

## **BAB IV**

### **KESIMPULAN DAN SARAN**

#### **4.1. Kesimpulan**

Beberapa penelitian menunjukkan bahwa konsumsi teh memiliki korelasi positif dengan penurunan faktor resiko penyakit jantung koroner, salah satunya karena adanya peningkatan fungsi arteri brakial, peningkatan kemampuan alir darah dalam pembuluh darah, dan peningkatan kandungan katekin dalam plasma darah. Di sisi lain, buah menurunkan resiko terkena PJK dengan bekerja sebagai *scavenger* ROS dan RNS, serta mereduksi senyawa LDL. Namun hasil yang diperoleh dari beberapa penelitian menunjukkan bahwa volume konsumsi buah yang tinggi tidak selalu berkorelasi positif terhadap penurunan kejadian PJK dan kemungkinan ada jumlah optimal tertentu untuk tiap jenis buah yang belum diketahui.

Kombinasi teh dengan buah yang menghasilkan *fruit infused tea* memang meningkatkan kandungan senyawa antioksidan dan secara teori seharusnya meningkatkan kemampuannya untuk menurunkan resiko terkena PJK, namun perlu diingat bahwa jumlah senyawa antioksidan saja tidak dapat dijadikan faktor tunggal dalam menilai efektivitasnya. Faktor lain seperti jenis senyawa antioksidan, pola konsumsi (volume, interval waktu, dan jangka waktu konsumsi), dan kemampuan penyerapan masing – masing senyawa oleh tubuh harus diperhitungkan. Selain itu faktor – faktor lain seperti pola makan, gaya hidup seperti merokok dan olahraga juga harus diperhitungkan.

#### **4.2. Saran**

Perlu dilakukan penelitian lebih lanjut mengenai aktivitas antioksidan *fruit infused tea* dibandingkan dengan aktivitas antioksidan teh hitam dan buah – buahan secara individu.

## DAFTAR PUSTAKA

- Afsana, K., K. Shiga, S. Ishizuka, and H. Hara. 2004. Reducing Effect of Ingesting Tannic Acid on the Absorption of Iron, but Not of Zinc, Copper, and Manganese by Rats. *Bioscience Biotechnology Biochemistry*. 68(3):584-592.
- Alissa, E. M. and G. A. Ferns. 2012. Functional Foods and Nutraceuticals in the Primary Prevention of Cardiovascular Diseases. *Journal of Nutrition and Metabolism*. 1-16, doi:10.1155/2012/569486.
- Anonim. 2010. Antioxidants. University of North Dakota, Grand Forks. 1-2.
- Anonim. 2014. Compendium of Guidelines for Herbal and Fruit Infusions. Tea & Herbal Infusions Europe, Hamburg. 5:4.
- Apak, R., K. Güçlü, B. Demirata, M. Özyürek, S. Esin Çelik, Burcu Bektaşoğlu, K. İşıl Berker ,and Dilek Özyur. 2007. Comparative Evaluation of Various Total Antioxidant Capacity Assays Applied to Phenolic Compounds with the CUPRAC Assay. *Molecules*. 12:1496-1547.
- Arteriosclerotic.org. <http://arteriosclerotic.org/arteriosclerotic-cardiovascular-disease/>. Diakses 11 Juli 2018.
- Badan Standar Nasional. 1992. SNI 01-3143-1992 Minuman Teh Dalam Kemasan. Jakarta: Dewan Standarisasi Nasional.
- Barrett, H.C. and A.M. Rhodes. 1976. A numerical taxonomic study of affinity relationships in cultivated Citrus and its close relatives. *Systematic Botany*. 1:105–136.
- Beh, L. K., Z. Zakaria, B. K. Beh, W. Y. Ho, S. K. Yeap, and N. B. M. Alitheen. 2012. Comparison of Total Phenolic Content and Antioxidant Activities of Freeze-Dried Commercial and Fresh Fruit Juices. *Journal of Medicinal Plants Research*. 6(48):5857-5862.
- Betanzos-Cabrera, G., J. A. Guerrero-Solano, M. M. Martinnez-Perez, Z. G. Calderon-Ramos, H. Belefant-Miller, and J. C. Cancino-Diaz. 2011. Pomegranate Juice Increases Levels of Paraoxonase1

- (PON1) Expression and Enzymatic Activity in Streptozotocin-Induced Diabetic Mice Fed with a High-Fat Diet. *Food Research International*. 44:1381-1385.
- Boshtam, M., S. Asgary, J. Moshtaghian, G. Naderi, and N. Jafari-Dinani. 2013. Impacts of Fresh Lime Juice and Peel on Atherosclerosis Progression in an Animal Model. *ARYA Atherosclerosis 2013*. 9(6):357-362.
- Cassidy, A., K. J. Mukamal, L. Liu, M. Franz, A. H. Eliassen, and B. Rimm. 2012. High Anthocyanin Intake Is Associated with a Reduced Risk of Myocardial Infarction in Young and Middle-Aged Women. *Circulation*. 127:188-196.
- Celestino, S. and S. Augustin. 2000. Proanthocyanidins and Tannin-like Compounds – Nature, Occurrence, Dietary Intake and Effects on Nutrition and Health. *Journal of the Science of Food and Agriculture*. 80:1094-1117.
- Cherubini, A., G. B. Vigna, G. Zuliani, C. Ruggiero, U. Senin, and R. Fellin. 2005. Role of Antioxidants in Atherosclerosis: Epidemiological and Clinical Update. *Current Pharmaceutical Design*. 11:2017-2032.
- Chowdhury, M. S., A. Ahmed, Md. R. Hoque, A. Rahman, S. U. H. Saied., and H. Md. H. K. Ealahe. 2016. Determination of Amount of Vitamin C (Ascorbic Acid) from Supplied Drug by Using Iodometric Titration.
- Dalimartha, S. dan F. Adrian, 2011, *Khasiat Buah dan Sayur*. Jakarta: Penebar Swadaya.
- Diaz-Rubio, M. E., J. Perez-Jimenez, M. A. Martinez-Bartolome, I. Alvarez, and F. Saura-Calixto. 2015. Regular Consumption of an Antioxidant-rich Juice Improves Oxidative Status and Causes Metabolome Changes in Healthy Adults. *Plant Foods for Human Nutrition*. 70:9-14.
- Di Castelnuovo A., R. di Giuseppe, L. Iacoviello, and G. de Gaetano. 2011. Consumption of Cocoa, Tea, and Coffe and Risk of Cardiovascular Disease. *European Journal of Internal Medicine*: 1-11, doi:

- 10.1016/j.ejim.2011.07.014.
- Duffy, S. J., J. F. Keaney, M. Holbrook, N. Gokce, P. L. Swedloff, B. Frei, and J. A. Vita. 2001. Short and Long-Term Black Tea Consumption Reverses Endothelial Dysfunction in Patients with Coronary Artery Disease. *Circulation*. 104:151-156.
- Ernawita, R. A. Wahyuno, J. Hesse, U. C. Hippler, Peter Elsner, and V. Bohm. 2017. In Vitro Lipophilic Antioxidant Capacity, Antidiabetic and Antibacterial Activity of Citrus Fruits Extracts from Aceh, Indonesia. *Antioxidants*. 6(1):1-15, doi:10.3390/antiox601001.
- Foroudi, S., A. S. Potter, A. Stamatikos, B. S. Patil, and F. Deyhim. Drinking Orange Juice Increases Total Antioxidant Status and Decreases Lipid Peroxidation in Adults. *Journal of Medicinal Food*. 17:612-617.
- Fuhrman, B. dan Aviram M. 2001. Flavonoids Protect LDL from Oxidation and Attenuate Atherosclerosis. *Curr Opin Lipidol*. 12:41-48.
- Gans, J. M. K., C. S. P. M. Uiterwaal, Y. T. van der Schouw, J. M. A. Boer, D. E. Grobbee, W. M. M. Verschuren, and J. W. J. Beulens. 2010. Tea and Coffee Consumption and Cardiovascular Morbidity and Mortality. *Arteriosclerosis, Thrombosis, and Vascular Biology*. 30:1665-1671.
- Ghani, A. M. 2002. *Buku Pintar Mandor: Dasar – Dasar Budidaya Teh*. Depok: Penebar Swadaya.
- Green, M. S. and G. Harari. 1992. Association of Serum Lipoproteins and Health-related Habits with Coffee and Tea Consumption in Free-living Subjects Examined in The Israeli CORDIS Study. *Preventive Medicine*. 21:532-545.
- Hakim, I. A., M. A. Alsaif, M. Alduwaihy, K. Al-Rubeaan, A. R. Al-Nuaim, and O. S. Al-Attas. 2003. Tea Consumption and the Prevalence of Coronary Heart Disease in Saudi Adults: Results from A Saudi National Study. *Preventive Medicine*. 36:64-70.
- Haryanto, A. A. 2017. Analisis Tataniaga Stroberi (*Fragaria vesca*) Pendekatan *Structure, Conduct, Performane* (SCP) Di Desa Serang, Kecamatan Karaangreja, Kabupaten Purbalingga. *UMP* 2017.

- Haryanto, S. 2006 . *Sehat dan Bugar Secara Alami*. Jakarta: Penebar Plus.
- Hayat, K., H. Iqbal, U. Malik, and S. Mushtaq. 2013. Tea and Its Consumption: Benefits and Risks. *Critical Reviews in Food Science and Nutrition*. 1-58, doi: 10.1080/10408398.2012.678949.
- Hertog, M. G. L., D. Kromhout, C. Aravanis, H. Blackburn, R. Buzina, F. Fidanza, S. Giampaoli, A. Jansen, A. Menotti, S. Nedeljkovic, M. Pekkarinen, B. S. Simic, H. Toshima, E. J. M. Feskens, P. C. H. Hollman, and M. B. Katan. 1995. Flavonoid Intake and Long-term Risk of Coronary Heart Disease and Cancer in The Seven Countries Study. *Archives of Internal Medicine*. 155:381-386.
- Indigomorie. 2009. Antioksidan: Apa yang KitaPerlu Ketahui Tentangnya.<http://netsains.com/2009/06/antioksidan-apa-yang-kitaperluketahuitentangnya>.
- Knekter, P., R. Jarvinen, A. Reunanen, and J. Maatela. 1996. Flavonoid Intake and Coronary Mortality in Finland: a Cohort Study. *British Medical Journal*. 312:478-481.
- Kusuma, H. R., T. Ingewati, N. Indraswati, dan Martina. 2007. Pengaruh Pasteurisasi Terhadap Kualitas Jus Jeruk Pacitan. *Widya Teknik*. 6(2):142-151.
- Lubna, S. R. 2014. Predicting Coronary Heart Disease through Risk Factor Categories. *ASEE 2014 Zone I Conference*. 1-7.
- Luczaj, W. and E. Skrzypkowska. 2004. Antioxidative Properties of Black Tea. *Preventive Medicine*. 40:910-918.
- Maxwell, S. R. J. and G. Y. H. Lip. 1997. Free Radicals and Antioxidants in Cardiovascular Disease. *British Journal of Clinical Pharmacology*. 44:307-317.
- Middleton, J. E. and C. Kandaswami. 1993. *The Flavonoids: Advances in Research Since 1986*, ed Harborne IR. London: Chapman and Hall. pp 619-645.
- Mursito, B.. 2006. *Ramuan Tradisional untuk Pelangsing Tubuh*. Jakarta: Penebar Swadya.
- Mursu, J. 2007. The Role of Polyphenols in Cardiovascular Diseases, *Doctoral Dissertation*, University of Kuopio at Kuopio.

- Nantz, M.P., C. A. Rowe, C. Muller, R. Creasy, J. Colee, C. Khoo, S. S. Percival. 2013. Consumption of Cranberry Polyphenols Enhances Human  $\gamma\delta$ -T Cell Proliferation and Reduces the Number of Symptoms Associated with Colds and Influenza: a Randomized, Placebo-Controlled Intervention Study. *Nutrition Journal*. 12:161.
- Nenadovic-Mratinic, E., J. Milivojecic, and D. Djurovic. 2006. The Influence of Planting Distance on Fruit Properties in Newly Introduced Strawberry Cultivars. *Journal of Pomology*. 40:123-132.
- Pekal, A., P. Drozdz, M. Biesaga, and K. Pyrzynska. 2011. Evaluation of The Antioxidant Properties of Fruit and Flavoured Black Teas. *European Journal of Nutrition*. 50:681-688.
- Pellegrino, D. 2016. Antioxidants and Cardiovascular Risk Factors. *Diseases*. 1-9, doi:10.3390/diseases401001.
- Pou, K. R. J. 2016. Fermentation: The Key Step in The Processing of Black Tea. *Journal of Biosystems Engineering*. 41(2):85-92.
- Prabbu, A., M. Shantaram, and H. P. Kedilaya. 2016. Fish and Fish Oil in Cardiovascular Diseases. *European Journal of Biomedical and Pharmaceutical Sciences*. 3(9):171-177.
- Razak, A., A. Djamal, dan G. Revilla. 2013. Uji Daya Hambat Air Perasan Buah Jeruk Nipis (*Citrus aurantifolia s.*) Terhadap Pertumbuhan Bakteri *Staphylococcus Aureus* Secara In Vitro. *Jurnal Kesehatan Andalas*. 2(1):5-8.
- Riso, P., F. Visioli, C. Gardana, S. Grande, A. Brusamolino, F. Galvano, G. Galvano, and M. Porrini. 2005. Effects of Blood Orange Juice Intake on Antioxidant Bioavailability and on Different Markers Related to Oxidative Stress. *Journal of Agricultural and Food Chemistry*. 53:941-947.
- Rukmana, R., 1998. *Stroberi Budidaya dan Pascapanen*. Yogyakarta: Kanisius.
- Sahin, S. 2013. Evaluation of Antioxidant Properties and Phenolic Composition of Fruit Tea Infusions. *Antioxidants*. 2:206-215.
- Salisbury, F. B., and C. W. Ross. 1995. *Fisiologi Tumbuhan Jilid 1*. Bandung: ITB.

- Sampoerno dan D. Ferdiaz. 2001. Kebijakan dan Pengembangan Pangan Fungsional dan Suplemen di Indonesia. *Pangan Tradisional Sebagai Basis Industri Pangan Fungsional dan Suplemen.* 1-15.
- Sesso, H. D., J. M. Graziano, J. E. Buring, and C. H. Hennekens. 1999. Coffee and Tea Intake and The Risk of Myocardial Infarction. *American Journal of Epidemiology.* 149:162-167.
- Shannon, E., A. K. Jaiswal and A. Ghannam, N. 2017. Polyphenolic Content and Antioxidant Capacity of White, Green, Black, and Herbal teas: a Kinetic Study. *Food Research.* .2(1):1-11.
- Shema-Didi L., B. Kristal, S. Sela, R. Geron, and L. Ore. 2014. Does Pomegranate Intake Attenuate Cardiovascular Risk Factors in Hemodialysis Patients? *Nutrition Journal.* 13:18.
- Shonisani, N. 2010. Effect of Brewing Temperature and Duration in Quality of Black Tea (*Camellia Sinensis*) and Equal (50:50) Combination of Bush Tea (Athrixia Phylloides DC.) and Black Tea. *Mini-Dissertation.* University of Limpopo, Limpopo.
- Stensvold, I., A. Tverdal, K. Solvoll, and O. P. Foss. 1992. Tea Consumption. Relationship to Cholesterol, Blood Pressure and Coronary and Total Mortality. *Preventive Medicine.* 21:546-553.
- Story, J. A., E. J. Furumoto, and K. K. Buhman. 1997. Dietary Fiber and Bile Acid Metabolism – an Update. *Advances in Experimental Medicine and Biology.* 427:259-266.
- Strawberry Plants.org. <https://strawberrylevels.org/strawberry-serving/>. Diakses 28 Juli 2018.
- Syamsuhidayat, S dan J.R. Hutape. 1991. Inventaris Tanaman Obat Indonesia. Jakarta: Departemen Kesehatan Republik Indonesia.
- United States Department of Agriculture. [https://ndb.nal.usda.gov/ndb/search/list?SYNCHRONIZER\\_TOKEN=1ca42733-ffc2-44a2-9d86-5ac35e067633&SYNCHRONIZER\\_URI=%2Fndb%2Fsearch%2Flist&qt=&qlookup=strawberry&ds=&manu=](https://ndb.nal.usda.gov/ndb/search/list?SYNCHRONIZER_TOKEN=1ca42733-ffc2-44a2-9d86-5ac35e067633&SYNCHRONIZER_URI=%2Fndb%2Fsearch%2Flist&qt=&qlookup=strawberry&ds=&manu=). Diakses 17 Juli 2018.
- Wang, Q. M., Q. Y. Gong, J. J. Yan, J. Zhu, J. J. Tang, M. W. Wang, Z. J. Yang, and L. S. Wang. 2010. Association Between Green Tea

- Intake and Coronary Artery Disease in a Chinese Population. *Circulation Journal.* 74:294-300.
- Wang, X., Y. Ouyang, J. Liu, M. Zhu, G. Zhao, W. Bao, and F. B. Hu. 2014. Fruit and Vegetable Consumption and Mortality from All Causes, Cardiovascular Disease, and Cancer: Systematic review and Dose-Response Meta-Analysis of Prospective Cohort Studies. *British Medical Journal.* 349:g4490 doi: 10.1136/bmj.g449.
- WHO Fact Sheet. 2017, Cardiovascular Diseases (CVDs) <http://www.who.int/mediacentre/factsheets/fs317/en/>
- Zhang, C., Y. Y. Qin, X. Wei, F. F. Yu, Y. H. Zhou, and J. He. 2014. Tea Consumption and Risk of Cardiovascular and Total Mortality: A Systematic Review and Meta-Analysis of Prospective Observational Studies. *European Journal of Epidemiology.* 30(2):1-11.
- Zheng, J., Y. Zhou, S. Li, P. Zhang, T. Zhou, D. P. Xu, and H. B. Li. 2017. Effects and Mechanisms of Fruit and Vegetable Juices on Cardiovascular Diseases. *International Journal of Molecular Science.* 18:1-15.