(tourism), p. 13.

Pourdarbani, R. *et al.* (2020) 'Determination of the most effective wavelengths for prediction of fuji apple starch and total soluble solids properties', *Applied Sciences (Switzerland)*, 10(22), pp. 1–16. doi: 10.3390/app10228145.

Putri, R. M., Adiwirman, A. and Zuhry, E. (2014) 'Studi Pertumbuhan dan Daya Hasil Empat Galur Tomat (Lycopersicum esculentum Mill) di Dataran Rendah', *Jurnal Online Mahasiswa Fakultas Pertanian Universitas Riau*, 1(2), pp. 1–9.

Rachmawati, A. (2018) 'Prediksi Kandungan Vitamin C Pada Tomat Berbasis Analisis Citra Digital Menggunakan Metode Artificial Neural Network', *Tesis*.

Rahayu, J. *et al.* (2012) 'PREFERENSI KONSUMEN TERHADAP BUAH APEL IMPOR DI TOKO BUAH HOKKY DAN PASAR TRADISIONAL AMPEL SURABAYA', *AGRIEKONOMIKA*, 1(1), pp. 52–67. doi: 10.21107/agriekonomika.v1i1.350.

Rahman, N., Ofika, M. and Said, I. (2015) 'Analisis Kadar Vitamin C Mangga Gadung (Mangifera SP) dan Mangga Golek (Mangifera Indica L) Berdasarkan Tingkat Kematangan dengan Menggunakan Metode Iodimetri', *Jurnal Akademika Kimia*, 4(1), pp. 33–37.

Rahman, R., Pato, U. and Harun, N. (2016) 'PEMANFAATAN BUAH PEDADA (Sonneratia caseolaris) DAN PEMBUATAN FRUIT LEATHER UTILIZATION OF CRABAPPLE MANGROVE FRUIT (Sonneratia caseolaris) AND RED DRAGON FRUIT (Hylocereus polyrhizus) IN MAKING', *JOM Faperta*, 3(2), pp. 1–15.

Rahmat, R. R., Suyono, B. and Risma, R. (2019) 'PENGARUH PEMBERIAN JUS BUAH APEL MANALAGI (MALUS SYLVESTRIS) TERHADAP KADAR TRIGLISERIDA DARAH TIKUS PUTIH (RATTUS NORVEGICUS) JANTAN GALUR WISTAR YANG DIBERI DIET TINGGI LEMAK', *Medical and Health Science Journal*, 3(2), pp. 6–6. doi: 10.33086/MHSJ.V3I2.866.

Rahmawati, S. and Bundjali, B. (2012) 'Kinetics of the oxidation of vitamin C', *Indonesian Journal of Chemistry*, 12(3), pp. 291–296. doi: 10.22146/ijc.21345.

Rezaei, M. *et al.* (2013) 'Nitrite in hamburgers in Arak, Iran', *http://dx.doi.org/10.1080/19393210.2013.822933*, 6(4), pp. 285–288. doi: 10.1080/19393210.2013.822933.

Roidoung, S., Dolan, K. D. and Siddiq, M. (2017) 'Estimation of kinetic parameters of anthocyanins and color degradation in vitamin C fortified cranberry juice during storage', *Food Research International*, 94, pp. 29–35. doi: 10.1016/j.foodres.2017.01.013.

Rumawas, V. V, Nayoan, H. and Kumayas, N. (2021) 'Peran Pemerintah Dalam Mewujudkan Ketahanan Pangan di Kabupaten Minahasa Selatan (Studi Dinas Ketahanan Pangan Minahasa Selatan)', *GOVERNANCE*, 1(1).

Rusmono, M. and Nasution, Z. (2014) 'Pengolahan Hasil Pertanian', *Sifat Fisik dan Bahan Kimia Bahan Baku Industri*, pp. 1–24.

S Tannenbaum dan P Walstra (2000) 'Handbook of Water Analysis, Ed. by Leo M. L. Nollet, New York, Basel, Marcel Dekker, Inc.', *Semantic Scholar*, 921 pp. Available at: https://www.semanticscholar.org/paper/Handbook-of-Water-Analysis%2C-Ed.-by-Leo-M.-L.-New/246b6eebd6bfbbce11ce90be57c318bee5958668 (Accessed: 23 September 2021).

Safaryani, N., Haryanti, S. and Hastuti, E. D. (2007) 'Pengaruh Suhu dan Lama Penyimpanan terhadap Penurunan Kadar Vitamin C Brokoli (Brassica oleracea L)', *Anatomi Fisiologi*, XV(2), pp. 39–45. doi: 10.14710/baf.v15i2.2571.

Santoso, A. (2011) 'Serat Pangan (Dietary Fiber) dan Manfaatnya Bagi Kesehatan', *Magistra No.75 Th.XXIII*, (ISSN 0215-9511), pp. 35–40. doi: 10.1108/eb050265.

Saputra, M. N., Utama, I. M. S. and Yulianti, N. L. (2019) 'Efektifitas Emulsi Lilin Lebah Sebagai Bahan Pelapis Buah Jeruk Siam (Citrus nobilis Lour var. microcarpa) terhadap Mutu Selama Penyimpanan', *Jurnal BETA (Biosistem dan Teknik Pertanian)*, 7(2), pp. 263–270. doi: 10.24843/JBETA.2019.V07.I02.P06.

Sari, R. N. (2015) 'THE EFFECT OF CONCENTRATION CARRAGEENAN FLOUR AND GLYCEROL AS EDIBLE COATING AGAINST THE CHANGES IN QUALITY OF STROWBERRIES (Fragaria x ananassa) DURING STORAGE', *Jurnal Teknik Pertanian Lampung*, 4(4), pp. 305–314.

Schlueter, A. K. and Johnston, C. S. (2011) 'Vitamin C: Overview and update', *Complementary Health Practice Review*, 16(1), pp. 49–57. doi: 10.1177/1533210110392951.

SD, G. *et al.* (1994) 'Nitrate, nitrite and N-nitroso compounds', *European journal of pharmacology*, 292(1), pp. 1–38. doi: 10.1016/0926-6917(94)90022-1.

Setyadjit, S. dan (2018) 'FORMULASI ANTIFUNGAL KOMBINASI DARI EKSTRAK LIMBAH MANGGA DENGAN PENGAWET MAKANAN KOMERSIAL UNTUK PRESERVASI BUAH MANGGA', *Jurnal Penelitian Pascapanen Pertanian*, 14(1), pp. 22–34. Available at: http://ejurnal.litbang.pertanian.go.id/index.php/jpasca/article/view/8390 (Accessed: 10 January 2022).

Shokrzadeh, M. *et al.* (2007) 'The Measurement of Nitrate and Nitrite Content in Leek and Spinach Sampled from Central Cities of Mazandaran State of Iran', *World Applied Sciences Journal*, 2(2), pp. 121–124.

Silaban, S. D. *et al.* (2013) 'Pengaruh Suhu dan Lama Penyimpanan Terhadap Kandungan Total Asam, Kadar Gula serta Kematangan Buah Terung Belanda (Cyphomandra betacea Sent.)', *Buletin Anatomi dan Fisiologi*, 21(1), pp. 55–63. doi: 10.14710/baf.v21i1.6266.

Silalahi, F. *et al.* (2007) 'Pengaruh Sistem Lanjaran Dan Tingkat Kematangan Buah Terhadap Mutu Markisa Asam', *Jurnal Hortikultura*, 17(1), p. 85354. doi: 10.21082/jhort.v17n1.2007.p.

Soedomo, P. (2012) 'Uji Daya Hasil Lanjutan Tomat Hibrida di Dataran Tinggi Jawa Timur', *Jurnal Hortikultura*, 22(1), p. 8. doi: 10.21082/jhort.v22n1.2012.p8-13.

Suhariyono (no date) *Sejarah Perkembangan Apel di Indonesia – Balitjestro*. Available at: http://balitjestro.litbang.pertanian.go.id/sejarah-perkembangan-apel-di-indonesia/ (Accessed: 20 May 2021).

Sumiasih, I. H. *et al.* (2016) 'Studi Perubahan Kualitas Pascapanen Buah Belimbing Dengan Beberapa Pengemasan Dan Suhu Simpan', *Agrin*, 20(2), pp. 1410–1439.

Susanto, W. H. and Setyohadi, B. R. (2011) 'Pengaruh Varietas Apel (Malus sylvestris) dan Lama Fermentasi oleh Khamir Saccharomyces cerivisiae sebagai Perlakuan Pra-Pengolahan terhadap Karakteristik Sirup', *Jurnal Teknologi Pertanian*, 12(3), pp. 135–142.

Tadese, A. *et al.* (2014) 'Journal of Chemical and Pharmaceutical Research , 2014 , 6 (5): 880-888 Research Article Electrochemical determination and comparison of ascorbic acid in freshly prepared and bottled fruit juices : A cyclic voltammetric study', *Journal of Chemical and Pharmaceutical Research*, 6(5), pp. 880–888.

Taufik, Y., Sumartini and Endriana, W. (2020) 'KAJIAN PERBANDINGAN BUAH BLACK MULBERRY (Morus nigra L.) DENGAN AIR TERHADAP KARAKTERISTIK SPREADABLE PROCESSED CHEESE BLACK MULBERRY', *Pasundan Food Technology Journal*, 6(3), pp. 183–191. doi: 10.23969/pftj.v6i3.2175.

Tia Anggara, D. S., Suryanto, A. and Ainurrasjid, A. (2017) 'KENDALA PRODUKSI APEL (Malus sylvestris Mill) Var. MANALAGI DI DESA PONCOKUSUMO KABUPATEN MALANG', *Jurnal Produksi Tanaman*, 5(2). doi: 10.21176/PROTAN.V5I2.367.

Triasanti, N. R. (2017) 'Prediksi Kandungan Vitamin C menggunakan Jaringan Syaraf Tiruan (Artificial Neural Network) pada Buah Jambu Biji Merah (Psidium Guajava) Berbasis Citra Digital.' Malang: Universitas Brawijaya.

Ubi, B. E. (2004) 'External stimulation of anthocyanin biosynthesis in apple fruit', *Journal of Food Agriculture & Environment*, 2(2), pp. 65–70.

Undang-undang Republik Indonesia Nomor 18 Tahun 2012 (2012) *Pangan, Lembaran Negara Republik Indonesia tahun 2012 nomor 227*.

Wei, J. *et al.* (2017) 'Influence of irrigation during the growth stage on yield and quality in mango (Mangifera indica L)', *PLoS ONE*, 12(4), pp. 1–14. doi: 10.1371/journal.pone.0174498.

Wu, J. *et al.* (2007) 'Chemical compositional characterization of some apple cultivars', *Food Chemistry*, 103(1), pp. 88–93. doi: 10.1016/J.FOODCHEM.2006.07.030.

Wu, Y. C. and Feng, J. W. (2018) 'Development and Application of Artificial Neural Network', *Wireless Personal Communications*, 102(2), pp. 1645–1656. doi: 10.1007/s11277-017-5224-x.

Xu, K., Wang, A. and Brown, S. (2012) ‘Genetic characterization of the Ma locus with pH and titratable acidity in apple’, *Molecular Breeding*, 30(2), pp. 899–912. doi: 10.1007/s11032-011-9674-7.

Zhang, Y., Li, P. and Cheng, L. (2010) ‘Developmental changes of carbohydrates, organic acids, amino acids, and phenolic compounds in “Honeycrisp” apple flesh’, *Food Chemistry*, 123(4), pp. 1013–1018. doi: 10.1016/J.FOODCHEM.2010.05.053.

LAMPIRAN

Lampiran A. Tabel Rekapitulasi Hasil Penelitian

a. Kualitas Fisik

Sampel	Kekerasan (N)	Bobot (g)	Diameter (nm)	Volume (mL)	Warna		
					L	a	b
1	23,4	163	72,12	187	72,075	9,8	28,525
2	24,4	139	66,825	162	63,3	21,55	23,375
3	25,2	151	67,13	151	54,875	27,525	21,05
4	28,4	151	61,875	148	55,5	23,15	18,8
5	27,4	151	66,2	160	63,45	16,65	23,95
6	22,3	132	67,035	172	46,6	33,05	10,5
7	25,2	134	63,325	148	60,625	23,625	20
8	22	115	63,105	137	51,625	29,675	15,675
9	28,8	111	63,555	122	43,275	27,575	14,7
10	33,2	132	62,105	153	44,975	31,275	14,5
11	29,4	147	66,915	188	64,775	15,4	25,85
12	26	143	67,05	158	52,075	26,45	18,275
13	23,2	124	59,92	140	72,8	9,025	39,9
14	26,8	153	66,425	148	46,025	31,4	12,075
15	26,2	147	67,895	141	64,65	17,375	29,375
16	24,2	170	70,715	172	74,325	6,175	27,425
17	24,4	142	65,365	155	65,1	17,625	24,925
18	23,8	155	69,885	191	50,725	30,225	12,35
19	26,4	148	66,68	160	53,9	27,35	15,625
20	24,4	127	64,415	129	50,8	30,575	12,975
21	33,2	138	64,945	142	67,525	14,275	34,025
22	26,1	151	67,885	159	70,125	13,45	26,95
23	23,4	105	59,045	100	61,525	23,125	19,425
24	27,2	151	66,72	163	67,725	14,925	33,45

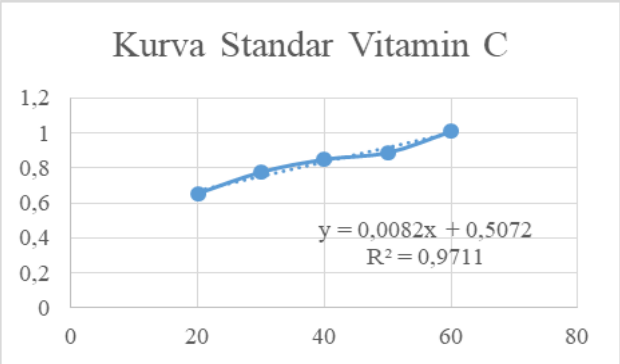
25	22,6	139	64,21	132	64,025	21,3	19,1
1	23,4	163	72,12	187	72,075	9,8	28,525

b. Kualitas Kimiawi dan Kadar Nitrat

Sampel	Total Asam (%)	TDS (°Brix)	Derajat Keasaman (pH)	Vitamin C (%)	Kadar Nitrat (mg/kg)
1	0,0015	11,6	4,58	0,1098	<30
2	0,0005	13,6	5,79	0,1330	<30
3	0,0015	13,7	5,09	0,1633	<30
4	0,0015	15,9	5,05	0,1320	<30
5	0,0005	14,6	5,55	0,1398	<30
6	0,0010	8,6	5,64	0,1429	<30
7	0,0010	11,8	4,92	0,1517	<30
8	0,0010	7,9	5,73	0,1545	<30
9	0,0015	13,5	4,85	0,1609	<30
10	0,0010	14,2	4,82	0,1749	<30
11	0,0020	12,4	4,64	0,1498	<30
12	0,0020	12,5	5,05	0,1346	<30
13	0,0020	15,8	4,72	0,1533	<30
14	0,0010	13,4	4,94	0,1294	<30
15	0,0020	14,7	4,75	0,1631	<30
16	0,0015	11,2	4,92	0,1292	<30
17	0,0010	13,3	5,27	0,1287	<30
18	0,0015	9,2	4,98	0,1245	<30
19	0,0010	12,8	5,28	0,1159	<30
20	0,0020	11,4	4,97	0,1036	<30
21	0,0015	15,3	5,06	0,0979	<30
22	0,0010	11,7	5	0,1048	<30

23	0,0020	10	4,92	0,1043	<30
24	0,0010	14,6	5,38	0,0918	<30
25	0,0010	13,3	4,98	0,0927	<30

Lampiran B. Kurva Standar Vitamin C



Lampiran C. Data Hasil Analisa Regresi Linear

Lampiran Tabel C.1 . Parameter Nondestruktif (Warna, Bobot, Volume, Diameter)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.010	6	.002	5.090	.001[b]
	Residual	.014	43	.000		
	Total	.025	49			

a. Dependent Variable: VItamin C

b. Predictors: (Constant), Diameter, L*, Volume, Bobot, a*, b*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.499	.105		4.763	.000
	L*	.000	.001	-.135	-.465	.644
	a*	-.001	.001	-.215	-.837	.407
	b*	.000	.001	.028	.107	.915
	Bobot	.001	.000	.434	1.855	.071
	Volume	.000	.000	-.196	-.891	.378
	Diameter	-.006	.001	-.802	-4.413	.000

a. Dependent Variable: VItamin C

Lampiran Tabel C.2 Parameter Fisik (Warna, Bobot, Volume, Diameter, Kekerasan)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.011	7	.002	5.104	.000[b]
	Residual	.013	42	.000		
	Total	.025	49			

a. Dependent Variable: Vitamin C

b. Predictors: (Constant), Kekerasan, L*, Volume, Diameter, a*, Bobot, b*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.434	.108		4.031	.000
	L*	.000	.001	-.056	-.198	.844
	a*	-.001	.001	-.209	-.837	.407
	b*	.000	.001	-.039	-.149	.882
	Bobot	.000	.000	.281	1.160	.253
	Volume	-9.239E-5	.000	-.093	-.420	.677
	Diameter	-.006	.001	-.720	-3.959	.000
	Kekerasan	.001	.001	.232	1.858	.070

a. Dependent Variable: Vitamin C

Lampiran Tabel C.3 Parameter Kimia (pH, Total Asam, Total Padatan Terlarut)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.009	3	.003	9.100	.000[b]
	Residual	.016	46	.000		
	Total	.025	49			

a. Dependent Variable: Vitamin C

b. Predictors: (Constant), Total Padatan Terlarut, Total Asam, pH

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.249	.055		4.519	.000
	pH	-.024	.010	-.303	-2.414	.020
	Total Asam	-.300	.059	-.615	-5.069	.000
	Total Padatan Terlarut	.000	.001	-.028	-.233	.817

a. Dependent Variable: Vitamin C

Lampiran Tabel C.4 Parameter Warna

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	3	.000	.111	.953[b]
	Residual	.025	46	.001		
	Total	.025	49			

a. Dependent Variable: Vitamin C

b. Predictors: (Constant), b*, a*, L*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.096	.079		1.214	.231
	L*	.000	.001	.059	.169	.866
	a*	.001	.001	.136	.438	.664
	b*	4.168E-5	.002	.009	.027	.978

a. Dependent Variable: Vitamin C

Lampiran Tabel C.5 Semua Parameter Uji (Bobot, Diameter, Volume, Kekerasan, Warna, pH, Total Asam, Total Padatan Terlarut)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.014	10	.001	4.920	.000[b]
	Residual	.011	39	.000		
	Total	.025	49			

a. Dependent Variable: Vitamin C

b. Predictors: (Constant), Total Padatan Terlarut, Volume, pH, L*, Kekerasan, Total Asam, Diameter, a*, Bobot, b*

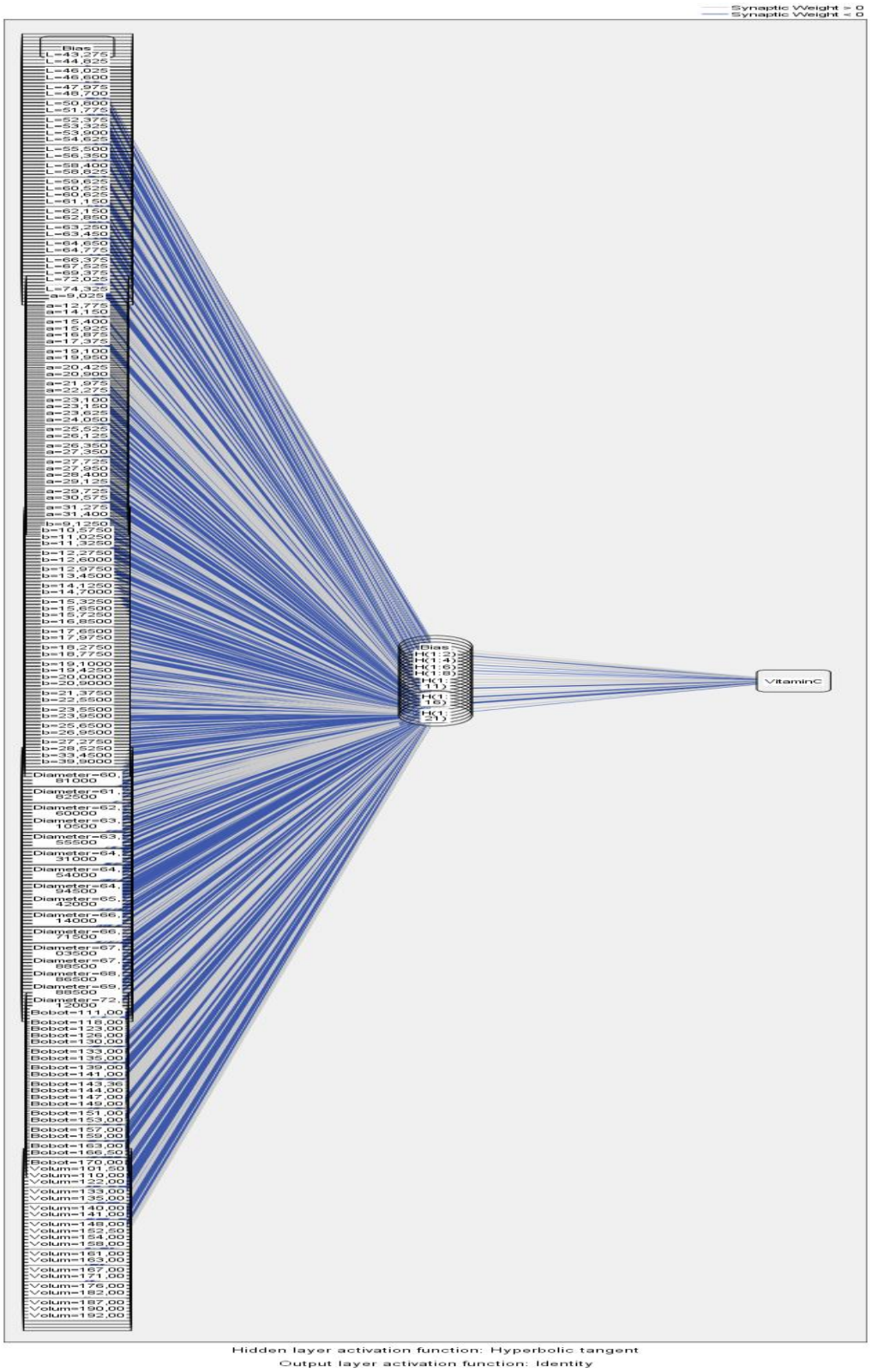
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.490	.121		4.061	.000
	L*	-.001	.001	-.248	-.810	.423
	a*	-.002	.001	-.413	-1.680	.101
	b*	-1.118E-6	.001	.000	-.001	.999
	Bobot	.000	.000	.098	.400	.691
	Volume	.000	.000	.130	.571	.571
	Diameter	-.004	.001	-.520	-2.742	.009
	Kekerasan	.001	.001	.204	1.655	.106
	pH	-.017	.010	-.218	-1.642	.109
	Total Asam	-.217	.078	-.446	-2.780	.008
	Total Padatan Terlarut	.000	.002	-.028	-.183	.856

a. Dependent Variable: Vitamin C

Lampiran D. Data Hasil Analisa Jaringan Syaraf Tiruan (JST)

Lampiran Tabel D.1 . Parameter Nondestruktif (Warna, Bobot, Volume, Diameter)



Model Summary

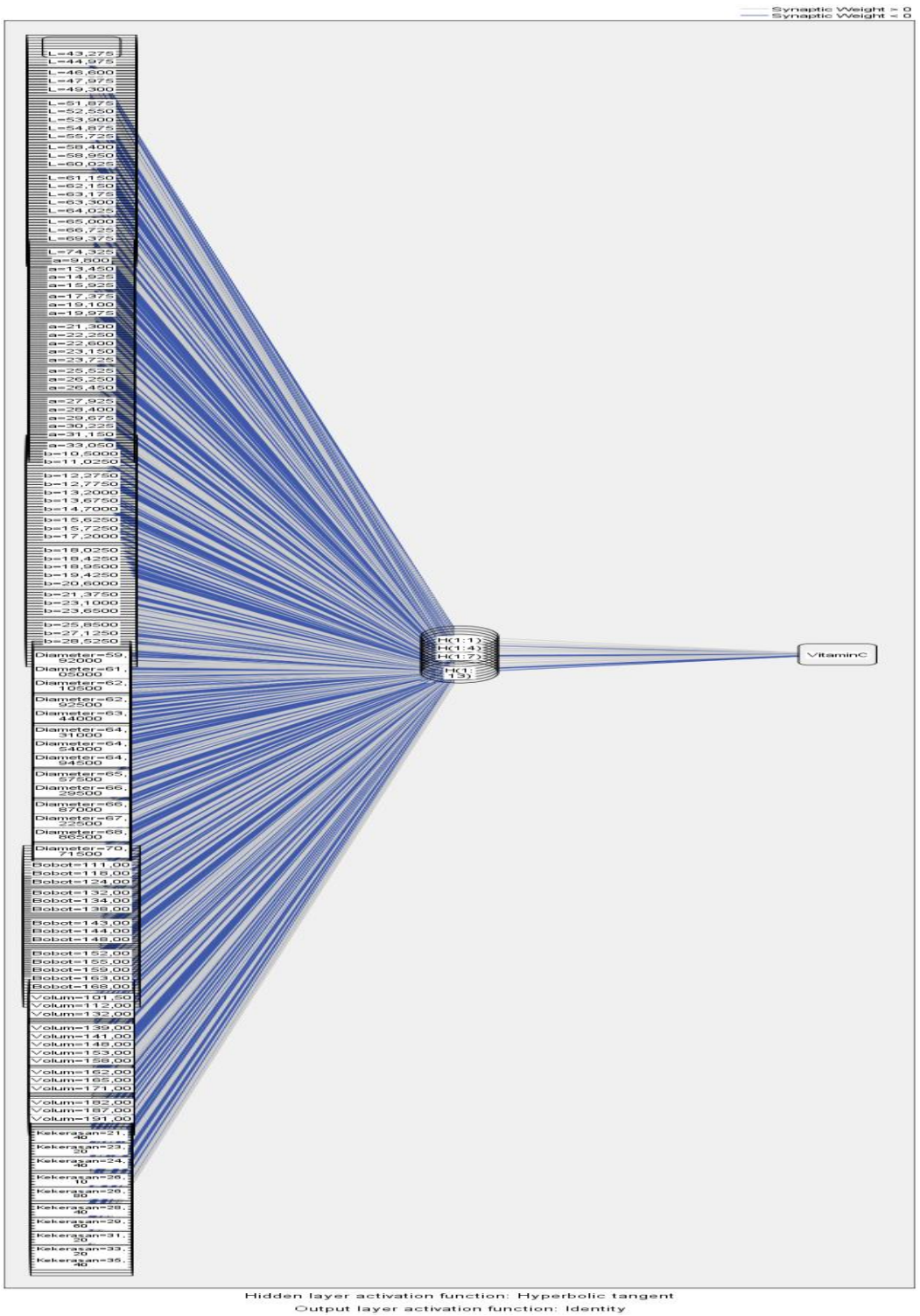
Training	Sum of Squares Error	.021
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (, 001) achieved
	Training Time	0:00:01,44

Dependent Variable: VitaminC

Independent Variable Importance

	Importance	Normalized Importance
L	.176	100.0%
a	.157	88.9%
b	.164	93.1%
Diameter	.176	99.6%
Bobot	.157	88.9%
Volum	.170	96.2%

Lampiran Tabel D.2 Parameter Fisik (Warna, Bobot, Volume, Diameter, Kekerasan)



Model Summary

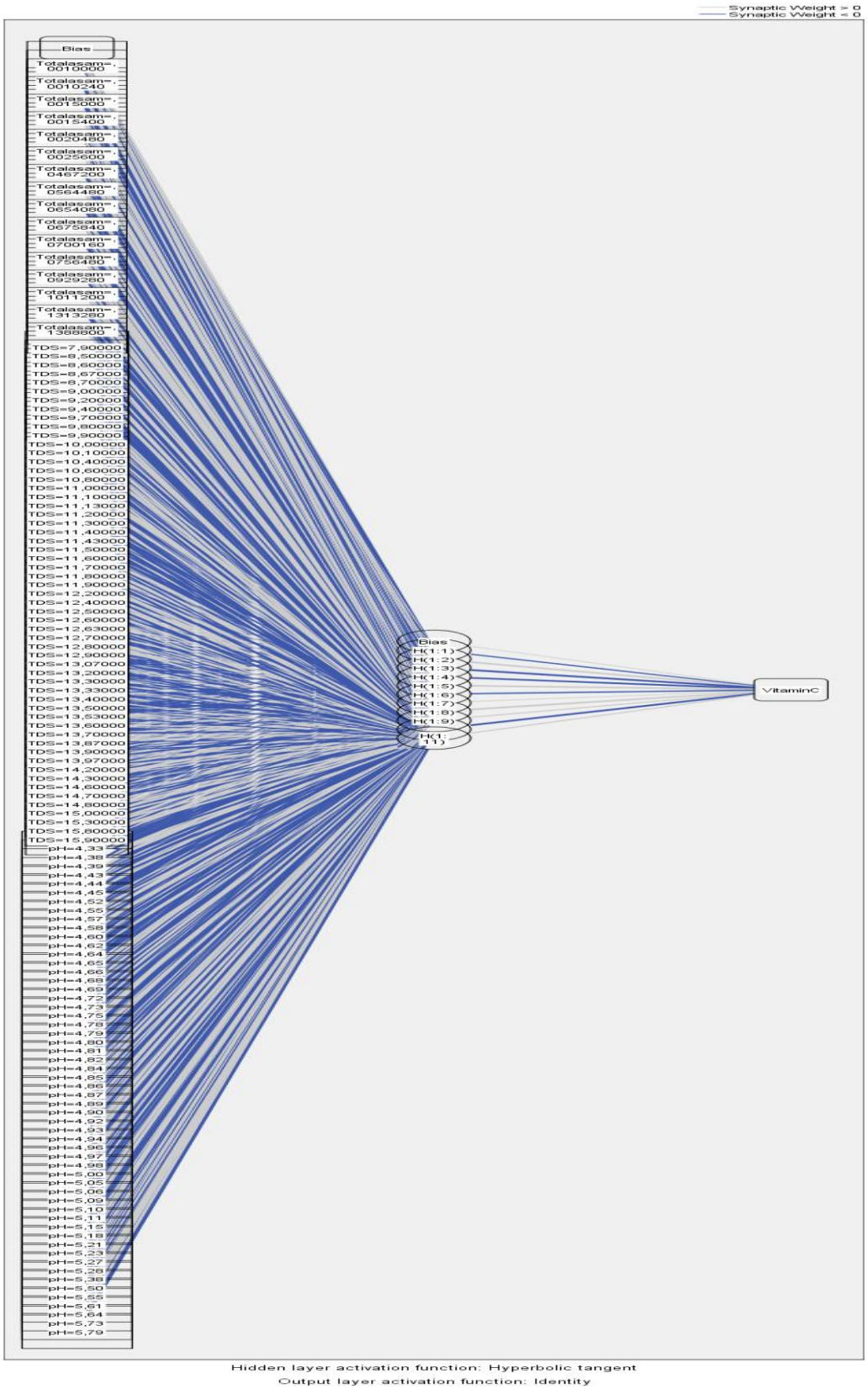
Training	Sum of Squares Error	.017
	Relative Error	.000
	Stopping Rule Used	Training error ratio criterion (, 001) achieved
	Training Time	0:00:02,09

Dependent Variable: VitaminC

Independent Variable Importance

	Importance	Normalized Importance
L	.149	90.9%
a	.141	86.2%
b	.151	92.5%
Diameter	.124	76.2%
Bobot	.163	100.0%
Volum	.139	85.2%
Kekerasan	.133	81.2%

Lampiran Tabel D.3 Parameter Kimia (pH, Total Asam, Total Padatan Terlarut)



Model Summary

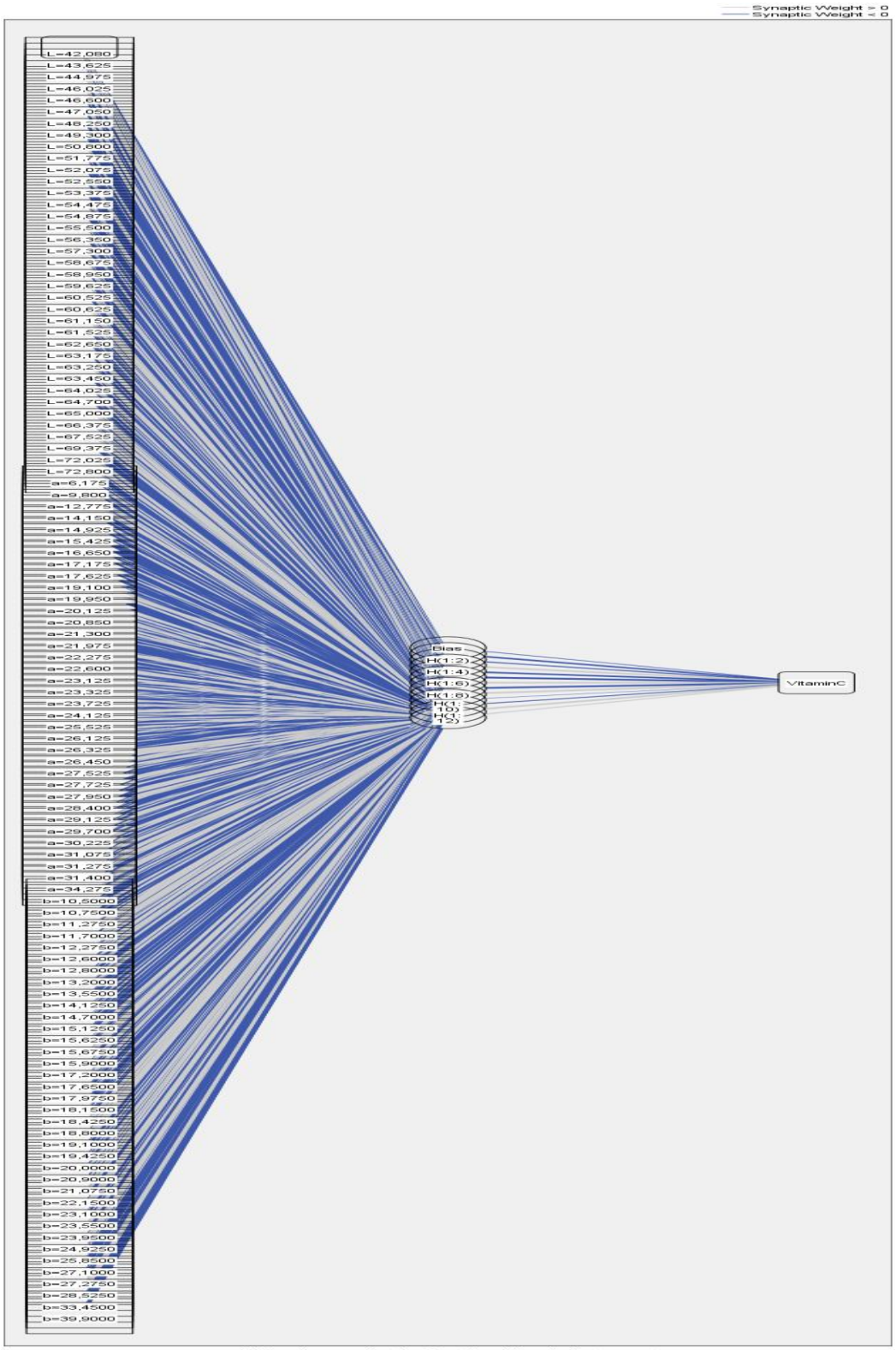
Training	Sum of Squares Error	.035
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (, 001) achieved
	Training Time	0:00:00,52

Dependent Variable: VitaminC

Independent Variable Importance

	Importance	Normalized Importance
Totalasam	.311	85.6%
TDS	.326	89.9%
pH	.363	100.0%

Lampiran Tabel D.4 Parameter Warna



Model Summary

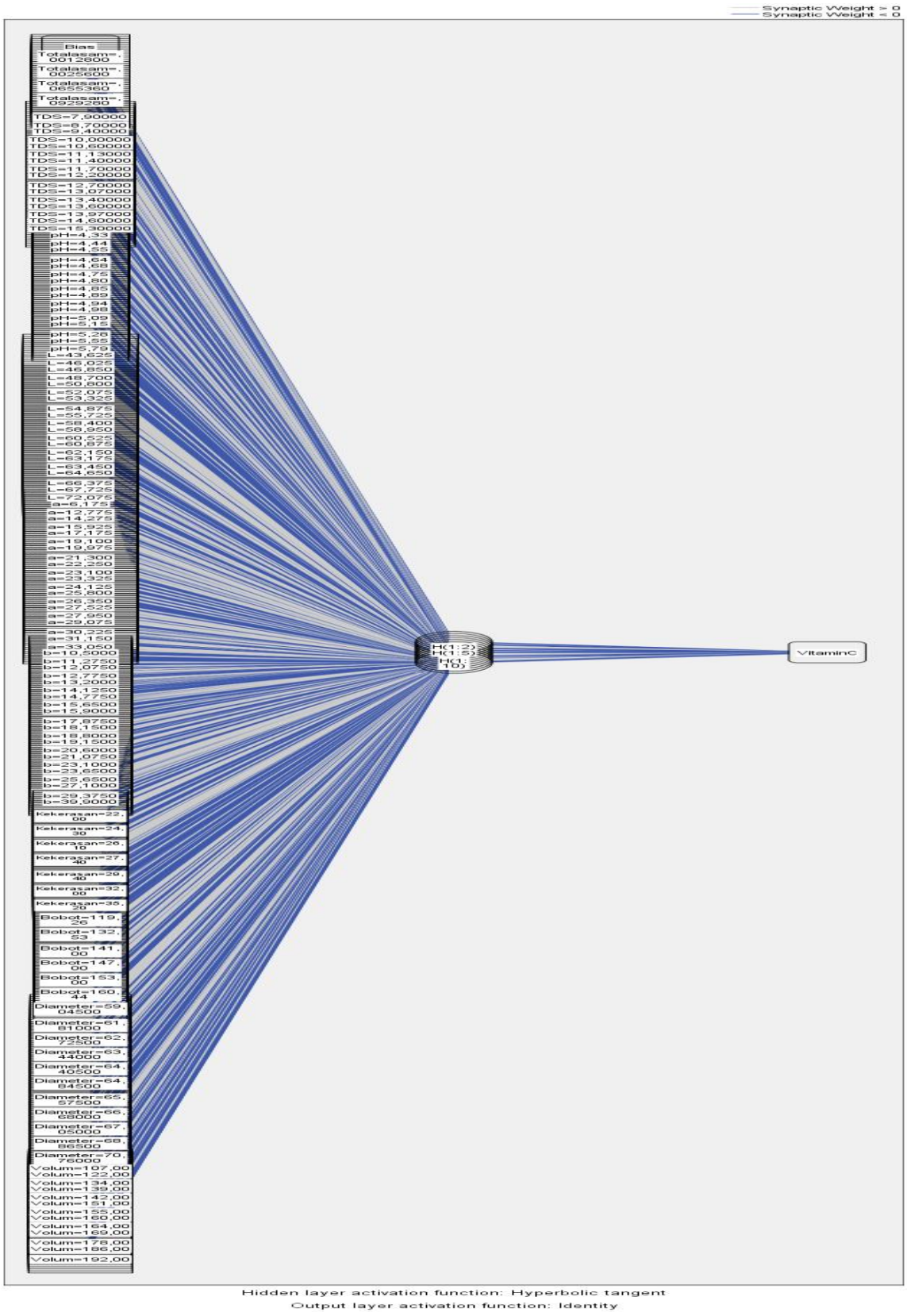
Training	Sum of Squares Error	.032
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (, 001) achieved
	Training Time	0:00:00,45

Dependent Variable: VitaminC

Independent Variable Importance

	Importance	Normalized Importance
L	.328	92.7%
a	.353	100.0%
b	.319	90.2%

Lampiran Tabel D.5 Semua Parameter Uji (Bobot, Diameter, Volume, Kekerasan, Warna, pH, Total Asam, Total Padatan Terlarut)



Model Summary

Training	Sum of Squares Error	.035
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (, 001) achieved
	Training Time	0:00:01,96

Dependent Variable: VitaminC

Independent Variable Importance

	Importance	Normalized Importance
Totalasam	.093	77.9%
TDS	.109	91.9%
pH	.090	75.3%
L	.119	100.0%
a	.118	98.8%
b	.100	84.0%
Kekerasan	.087	73.4%
Bobot	.086	72.2%
Diameter	.096	80.9%
Volum	.102	85.3%

Lampiran E. Uji Inpendent T-Test

Lampiran Tabel E.1 . Parameter Nondestruktif (Warna, Bobot, Volume, Diameter)

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitamin C	Equal variances assumed	.000	.984	.065	48	.948	.0002838824	.0043618492	-.0084862032	.0090539680
	Equal variances not assumed			.065	47.999	.948	.0002838824	.0043618492	-.0084862099	.0090539746

Lampiran Tabel E.2 Parameter Fisik (Warna, Bobot, Volume, Diameter, Kekerasan)

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitamin C	Equal variances assumed	.000	.994	.013	48	.990	.0000552177	.0043405369	-.0086720167	.0087824521
	Equal variances not assumed			.013	47.999	.990	.0000552177	.0043405369	-.0086720210	.0087824564

Lampiran Tabel E.3 Parameter Kimia (pH, Total Asam, Total Padatan Terlarut)

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitamin C	Equal variances assumed	.000	.984	-.011	48	.991	-.0000477464	.0043559183	-.0088059071	.0087104143
	Equal variances not assumed			-.011	48.000	.991	-.0000477464	.0043559183	-.0088059087	.0087104159

Lampiran Tabel E.4 Parameter Warna

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitamin C	Equal variances assumed	.000	.999	.080	48	.937	.0003488926	.0043644396	-.0084264014	.0091241866
	Equal variances not assumed			.080	47.998	.937	.0003488926	.0043644396	-.0084264113	.0091241965

Lampiran Tabel E.5 Semua Parameter Uji (Bobot, Diameter, Volume, Kekerasan, Warna, pH, Total Asam, Total Padatan Terlarut)

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Vitamin C	Equal variances assumed	.005	.945	-.014	48	.989	-.0000622838	.0043877900	-.0088845268	.0087599593
	Equal variances not assumed			-.014	47.986	.989	-.0000622838	.0043877900	-.0088845938	.0087600263