



DAFTAR PUSTAKA

- Abete, I., Perez-cornago, A., Navas-carretero, S., Bondia-pons, I., Zulet, M. A., & Martinez, J. A., 2013. A regular lycopene enriched tomato sauce consumption influences antioxidant status of healthy young-subjects : A crossover study. *Journal of Functional Foods*, 5(1), 28–35.
- Agrawal, B. K., & Bose, K. S. C., 2007. Effect of lycopene from cooked tomatoes on serum antioxidant enzymes, lipid peroxidation rate and lipid profile in coronary heart disease. *Singapore Medical Journal*, 48(5), 415–420.
- Ali, Y., Ali, A., Sina, I., Khandker, S. S., Neesa, L., Tanvir, E. M., Kabir, A., Khalil, I., & Gan, S. H., 2021. Nutritional Composition and Bioactive Compounds in Tomatoes and Their Impact on Human Health and Disease : A Review. *Foods*, 10(45).
- Alvi, S. S., Ansari, I. A., Ahmad, M. K., Iqbal, J., & Khan, M. S., 2017. Lycopene amends LPS induced oxidative stress and hypertriglyceridemia via modulating PCSK-9 expression and Apo-CIII mediated lipoprotein lipase activity. *Biomedicine and Pharmacotherapy*, 96, 1082–1093.
- Aronson, J. K., 2017. Defining ‘Nutraceuticals’: neither Nutritious nor Pharmaceutical. *British Journal of Clinical Pharmacology*, 83, 8–19.
- Arranz, S., Martínez-huéamo, M., Vallverdu-queralt, A., Valderas-martinez, P., Illán, M., Sacanella, E., Escribano, E., Estruch, R., & Lamuela-Raventos, R. M., 2015. Influence of olive oil on carotenoid absorption from tomato juice and effects on postprandial lipemia. *FOOD CHEMISTRY*, 168, 203–210.
- Asgary, S., Soltani, R., Daraei, F., Salehizadeh, L., Vaseghi, G., & Sarrafzadegan, N., 2021. The effect of lycopene on serum level of cardiac biomarkers in patients undergoing elective percutaneous coronary intervention: A randomized controlled clinical trial. *ARYA Atherosclerosis*, 17(1), 1–7.
- Biddle, M. J., Lennie, T. A., Bricker, G. V., Kopec, R. E., Schwartz, S. J., & Moser, D. K., 2015. Lycopene Dietary Intervention: A pilot study in patients with heart failure. *Journal of Cardiovascular Nursing*, 30(3), 205–212.
- Biddle, M., Moser, D., Song, E. K., Heo, S., Payne-Emerson, H., Dunbar, S. B., Pressler, S., & Lennie, T., 2013. Higher dietary lycopene intake is associated with longer cardiac event-free survival in patients with heart failure. *European Journal of Cardiovascular Nursing*, 12(4), 377–384.
- Bose, K. S. C., & Agrawal, B. K., 2007. Effect of Lycopene from Tomatoes (Cooked) on Plasma Antioxidant Enzymes , Lipid Peroxidation Rate and Lipid Profile in Grade-I Hypertension. *Annals of Nutrition & Metabolism*, 51, 477–481.
- Burton-Freeman, B., Talbot, J., Park, E., Krishnankutty, S., & Edirisinghe, I., 2012. Protective activity of processed tomato products on postprandial oxidation and inflammation: A clinical trial in healthy weight men and women. *Molecular Nutrition and Food Research*, 56, 622–631.



- Caseiro, M., Ascenso, A., Costa, A., Creagh-flynn, J., Johnson, M., & Simões, S., 2020. Lycopene in Human Health. *LWT - Food Science and Technology*, 127. <https://doi.org/10.1016/j.lwt.2020.109323>
- Chaudhary, P., Sharma, A., Singh, B., & Kaur, A., 2018. Bioactivities of Phytochemicals Present in Tomato. *Journal of Food Science and Technology*, 55(8), 2833–2849.
- Chiu, Y. T., Chiu, C. P., Chien, J. T., Ho, G. H., Yang, J., & Chen, B. H., 2007. Encapsulation of lycopene extract from tomato pulp waste with gelatin and poly(γ -glutamic acid) as carrier. *Journal of Agricultural and Food Chemistry*, 55(13), 5123–5130.
- Colmán-Martínez, M., Martínez-Huélamo, M., Valderas-Martínez, P., Arranz-Martínez, S., Almanza-Aguilera, E., Corella, D., Estruch, R., & Lamuela-Raventós, R. M., 2017. trans-Lycopene from tomato juice attenuates inflammatory biomarkers in human plasma samples: An intervention trial. *Molecular Nutrition and Food Research*, 1–29.
- Cornelli, U., 2009. Antioxidant Use in Nutraceuticals. *Clinics in Dermatology*, 27(2), 175–194.
- Costa, J. P. da., 2017. A Current Look at Nutraceuticals - Key Concepts and Future Prospects. *Trends in Food Science & Technology*, 62, 68–78.
- Cuevas-ramos, D., Almeda-valdés, P., Chávez-manzanera, E., Meza-arana, C. E., Brito-córdova, G., Mehta, R., Pérez-Méndez, O., & Gómez-Pérez, F. J., 2013. Effect of tomato consumption on high-density lipoprotein cholesterol level : a randomized, single-blinded, controlled clinical trial. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, 6, 263–273.
- Das, L., Bhaumik, E., & Raychaudhuri, U., 2012. Role of Nutraceuticals in Human Health. *Journal Food ScienceTechnology*, 49, 173–183.
- Deng, Y., Zhao, S., Yang, X., Hou, F., Fan, L., & Wang, W., 2021. Evaluation of Extraction Technologies of Lycopene : Hindrance of Extraction, Effects on Isomerization and Comparative Analysis - A Review. *Trends in Food Science & Technology*, 115, 285–296.
- Dima, C., Assadpour, E., Dima, S., & Jafari, S. M., 2020. Bioavailability of Nutraceuticals: Role of the Food Matrix, Processing Conditions, the Gastrointestinal Tract, and Nanodelivery Systems. *Comprehensive Reviews In Food Science And Food Safety*, 19, 954–994.
- Durante, M., Milano, F., de Caroli, M., Giotta, L., Piro, G., Mita, G., Frigione, M., & Lenucci, M. S., 2020. Tomato oil encapsulation by α -, β -, and γ -Cyclodextrins: A comparative study on the formation of supramolecular structures, antioxidant activity, and carotenoid stability. *Foods*, 9(1553).
- Engelhard, Y. N., Gazer, B., & Paran, E., 2006. Natural antioxidants from tomato extract reduce blood pressure in patients with grade-1 hypertension : A double-blind , placebo-controlled pilot study. *American Heart Journal*, 151(1), 1–



6.

- Espin, J. C., Garcia-Conesa, M. T., & Tomas-Barberan, F. A., 2007. Nutraceuticals : Facts and Fiction. *Phytochemistry*, 68, 2986–3008.
- Ferreira-Santos, P., Aparicio, R., Carrón, R., Sevilla, M. Á., Monroy-Ruiz, J., & Montero, M. J., 2018. Lycopene-supplemented diet ameliorates cardiovascular remodeling and oxidative stress in rats with hypertension induced by Angiotensin II. *Journal of Functional Foods*, 47, 279–287.
- Ferro, Y., Mazza, E., Angotti, E., Pujia, R., Mirarchi, A., Salvati, M. A., Terracciano, R., Savino, R., Romeo, S., Scuteri, A., Mare, R., Costanzo, F. S., Pujia, A., & Montalcini, T., 2021. Effect of a novel functional tomato sauce (OsteoCol) from vine - ripened tomatoes on serum lipids in individuals with common hypercholesterolemia : tomato sauce and hypercholesterolemia. *Journal of Translational Medicine*, 19(19), 1–12.
- Gajendragadkar, P. R., Hubsch, A., Mäki-Petäjä, K. M., Serg, M., Wilkinson, I. B., & Cherian, J., 2014. Effects of oral lycopene supplementation on vascular function in patients with cardiovascular disease and healthy volunteers: A randomised controlled trial. *PLoS ONE*, 9(6).
- Ghavipour, M., Saedisomeolia, A., Djalali, M., Sotoudeh, G., Eshraghyan, M. R., Moghadam, A. M., & Wood, L. G., 2013. Tomato juice consumption reduces systemic inflammation in overweight and obese females. *British Journal of Nutrition*, 109, 2031–2035.
- González-sarrías, A., Larrosa, M., García-conesa, M. T., Tomás-barberán, F. A., & Espín, J. C., 2013. Nutraceuticals for Older People: Facts, Fictions and Gaps in Knowledge. *Maturitas*, 75(4), 313–334.
- Grabowska, M., Wawrzyniak, D., Rolle, K., Chomczyński, P., Oziewicz, S., Jurga, S., & Barciszewski, J., 2019. Let Food be Your Medicine: Nutraceutical Properties of Lycopene. *Food & Function*, 10, 3090–3102.
- Gulcin, İ., 2020. Antioxidants and Antioxidant Methods: An Updated Overview. In *Archives of Toxicology* (Vol. 94, Issue 3).
- He, Q., Zhou, W., Xiong, C., Tan, G., & Chen, M., 2015. Lycopene attenuates inflammation and apoptosis in post.myocardial infarction remodeling by inhibiting the nuclear factor-κB signaling pathway. *Molecular Medicine Reports*, 11, 374–378.
- Hirose, A., Terauchi, M., Tamura, M., Akiyoshi, M., Owa, Y., Kato, K., & Kubota, T., 2015. Tomato juice intake increases resting energy expenditure and improves hypertriglyceridemia in middle-aged women: an open-label, single-arm study. *Nutrition Journal*, 14(34).
- Irshad, M., & Chaudhuri, P. S., 2002. Oxidant-antioxidant System : Role and Significance in Human Body. *Indian Journal of Experimental Biology*, 40, 1233–1239.
- Jacques, P. F., Lyass, A., Massaro, J. M., Vasan, R. S., & D'Agostino Sr, R. B.,



2013. Relationship of Lycopene Intake and Consumption of Tomato Products to Incident CVD. *British Journal of Nutrition*, 110, 545–551.
- Jain, S., Winuprasith, T., & Suphantharika, M., 2020. Encapsulation of lycopene in emulsions and hydrogel beads using dual modified rice starch: Characterization, stability analysis and release behaviour during in-vitro digestion. *Food Hydrocolloids*, 104.
- Kadenbach, B., Ramzan, R., & Vogt, S., 2009. Degenerative Diseases, Oxidative Stress and Cytochrome C Oxidase Function. *Trends in Molecular Medicine*, 15(4), 138–147.
- Kancheva, V. D., & Kasaikina, O. T., 2013. Bio-Antioxidants – A Chemical Base of Their Antioxidant Activity and Beneficial Effect on Human Health. *Current Medicinal Chemistry*, 20(1).
- Kaya, E., Keskin, L., Aydogdu, I., Kuku, I., Bayraktar, N., & Erkut, M., 2005. Oxidant/antioxidant Parameters and their Relationship with Chemotherapy in Hodgkin's Lymphoma. *The Journal of International Medical Research*, 33, 687–692.
- Kim, J., & Choi, S. J., 2020. Improving the stability of lycopene from chemical degradation in model beverage emulsions: Impact of hydrophilic group size of emulsifier and antioxidant polarity. *Foods*, 9(8).
- Kim, J. Y., Lee, J., Han, Y., Lee, J. H., Bae, I., & Yoon, Y. M., 2015. Pretreatment with Lycopene Attenuates Oxidative Stress-Induced Apoptosis in Human Mesenchymal Stem Cells. *Biomolecules & Therapeutics*, 23(6), 517–524.
- Kong, K. W., Khoo, H. E., Prasad, K. N., Ismail, A., Tan, C. P., & Rajab, N. F., 2010. Revealing the power of the natural red pigment lycopene. *Molecules*, 15, 959–987.
- Krasinska, B., Osińska, A., Osinski, M., Krasinska, A., Rzymski, P., Tykarski, A., & Krasinski, Z., 2018. Standardised tomato extract as an alternative to acetylsalicylic acid in patients with primary hypertension and high cardiovascular risk – a randomised, controlled trial. *Arch Med Sci*, 14(4), 773–780.
- Li, X. L., & Xu, J. H., 2013. Lycopene supplement and blood pressure: An updated meta-analysis of intervention trials. *Nutrients*, 5, 3696–3712.
- Li, X. N., Lin, J., Xia, J., Qin, L., Zhu, S. Y., & Li, J. L., 2017. Lycopene mitigates atrazine-induced cardiac inflammation via blocking the NF-κB pathway and NO production. *Journal of Functional Foods*, 29, 208–216.
- Liang, X., Ma, C., Yan, X., Liu, X., & Liu, F., 2019. Advances in Research on Bioactivity, Metabolism, Stability and Delivery Systems of Lycopene. *Trends in Food Science and Technology*, 93, 185–196.
- Lobo, V., Patil, A., Phatak, A., & Chandra, N., 2010. Free Radicals, Antioxidants and Functional Foods : Impact on Human Health. *Pharmacognosy Reviews*, 4(8), 118–126.



- Mangge, H., Becker, K., Fuchs, D., & Gostner, J. M., 2014. Antioxidants, inflammation and cardiovascular disease. *World Journal of Cardiology*, 6(6), 462–477.
- McEneny, J., Wade, L., Young, I. S., Masson, L., Duthie, G., McGinty, A., McMaster, C., & Thies, F., 2013. Lycopene intervention reduces inflammation and improves HDL functionality in moderately overweight middle-aged individuals. *Journal of Nutritional Biochemistry*, 24, 163–168.
- Meroni, E., & Raikos, V., 2018. Lycopene in beverage emulsions: Optimizing formulation design and processing effects for enhanced delivery. *Beverages*, 4(14).
- Michaličková, D., Belović, M., Ilić, N., Kotur-Stevuljević, J., Slanař, O., & Šobajić, S., 2019. Comparison of Polyphenol-Enriched Tomato Juice and Standard Tomato Juice for Cardiovascular Benefits in Subjects with Stage 1 Hypertension: a Randomized Controlled Study. *Plant Foods for Human Nutrition*.
- Montiel-Ventura, J., Luna-Guevara, J. J., Tornero-Campante, M. A., Delgado-Alvarado, A., & Luna-Guevara, M. L., 2018. Study of encapsulation parameters to improve content of lycopene in tomato (*Solanum lycopersicum* L.) powders. *Acta Alimentaria*, 47(2), 135–142.
- Mozos, I., Stoian, D., Caraba, A., Malainer, C., Horbanczuk, J. O., & Atanasov, A. G., 2018. Lycopene and vascular health. *Frontiers in Pharmacology*, 9(521), 1–16.
- Nagao, A., 2014. Bioavailability of dietary carotenoids: Intestinal absorption and metabolism. *Japan Agricultural Research Quarterly*, 48(4), 385–392.
- Nasri, H., Baradaran, A., Shirzad, H., & Kopaei, M. R., 2014. New Concepts in Nutraceuticals as Alternative for Pharmaceuticals. *International Journal of Preventive Medicine*, 5(12), 1487–1499.
- Nicola, S., & Tibaldi, G., 2009. Tomato Production Systems and Their Application to the Tropics. *Acta Holticulturae*, 821(1), 27–33.
- Nishimura, M., Tominaga, N., Ishikawa-Takano, Y., Maeda-Yamamoto, M., & Nishihira, J., 2019. Effect of 12-Week Daily Intake of the High-Lycopene Tomato (*Solanum lycopersicum*), a Variety Named “PR-7”, on Lipid Metabolism: A Randomized, Double-Blind, Placebo-Controlled, Parallel-Group Study. *Nutrients*, 11(1177), 1–13.
- Odai, T., Terauchi, M., Okamoto, D., Hirose, A., & Miyasaka, N., 2019. Unsalted tomato juice intake improves blood pressure and serum low - density lipoprotein cholesterol level in local Japanese residents at risk of cardiovascular disease. *Food Science & Nutrition*, 7, 2271–2279.
- Osińska, A. N., Begier-krasińska, B., Rzymski, P., Krasińska, A., Tykarski, A., & Krasiński, Z., 2017. The influence of adding tomato extract and acetylsalicylic acid to hypotensive therapy on the daily blood pressure profiles of patients



with arterial hypertension and high cardiovascular risk. *Kardiochirurgia i Torakochirurgia Polska*, 14(4), 245–252.

Palozza, P., Catalano, A., Simone, R. E., Mele, M. C., & Cittadini, A., 2012. Effect of lycopene and tomato products on cholesterol metabolism. *Annals of Nutrition and Metabolism*, 61(2), 126–134.

Pandey, M., Verma, R. K., & Saraf, S. A., 2010. Nutraceuticals: New Era of Medicine and Health. *Asian Journal of Pharmaceutical and Clinical Research*, 3(1).

Pellegrino, D., 2016. Antioxidants and Cardiovascular Risk Factors. *Disease*, 4(11).

Petyaev, I., Dovgalevsky, P., Chalyk, N., Klochkov, V., & Kyle, N., 2016. Lycopene Embedded into Cocoa Butter Micelles of Dark Chocolate Causes Dose-dependent Decrease in Serum Lipids of Hypercholesterolemic Volunteers. *British Journal of Medicine and Medical Research*, 13(11), 1–11.

Petyaev, I. M., Chalyk, N. E., Klochkov, V. A., Pristenskiy, D. V., Chernyshova, M. P., & Kyle, N. H., 2019. Ingestion of Lycosome L-tug Formulation of Dark Chocolate Ameliorates Postprandial Hyperlipidemia and Hyperglycemia in Healthy Volunteers. *Advances in Preventive Medicine*, 2019, 1–8.

Petyaev, I. M., Dovgalevsky, P. Y., Chalyk, N. E., Klochkov, V., & Kyle, N. H., 2014. Reduction in blood pressure and serum lipids by lycosome formulation of dark chocolate and lycopene in prehypertension. *Food Science & Nutrition*, 2(6), 734–743.

Petyaev, I. M., Dovgalevsky, P. Y., Klochkov, V. A., Chalyk, N. E., Pristensky, D. V., Chernyshova, M. P., Uдумян, Р., Kocharyan, Т., Kyle, N. H., Lozbiakova, M. V., & Bashmakov, Y. K., 2018. Effect of lycopene supplementation on cardiovascular parameters and markers of inflammation and oxidation in patients with coronary vascular disease. *Food Research International*, 1–8.

Rahman, T., Hosen, I., Islam, M. M. T., & Shekhar, H. U., 2012. Oxidative Stress and Human Health. *Advances in Bioscience and Biotechnology*, 3, 997–1019.

Rao, A. V., & Rao, L. G., 2007. Carotenoids and Human Health. *Pharmacological Research*, 55(3), 207–216.

Ried, K., Frank, O. R., & Stocks, N. P., 2009. Dark chocolate or tomato extract for prehypertension : a randomised controlled trial. *BMC Complementary and Alternative Medicine*, 9(22).

Ruan, Y., Guo, Y., Zheng, Y., Huang, Z., Sun, S., Kowal, P., Shi, Y., & Wu, F., 2018. Cardiovascular disease (CVD) and associated risk factors among older adults in six low-and middle-income countries : results from SAGE Wave 1. *BMC Public Health*, 18(778), 1–13.

Saini, R. K., Rengasamy, K. R. R., Mahomoodally, F. M., & Keum, Y. S., 2020. Protective Effects of Lycopene in Cancer, Cardiovascular, and Neurodegenerative Diseases: An Update on Epidemiological and Mechanistic



- Perspectives. *Pharmacological Research*, 155, 104730.
- Salvia-Trujillo, L., & McClements, D. J., 2016. Enhancement of lycopene bioaccessibility from tomato juice using excipient emulsions: Influence of lipid droplet size. *Food Chemistry*, 210, 295–304.
- Scott, J., 2004. Pathophysiology and biochemistry of cardiovascular disease. *Current Opinion in Genetics and Development*, 14(3), 271–279.
- Singh, J., & Sinha, S., 2012. Classification, Regulatory Acts and Applications of Nutraceuticals for Health. *International Journal of Pharmacy and Biological Sciences*, 2(1), 177–187.
- Singh, M., Gujjar, R. S., Karkute, S. G., & Tiwari, S. K., 2016. *Biology of Solanum lycopersicum* (Tomato) (Issue 1).
- Stahl, W., & Sies, H., 2003. Antioxidant Activity of Carotenoids. *Molecular Aspect of Medicine*, 24, 345–351.
- Thies, F., Masson, L. F., Rudd, A., Vaughan, N., Tsang, C., Brittenden, J., Simpson, W. G., Duthie, S., Horgan, G. W., & Duthie, G., 2012. Effect of a tomato-rich diet on markers of cardiovascular disease risk in moderately overweight, disease-free, middle-aged adults: A randomized controlled trial. *American Journal of Clinical Nutrition*, 95, 1013–1022.
- Tierney, A. C., Rumble, C. E., Billings, L. M., & George, E. S., 2020. Effect of Dietary and Supplemental Lycopene on Cardiovascular Risk Factors : A Systematic Review and Meta-Analysis. *American Society for Nutrition*, 11(8), 1453–1488.
- Valderas-Martinez, P., Chiva-Blanch, G., Casas, R., Arranz, S., Martínez-Huélamo, M., Urpi-Sarda, M., Torrado, X., Corella, D., Lamuela-Raventós, R. M., & Estruch, R., 2016. Tomato sauce enriched with olive oil exerts greater effects on cardiovascular disease risk factors than raw tomato and tomato sauce: A randomized trial. *Nutrients*, 8(170), 1–14.
- Wang, W., & Kang, P. M., 2020. Oxidative stress and inflammation in cardiovascular diseases. *Antioxidants*, 9(1292).
- Wolak, T., Sharoni, Y., Levy, J., Linnewiel-hermoni, K., Stepensky, D., & Paran, E., 2019. Effect of Tomato Nutrient Complex on Blood Pressure : A Double Blind , Randomized Dose – Response Study. *Nutrients*, 11(950).
- Xianquan, S., Shi, J., Kakuda, Y., & Yueming, J., 2005. Stability of lycopene during food processing and storage. *Journal of Medicinal Food*, 8(4), 413–422.
- Xu, J., Hu, H., Chen, B., Yue, R., Zhou, Z., Liu, Y., Zhang, S., Xu, L., Wang, H., & Yu, Z., 2015. Lycopene protects against hypoxia/reoxygenation injury by alleviating ER stress induced apoptosis in neonatal mouse cardiomyocytes. *PLoS ONE*, 10(8), 1–16.
- Zeng, J., Zhao, J., Dong, B., Cai, X., Jiang, J., Xue, R., Yao, F., Dong, Y., & Liu, C., 2019. Lycopene protects against pressure overload-induced cardiac



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MITA ISTIA, Dr. apt. Rumiyati, M.Si.; Dr. apt. Arief Nurrochmad, M.Si., M.Sc.

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hypertrophy by attenuating oxidative stress. *Journal of Nutritional Biochemistry*, 66, 70–78.