

DAFTAR PUSTAKA

- Alhakmani, F., Kumar, S. and Khan, S.A. 2013. Estimation of total phenolic content, in-vitro antioxidant and anti-inflammatory activity of flowers of *Moringa oleifera*. *Asian Pac J Trop Biomed.* 3(8): 623-627.
- Amani, M., Darbin, A., Pezeshkian, M., Afrasiabi, A., Safaei, N., Jodati, A. et al. 2017. The role of cholesterol-enriched diet and paraoxonase 1 inhibition in atherosclerosis progression. *J Cardiovasc Thorac Res.* 9 (3): 133-139.
- Amelia, F., Afnani, G.N., Musfiyah, A., Fikriyani A.N., Ucche, S. and Murrukmihadi, M. 2013. Extraction and Stability Test of Anthocyanin from Buni Fruits (*Antidesma Bunius L*) as an Alternative Natural and Safe Food Colorants. *J.Food Pharm.Sci.* 1: 49-53.
- Andreyev, A.Y., Kushnareva, Y.E. and Starkov, A.A. 2005. Mitochondrial metabolism of Reactive oxygen species, *Biochem.* 70 (2): 200-2004.
- Basu, A., Wilkinson, M., Penugonda, K., Simmons, B., Betts, N.M. and Lyons, T.J. 2009. Freeze-dried strawberry powder improves lipidprofile and lipidperoxidation in women with metabolic syndrome: baseline and postintervention effects. *Nutr J.* 8:43 doi:10.1186/1475-2891-8-43.
- Barter, P.J., Caulfield, M., Eriksson, M., Grundy, S.M., Kastelein, J.J.P., Komadja, M. et al. 2007. Effects of Torcetrapib in Patients at High Risk for Coronary Events. *N Eng J Med.* 357 (21): 2109-2122.
- Benn, T., Kim, B., Park, Y.K., Yang, Y., Pham, T.X., Ku, C.S. et al. 2015. Polyphenol-rich blackcurrant extract exerts hypocholesterolaemic andhypoglycaemic effects in mice fed a diet containing high fat and cholesterol. *British J of Nutr.* 113:1697–1703.
- Berrougui, H., Ikhlef, S. and Khalil, A. 2015. Extra Virgin Olive Oil Polyphenols Promote Cholesterol Efflux and Improve HDL Functionality' *Evid-Based Complement and Alternative Med.* 2015. Article ID 208062, 9 pages. <http://dx.doi.org/10.1155/2015/208062>.



- Bhagwat, S., Haytowitz, D.B. and Holden, J.M. 2013. USDA database for the flavonoid content of selected foods in *Nutrient Data Laboratory*. Beltsville Human Nutrition Research Center. Agricultural Research Service. US Department of Agriculture.
- Ble-Castillo, J.L., Aparicio-Trapala, M.A., Juárez-Rojop, I.E., Torres-Lopez, J.E., Mendez, J.D., Aguilar-Mariscal, H. et al. 2012. Differential Effects of High-Carbohydrate and High-Fat Diet Composition on Metabolic Control and Insulin Resistance in Normal Rats. *Int. J. Environ. Res. Public Health.* 9: 1663-1676.
- Boes, E., Coassini, S., Kollerits, B., Heid, I.M. and Kronenberg, F. 2009. Genetic-epidemiological evidence on genes associated with HDL cholesterol levels: A systematic in-depth review. *Experimental Gerontology.* 44:136–160.
- Boom, R., Sol, C.J.A., Salimans, M.M.M. et al. 1990. Rapid and simple method for purification of nucleic acid. *J.Clin. Microbiol.* 28 (3) 495-503.
- Bukhari, A., Tawali, S., Rahman, N., 2014. *Kajian Buah Buni sebagai Makanan Fungsional untuk Memperbaiki kesehatan Pembuluh Darah*. Laporan Penelitian Unggulan Perguruan Tinggi. Universitas Hasanuddin. Makassar.
- Burke, M.F., Khera, A.V., and Rader, D.J. 2010. Polyphenols and cholesterol efflux. Is coffee the next red wine?. *Circ Res.* 106: 627-629.
- Butkhup, L. and Samappito, S. 2008. An analysis on flavonoids contents in Mao Luang fruits of fifteen cultivars grown in Northeast Thailand. *Pak J. Biol. Sci.* 11(7) 996-1002.
- Butkhup, L. and Samappito, S. 2011. Changes in physico-chemical properties, polyphenol compounds, and antioxidant activity during development and ripening of Maoluang (*Antidesma bunius* L. Spreng) fruits. *Journal of Fruit and Ornamental Plant Research* Vol. 19, Issue 4, pp. 85-99.
- Y., Lee, T.S. and Chiang, A.N. 2012. Quercetin enhances ABCA1 expression and cholesterol efflux through a p38-dependent pathway in macrophages. *J Lipid Res.* 53(9): 1840–1850.



[Charan](#), J. and [Kantharia](#), N.D. 2013. How to calculate sample size in animal studies?. *J Pharmacol & Pharmacother.* 4 (4) 303–306.

Chen, J.H., Wang, C.J., Wang, C.P., Sheu, J.Y., Lin, C.L. and Lin, H.H. 2013. *Hibiscus sabdariffa* leaf polyphenolic extract inhibits LDL oxidation and foam cell formation involving up-regulation of LXRa/ABCA1 pathway. *Food Chem.* Vol. 141: 397–406.

Cho, K.Y. 2009. Biomedicinal implications of high-density lipoprotein: Its composition, structure, functions, and clinical applications. *BMB Rep.* 393-400.

Connelly, P.W., Maguire, G.F., Draganov, D.G. 2004. Separation and quantitative recovery of mouse serum arylesterase and carboxylesterase activity. *J. Lipid Res.* 45:561–566.

Deanfield, J. E., Halcox, J.P., and Rabelink, T.J. 2007. Endothelial function and dysfunction testing and clinical relevance. *Circulation.* 115: 1285-1295.

De Pascual-Teresa, S., Moreno D.A., and Garcia-Viguerra, C. 2011. Flavanols and anthocyanins in cardiovascular health: a review of current evidence. *Int J Mol Sci.* 11: 1679-1703 ; doi: 10.3390/ijms 11041679.

Duthie, S.J., Jenkinson, A.M., Crozier, A., Mullen, W., Pirie, L., Kyle, J. et al. 2006. The effects of cranberry juice consumption on antioxidant status and biomarkers relating to heart disease and cancer in healthy human volunteers. *Eur J Nut.* 45: 113–122.

Erlund, I., Koli, R., Alfthan, G., Marniemi, J., Puukka, P., Mustonen, P., et al. 2008. Favorable effects of berry consumption on platelet function, bloodpressure, and HDL cholesterol. *Am J Clin Nutr.* 87: 323–31.

Farràs, M., Valls, R.M., Fernández-Castillejo, S., Giralt, M., Solà, R., Subirana, I. et al. 2013. Olive oil polyphenols enhance the expression of cholesterol efflux related genes in vivo in humans. A randomized controlled trial. *J Nutr Biochem.* 24(7):1334-9.

A.M., Pellizzon, M.A., Ricci, M.R. and Ulman, E.A., 2007. Diet-induced metabolic syndrome in rodent models. *Animal Lab News*, available from: www.research.diet.com.



- Gimbrone, M.A. Jr., and García-Cerdeña, G. 2016. Endothelial cell dysfunction and the pathobiology of atherosclerosis. *Circ Res.* 118(4): 620–636. doi:10.1161/CIRCRESAHA.115.306301.
- Glass, C.K. and Witztum, J.L. 2001. Atherosclerosis: The road ahead (a review). *Cell.* 104: 503-516.
- Goué'dard, C., Barouki, R. and Morel, Y. 2004. Dietary Polyphenols Increase Paraoxonase 1 Gene Expression by an Aryl Hydrocarbon Receptor-Dependent Mechanism. *Molecular and Celular Biology.* 24 (12): 5209–5222.
- Gugliucci, A. and Menini, T. 2015. Paraoxonase 1 and HDL maturation. *Clin Chim Acta.* 439: 5 –13.
- Hatta, M. 2017. *Pelatihan aplikasi teknik biologi molekuler dan imunologi dalam penelitian bidang kesehatan: Teknik konvensional PCR, realtime PCR dan ELISA.* Makassar. Laboratorium Biologi Molekuler dan Imunologi Fakultas Kedokteran Universitas Hasanuddin.
- Heinecke, J.W. 2013. HDL's Protein Cargo: Friend or Foe in Cardioprotection?. *Circulation.* 127:868-869.
- Herman, A.G. and Moncada, S. 2005. Therapeutic potential of nitric oxide donors in the prevention and treatment of atherosclerosis. *Eur Heart J.* 26: 1945–1955.
- Hollman, P.C.H., Cassidy, A., Comte, B., Heinonen, M., Richelle, M., Richling, E. et al. 2011. The Biological Relevance of Direct Antioxidant Effects of Polyphenols for Cardiovascular Health in Humans Is Not Established. *J Nutr.* March 30: 989s-1009s.
- Iio, A., Ohguchi, K., Iinuma, M., Nozawa, Y. And Ito, M. 2012. Hesperetin Upregulates ABCA1 Expression and PromotesCholesterol Efflux from THP-1 Macrophages', *J. Nat. Prod.* 75 : 563–566.
- Inácio, M.R.C., de Lima, K.M.G., Lopes, V.G., Pessoa, J.D.C. and Teixeira, G.H.A. 2013. Total anthocyanin content determination in intact açaí (*Euterpe oleracea* Mart.) and palmitero-juçara (*Euterpe edulis* Mart.) fruit using near infrared spectroscopy (NIR) and multivariate calibration. *Food Chem.* 136: 1160–1164.
- , M., Ogasawara, F., Nagao, K., Hashimoto, H., Kimura, Y., Kioka, N. and Ueda, K. 2018. Temporary sequestration of cholesterol



- and phosphatidylcholine within extracellular domains of ABCA1 during nascent HDL generation. *Scientific Reports.* 8: 6170.
- JAMA. 2014. *Overview of Reverse Cholesterol Transport and High Density Lipoprotein Metabolism.* Video Recording. Download on. 10th May 2016 from :<https://www.youtube.com/watch?v=XxFnbkDZ7bl>
- Jensen, G.S., Wu, X., Patterson, K.M., Barnes, J., Carter, S.G., Scherwitz, L. et al. 2008. In vitro and in vivo antioxidant and anti-inflammatory capacities of an antioxidant-rich fruit and berry juice blend. Results of a pilot and randomized, double-blinded, placebo-controlled, crossover Study. *J. Agric. Food Chem.* 56: 8326–8333.
- Kaperonis, E.A., Liapis, C.D., Kakisis, J.D., Dimitroulis, D. and Papavassiliou, V.G. 2006. Inflammation and atherosclerosis. *Eur J Vasc Endovasc Surg.* 31: 386–393.
- Kedare, S.G. and Singh, R.P. 2011. Genesis and development of DPPH method of antioxidant assay. *J Food Sci Technol.* 48 (44):412 - 422.
- Khateeb, J., Gantman, A., Kreitenberg, A.J. Aviram, M. and Fuhrman, B. 2010. Paraoxonase 1 (PON1) expression in hepatocytes is upregulated by pomegranate polyphenols: A role for PPAR-γ pathway. *Atherosclerosis.* 208: 119–125.
- Khoo, H.E., Azlan, A., Ismail, A., Abas, F. and Hamid, M. 2014. Inhibition of Oxidative Stress and Lipid Peroxidation by Anthocyanins from Defatted Canarium odontophyllum Pericarp and Peel Using In Vitro Bioassays. *Plos One.* 9(1): e81447.
- Kiyici, A., Okudan, N., Go̞kbol, H., and Belviranli, M. 2010. The effect of grape seed extracts on serum paraoxonase activities in streptozotocin-induced diabetic rats. *J Med Food.*13 (3): 725–728.
- Kratzer, A., Giral, H. and Landmesser, U. 2014. High-density lipoproteins as modulators of endothelial cell functions: alterations in patients with coronary artery disease (A spotlight review). *Cardiovasc Res.* 103: 350–361.
- o, V. 2013. Phenolic compounds : Introduction in Ramawat, K.G. and Me'illion, J.M. (eds) *Natural Products.* Berlin Heidelberg: Springer Verlag.1544-1573.



- Libby, P. 2002. Inflammation in atherosclerosis. *Nature*. 420: 868-874.
- Leckey, L.C., Garige, M., Varatharajalu, R., Gong, M., Nagata, T., Spurney, C.F. and Lakshman, R.M. 2010. Quercetin & ethanol attenuate the progression of atherosclerotic plaques with concomitant up Regulation of paraoxonase1 (PON1) gene expression and PON1 activity in LDLR^{-/-} mice. *Alcohol Clin Exp Res*. 34(9): 1535–1542.
- Li, H.L., Liu, D.P. and Liang, C.C. 2003. Paraoxonase gene polymorphisms, oxidative stress, and diseases: (a review). *J Mol Med*. 81: 766–779.
- Liang, Y., Chen, J., Zuo, Y., Ma, K.Y., Jiang, Y., Huang, Y. and Chen, Z.Y. 2013. Blueberry anthocyanins at doses of 0.5 and 1 % lowered plasmacholesterol by increasing fecal excretion of acidic and neutralsterols in hamsters fed a cholesterol-enriched diet. *Eur J Nutr*. 52:869–875.
- Litvinov, D., Mahini, M. and Garelnabi, M. 2012. Antioxidant and Anti-Inflammatory Role of Paraoxonase 1: Implication in Arteriosclerosis Diseases (A review), *North Am J Med Sci*. 4(11) :523-532.
- Llanos, P., Sanchez, P., Cerdá-Kohler, H., Arias-Calderon, A., Diaz-Vegas, A., Campos, C. et al. 2016. ATP Binding Cassette transporter ABCA1 is decreased in skeletal muscle from insulin resistant mice', *FASEB Journal*, Vol.30, No.1 (Supplement).
- Lusis, J.A. 2000. Atherosclerosis. *Nature*. 407: 233-241.
- Mackness, M.I., Arrol, S. and Durrington, P.N. 1991. Paraoxonase prevents accumulation of lipoperoxides in low-density lipoprotein. *FEBS Lett*. 286:152–154.
- Mackness M. and Mackness, B. 2013. Targeting paraoxonase-1 in atherosclerosis. *Expert Opin Ther Targets*. 17:829–37.
- Martini D., Del Bo', C., Porrini, M., Ciappellano, S., and Riso, P. 2017. Role of polyphenols and polyphenol-rich foods in the modulation of PON1 activity and expression (Review). *J Nutr Biochem*. 48: 1–8.
- G., Kay, C.D., Cotrell, T., Holub, B.J. 2002. Absorption of anthocyanins from blueberries and serum antioxidant status in human subjects *J. Agric. Food Chem*. 50: 7731-7737.



Mendis, S., Puska, P. and Norrving, B. (eds) 2011. *Global atlas on cardiovascular disease prevention and control.* World Health Organization, Geneve.

Miranda-Rottmann, S., Aspilla, A.A., Perez, D.D., Vasquez, L., Martinez, A.L.F. and Leighton, F. 2002. Juice and phenolic fractions of the berry *Aristotelia chilensis* inhibit LDL oxidation *in vitro* and protect human endothelial cells against oxidative stress. *J. Agric. Food Chem.* Vol. 50: 7542-7547.

Mufidah, 2011. *Aktivitas antiaterosklerosis ekstrak terstandar klinka ongkea (Mezzetia parviflora BECC) pada tikus wistar yang diberi asupan kolesterol: Kajian efek antioksidan dan antikolesterol terhadap penghambatan MCP-1 dan disfungsi endote.* Disertasi yang tidak diterbitikan. Makassar:Program Pasca Sarjana Universitas Hasanuddin.

Nair, A.B. and Jacob, S. 2016. A Simple practice guide for dose conversion between animals and human. *J Basic Clin Pharma.*7: 27-31.

Nelson and Cox. 2008. Lipid Biosynthesis in *Lehninger Principles of Biochemistry*.787-829.

Nicouea, E.N.M., Savard, S., Belkacemi, K. 2007. Anthocyanins in wild blueberries of Quebec: Extraction and identification. *J Agric Food Chem.* 55: 5626-5635.

Nissen, S.E., Tardif, J.C., Nicholls, S.J., Revkin, J.H., Shear, C.L., Duggan, W.T. et al. 2007. Effect of Torcetrapib on the Progression of Coronary Atherosclerosis. *N Engl J Med.* 356:1304-16.

Oram, J.F. 2003. HDL Apolipoproteins and ABCA1 Partners in the Removal of Excess Cellular Cholesterol. *Arterioscler Thromb Vasc Biol.* 23: 720-727.

Orwa, C., Mutua, A., Kindt, R., Jamnadass, R. and Anthony, S. 2009. Agroforestry Database: a tree reference and selection guide version
[\(http://www.worldagroforestry.org/sites/treedatabases.asp\)](http://www.worldagroforestry.org/sites/treedatabases.asp)



- recombinant inbred strains of mice. *Arterioscler Thromb Vasc Biol.* 10:316-323.
- Phillips, M.C. 2018. Is ABCA1 a lipid transporter?. *J.Lipid Res.* Jlr.R082313.
- Précourta, L.P., Amreb, D., Denisa, M.C., Lavoieb, J.C., Delvinc, E., Seidmand, E. and Levy, E. 2011. The three-gene paraoxonase family: Physiologic roles, actions and regulation', *Atherosclerosis*. 214: 20–36.
- Prior, R.I., Cao, G., Martin, A., Sofic, E., McEwen, J., O'Brien, C. et al. 1998. Antioxidant capacity as influenced by total phenolic and anthocyanin content, maturity, and variety of *Vaccinium* species. *J Agric Food Chem.* 46: 2686 – 2693.
- Rader, D. and Daugherty, A. 2008. Translating molecular discoveries into new therapies for atherosclerosis. *Nature*. 451: 904-913.
- Riso, P., Klimis-Zacas, D., Del Bo', C., Martini, D., Campolo, J., Vendrame, S. et al. 2013. Effect of a wild blueberry (*Vaccinium angustifolium*) drink intervention on markers of oxidative stress, inflammation and endothelial function in humans with cardiovascular risk factors'. *Eur J Nutr.* 52: 949–961.
- Samappito, S. and Butkhup, L. 2008a. An analysis on organic acids contents in ripe fruits of fifteen Mao Luang (*Antidesma bunius*) cultivars, harvested from dipterocarp forest of Phupan valley in Northeast Thailand. *Pak J Biol Sci.* 11(7): 974-981.
- Samappito, S. and Butkhup, L. 2008b. An analysis of flavonoids, phenolics and organic acids contents in brewed red wines of both non-skin contact and skin contact fermentation technique of Mao Luang ripe fruits (*Antidesma bunius*) harvested from Phupan valley in Northeast Thailand. *Pak J Biol Sci.* 11(13) 1654-1661.
- Schrader, C., Ernst, I.M.A., Sinnecker, H., Soukup, S.T., Kulling, S.E. and Rimbach, G. 2012. Genistein as a potential inducer of the anti-atherogenic enzyme paraoxonase-1: studies in cultured hepatocytes in vitro and in rat liver in vivo. *J. Cell. Mol. Med.* 16 (10): 2331-2341.
3. and Heinecke, J.W., 2018. Quantifying HDL proteins by mass spectrometry: how many proteins are there and what are their functions?. *Expert Rev Proteomics.*15(1): 31–40.



Shen, W.J., Azhar, S. and Kraemer, F.B. 2018. SR-B1: A Unique Multifunctional Receptor for Cholesterol Influx and Efflux. *Annu Rev Physiol.* 80: 95-116.

Shih, D.M., Gu, L., Xia, Y.R., Navab, M., Li, W.F., Hama, S., Castellani, L.W., et al. 1998. Mice lacking serum paraoxonase are susceptible to organophosphate toxicity and atherosclerosis. *Nature.* 394: 284–28.

Stephens, A.S., Sebastien, R., Stephens, S.R., Morrison, A.N. 2011. Internal control genes for quantitative RT-PCR expression analysis in mouse osteoblasts, osteoclasts and macrophages. *BMC Res Notes.* 4: 410.

Sparrow, C.P., Burton, C.A., Hernandez, M., Mundt, S., Hassing, H., Patel, S. et al. 2001. Simvastatin has anti-Inflammatory and antiatherosclerotic activities independent of plasma cholesterol lowering. *Arterioscler Thromb Vasc Biol.* 21:115-121.

Tang, C., Kanter, J.E., Bornfeldt, K.E., Leboeuf, R.C. and Oram, J.F. 2010. Diabetes reduces the cholesterol exporter ABCA1 in mouse macrophages and kidneys. *J Lipid Res.* 51(7): 1719–1728.

Teissedre, P.L. and Jourdes, M. 2013. Tannins and anthocyanins of wine: Phytochemistry and organoleptics properties in: Ramawat, K.G. and Me'rillon, J.M. (eds) *Natural Products.* 2256-2269. Springer-Verlag. Berlin Heidelberg.

Thomàs-Moyà, E., Gianotti, M., Proenza, A.M., and Lladó, I. 2007. Paraoxonase 1 Response to a High-Fat Diet: Gender Differences in the Factors Involved. *Mol Med.* 13 (3-4): 203 - 209.

Tward, A., Xia, Y.R., Wang, X.P., Shi, Y.S., Park, C., Castellani, L.W., et al. 2002. Decreased atherosclerotic lesion formation in human serum paraoxonase transgenic mice. *Circulation.* 106: 484–490.

Vogel-van den Bosch, H.M.de., Wit N.J.W. de., Hooiveld, G.J.E.J., Vermeulen, H., Veen J.N. van. der., Houten, S.M. et al. 2008. A cholesterol-free, high-fat diet suppresses gene expression of cholesterol transporters in murine small intestine. *Am J Physiol Gastrointest Liver Physiol.* 294: G1171–G1180.



- Waller-Evans, H., Hue, C., Fearnside, J., Rothwell, A.R., Helen, E., Lockstone, H.E. et al. 2013. Nutrigenomics of High Fat Diet Induced Obesity in Mice Suggests Relationships between Susceptibility to Fatty Liver Disease and the Proteasome. *Plos One*. 8: 12.
- Wang, L.S. and Stoner, G.D. 2008. Anthocyanins and their role in cancer prevention. *Cancer Lett.* 269(2): 281-290.
- Wang, L., Wesemann, S., Krenn, L., Ladurner, A., Heiss, E.H., Dirsch, V.M. and Atanasov, A.G., 2017. Erythrodiol, an Olive Oil Constituent, Increases the Half-Life of ABCA1 and Enhances Cholesterol Efflux from THP-1-Derived Macrophages. *Frontiers in Pharmacology*. 8:375.
- WHO. 2011. *Noncommunicable Diseases country profiles*. Available at (accessed on : 22 April 2013).
- Wu, X., Beecher, G.R., Holden, J.F., Haytowitz, D.B., Gebhart, S.E. and Prior, R.L. 2006. Concentrations of anthocyanins in common foods in the United States and estimation of normal consumption. *J Agric Food Chem.* 54. 4069-4075.
- Xia, M., Hou, M., Zhu, H., Ma, J., Tang, Z. et al. 2005. Anthocyanins Induce Cholesterol Efflux from Mouse Peritoneal Macrophages: The role of the peroxisome proliferator activated receptor-Live X receptor-ABCA2 pathway. *J Biol Chem.* 280 (44): 36792–36801.
- Xia, X., Ling, W., Ma, J., Xia, M., Hou, M., Wang, Q., Zhu H. et al. 2016. An anthocyanin rich extract from black rice enhance atherosclerotic plaque stabilization in apolipoprotein E-deficient Mice. *J Nutr.* 35: 2220-5.
- Yang, Y., Smith Jr, D.L., Keating, K.D., Allison, D.B. and Nagy, T.R. 2014. Variations in body weight, food intake and body composition after long-term high-fat diet feeding in C57BL/6J Mice. *Obesity (Silver Spring)*. 22(10): 2147–2155.
- Yvan-Charvet, L., Wang, N., & Tall, A.R. 2010. The role of HDL, ABCA1 and ABCG1 transporters in cholesterol efflux and immune responses. *Arterioscler Thromb Vasc Biol.* 30(2): 139–143.
- Zheng, C. and Aikawa, M. 2012. High-Density Lipoproteins From Function to Therapy (Editorial comment). *J Am Coll Cardiol.* 60: 23.
- Zhu, Y., Huang, X., Zhang, Y., Wang, Y., Liu, Y., Sun, R. et al. 2014. Anthocyanin Supplementation Improves HDL Associated Paraoxonase 1 Activity and Enhances Cholesterol Efflux Capacity in Subjects With Hypercholesterolemia. *J Clin Endocrinol Metab.* 99(2):561–569.





**KEMENTERIAN RISET, TEKNOLOGI DAN PENDIDIKAN TINGGI
UNIVERSITAS HASANUDDIN
FAKULTAS KEDOKTERAN
RSPTN UNIVERSITAS HASANUDDIN
RSUP DR. WAHIDIN SUDIROHUSODO MAKASSAR
KOMITE ETIK PENELITIAN KESEHATAN**



107

Sekretariat : Lantai 3 Gedung Laboratorium Terpadu
JL. PERINTIS KEMERDEKAAN KAMPUS TAMALANREA KM.10 MAKASSAR 90245.
Contact Person: dr. Agussalim Bukhari, MMed.PhD, Sp.GK Telp. 081241850858, 0411 5780103, Fax: 0411-581431

REKOMENDASI PERSETUJUAN ETIK

Nomor : 597 / H4.8.4.5.31 / PP36-KOMETIK / 2017

Tanggal: 23 Agustus 2017

Dengan ini Menyatakan bahwa Protokol dan Dokumen yang Berhubungan Dengan Protokol berikut ini telah mendapatkan Persetujuan Etik :

| | | | |
|-----------------------------------|--|--|---------------------------|
| No Protokol | UH17050326 | No Sponsor Protokol | |
| Peneliti Utama | Dr.Suryani Tawali,MPH | Sponsor | Pribadi |
| Judul Peneliti | Aktivitas anti-aterosklerosis ekstrak buah buni (antidesma bunius) pada mencit BALB/c DM hasil induksi aloksan yang diberi asupan tinggi lemak : kajian efek antioksidan dan anir kolesterol terhadap penghambatan oksidasi LDL dan peningkatan ekspresi mRNA e | | |
| No Versi Protokol | 2 | Tanggal Versi | 7 Agustus 2017 |
| No Versi PSP | | Tanggal Versi | |
| Tempat Penelitian | Laboratorium Hewan FKUH , Laboratorium Mikrobiologi dan Immunologi FKUH, Laboratorium PKP UH Makassar | | |
| Dokumen Lain | | | |
| Jenis Review | <input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard Tanggal | Masa Berlaku 23 Agustus 2017 sampai 23 Agustus 2018 | Frekuensi review lanjutan |
| Ketua Komisi Etik Penelitian | Nama Prof.Dr.dr. Suryani As'ad, M.Sc.,Sp.GK (K) | Tanda tangan | Tanggal |
| Sekretaris Komisi Etik Penelitian | Nama dr. Agussalim Bukhari, M.Med.,Ph.D.,Sp.GK (K) | Tanda tangan | Tanggal |

Kewajiban Peneliti Utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum di implementasikan

Menyerahkan Laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan Lapor SUSAR dalam

litia Utama menerima laporan

ran Kemajuan (progress report) setiap 6 bulan untuk penelitian resiko tinggi dan setiap

litian resiko rendah

an akhir setelah Penelitian berakhir

pangan dari protokol yang disetujui (protocol deviation / violation)

aturan yang ditentukan



Lampiran 2 : Hasil uji normalitas intake makanan

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|--------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| buni1 | .121 | 84 | .004 | .979 | 84 | .194 |
| buni2 | .099 | 84 | .041 | .975 | 84 | .094 |
| buni3 | .085 | 84 | .193 | .973 | 84 | .070 |
| buni4 | .118 | 84 | .006 | .976 | 84 | .114 |
| buni5 | .145 | 84 | .000 | .914 | 84 | .000 |
| simva1 | .086 | 84 | .186 | .989 | 84 | .676 |
| simva2 | .080 | 84 | .200* | .989 | 84 | .670 |
| simva3 | .121 | 84 | .004 | .955 | 84 | .005 |
| simva4 | .118 | 84 | .006 | .966 | 84 | .026 |
| simva5 | .095 | 84 | .058 | .966 | 84 | .026 |
| hfd1 | .099 | 84 | .042 | .978 | 84 | .151 |
| hfd2 | .072 | 84 | .200* | .983 | 84 | .345 |
| hfd3 | .109 | 84 | .016 | .965 | 84 | .022 |
| hfd4 | .095 | 84 | .057 | .940 | 84 | .001 |
| hfd5 | .069 | 84 | .200* | .982 | 84 | .289 |
| nd1 | .095 | 84 | .058 | .970 | 84 | .046 |
| nd2 | .099 | 84 | .041 | .969 | 84 | .039 |
| nd3 | .065 | 84 | .200* | .981 | 84 | .249 |
| nd4 | .058 | 84 | .200* | .985 | 84 | .469 |
| nd5 | .136 | 84 | .001 | .968 | 84 | .034 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| buni | .308 | 5 | .135 | .709 | 5 | .012 |
| | .232 | 5 | .200* | .856 | 5 | .215 |
| | .290 | 5 | .196 | .895 | 5 | .385 |
| | .278 | 5 | .200* | .839 | 5 | .161 |

lower bound of the true significance.



a. Lilliefors Significance Correction

Lampiran 3 : OneWay ANOVA dan Post Hoc test untuk intake makanan

Oneway

ANOVA

Intake

| | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|-------|------|
| Between Groups | 1.934 | 3 | .645 | 2.446 | .102 |
| Within Groups | 4.217 | 16 | .264 | | |
| Total | 6.151 | 19 | | | |

Post Hoc Tests

Multiple Comparisons

Dependent Variable: intake

LSD

| (I) kelompok | (J) kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|--------------|--------------|--------------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| 1 | 2 | -.4538 | .3247 | .181 | -1.142 | .235 |
| | 3 | -.5508 | .3247 | .109 | -1.239 | .138 |
| | 4 | -.8688* | .3247 | .017 | -1.557 | -.180 |
| 2 | 1 | .4538 | .3247 | .181 | -.235 | 1.142 |
| | 3 | -.0970 | .3247 | .769 | -.785 | .591 |
| | 4 | -.4150 | .3247 | .219 | -1.103 | .273 |
| 3 | 1 | .5508 | .3247 | .109 | -.138 | 1.239 |
| | 2 | .0970 | .3247 | .769 | -.591 | .785 |
| | 4 | -.3180 | .3247 | .342 | -1.006 | .370 |
| | 1 | .8688* | .3247 | .017 | .180 | 1.557 |
| | 2 | .4150 | .3247 | .219 | -.273 | 1.103 |
| | 3 | .3180 | .3247 | .342 | -.370 | 1.006 |



An difference is significant at the 0.05 level.

Lampiran 4. Normality test, ANOVA, dan Paired t test

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|-------------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Hari0_klp1 | .145 | 5 | .200* | .985 | 5 | .960 |
| Hari0_klp2 | .182 | 5 | .200* | .984 | 5 | .955 |
| Hari0_klp3 | .293 | 5 | .187 | .836 | 5 | .153 |
| Hari0_klp4 | .193 | 5 | .200* | .934 | 5 | .623 |
| Hari84_klp1 | .273 | 5 | .200* | .893 | 5 | .370 |
| Hari84_klp2 | .190 | 5 | .200* | .983 | 5 | .950 |
| Hari84_klp3 | .213 | 5 | .200* | .931 | 5 | .604 |
| Hari84_klp4 | .225 | 5 | .200* | .970 | 5 | .875 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

ANOVA

berat_badan_pre

| | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|------|------|
| Between Groups | 6.065 | 3 | 2.022 | .274 | .843 |
| Within Groups | 118.060 | 16 | 7.379 | | |
| Total | 124.126 | 19 | | | |

T-Test

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|-------------|---------|---|----------------|-----------------|
| Pair 1 | Hari84_klp1 | 36.1400 | 5 | 3.79842 | 1.69871 |
| | Hari0_klp1 | 36.6400 | 5 | 2.99466 | 1.33925 |
| Pair 2 | Hari84_klp2 | 37.1400 | 5 | 2.71164 | 1.21268 |
| | Hari0_klp1 | 36.6400 | 5 | 2.99466 | 1.33925 |
| Pair 3 | Hari84_klp3 | 37.3600 | 5 | 2.74827 | 1.22906 |
| | Hari0_klp3 | 38.0200 | 5 | 1.08720 | .48621 |
| Pair 4 | Hari84_klp4 | 41.6600 | 5 | 3.92912 | 1.75716 |
| | Hari0_klp4 | 37.8600 | 5 | 3.22847 | 1.44381 |



Paired Samples Test**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) | | | |
|--------|------------------|--------------------|----------------|-----------------|---|---------|-------|----|--------------------|--|--|--|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | | | | |
| | | | | | Lower | Upper | | | | | | |
| Pair 1 | Hari84_klp1 - | -.50000 | 1.73349 | .77524 | -2.65242 | 1.65242 | -.645 | 4 | .554 | | | |
| Pair 2 | Hari84_klp2 - | .50000 | 5.66745 | 2.53456 | -6.53707 | 7.53707 | .197 | 4 | .853 | | | |
| Pair 3 | Hari84_klp3 - | -.66000 | 2.93309 | 1.31172 | -4.30191 | 2.98191 | -.503 | 4 | .641 | | | |
| Pair 4 | Hari84_klp4 - | 3.80000 | 2.78119 | 1.24378 | .34670 | 7.25330 | 3.055 | 4 | .038 | | | |



Optimization Software:
www.balesio.com

Lampiran 5 Normality test, Paired t test untuk total kolesterol

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|--------------------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| prebuni_totchol | .335 | 5 | .070 | .816 | 5 | .108 |
| postbuni_totchol | .231 | 5 | .200* | .908 | 5 | .455 |
| pre_simva_totchol | .219 | 5 | .200* | .970 | 5 | .876 |
| post_simva_totchol | .166 | 5 | .200* | .980 | 5 | .932 |
| pre_hfd_totchol | .179 | 5 | .200* | .968 | 5 | .865 |
| post_hfd_totchol | .322 | 5 | .098 | .848 | 5 | .187 |
| pre_nd_totchol | .199 | 5 | .200* | .921 | 5 | .534 |
| post_nd_totchol | .168 | 5 | .200* | .990 | 5 | .979 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|--------------------|----------|---|----------------|-----------------|
| Pair 1 | postbuni_totchol | 268.9183 | 5 | 19.10527 | 8.54414 |
| | prebuni_totchol | 242.6399 | 5 | 19.23035 | 8.60007 |
| Pair 2 | post_simva_totchol | 284.2273 | 5 | 25.19905 | 11.26936 |
| | pre_simva_totchol | 281.4548 | 5 | 31.08992 | 13.90384 |
| Pair 3 | post_hfd_totchol | 364.3887 | 5 | 22.50324 | 10.06375 |
| | pre_hfd_totchol | 242.5193 | 5 | 18.20367 | 8.14093 |
| Pair 4 | post_nd_totchol | 267.3513 | 5 | 17.69567 | 7.91374 |
| | pre_nd_totchol | 271.5703 | 5 | 34.52887 | 15.44178 |



Paired Samples Test

| | Paired Differences | | | | | t | df | Sig. (2-tailed) | | | |
|---|--------------------|----------------|-----------------|---|-----------|-------|----|--------------------|--|--|--|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | | | | |
| | | | | Lower | Upper | | | | | | |
| Pair 1 postbuni_totchol - prebuni_totchol | 26.27846 | 9.46859 | 4.23448 | 14.52165 | 38.03527 | 6.206 | 4 | .003 | | | |
| Pair 2 post_simva_totchol - pre_simva_totchol | 2.77246 | 34.09377 | 15.24720 | -39.56054 | 45.10546 | .182 | 4 | .865 | | | |
| Pair 3 post_hfd_totchol - pre_hfd_totchol | 121.86938 | 30.23935 | 13.52345 | 84.32227 | 159.41649 | 9.012 | 4 | .001 | | | |
| Pair 4 post_nd_totchol - pre_nd_totchol | -4.21902 | 22.09596 | 9.88161 | -31.65478 | 23.21674 | -.427 | 4 | .691 | | | |



Lampiran 6 . Normality test, Paired t test untuk Kolesterol HDL

Tests of Normality

| | intervensi | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|----------|------------|---------------------------------|----|-------|--------------|----|------|
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| hdl_pre | buni | .206 | 5 | .200* | .976 | 5 | .910 |
| | hfd | .232 | 5 | .200* | .881 | 5 | .313 |
| | nd | .204 | 5 | .200* | .884 | 5 | .326 |
| hdl_post | simva | .190 | 5 | .200* | .953 | 5 | .757 |
| | buni | .188 | 5 | .200* | .956 | 5 | .780 |
| | hfd | .232 | 5 | .200* | .900 | 5 | .412 |
| | nd | .194 | 5 | .200* | .951 | 5 | .747 |
| | simva | .318 | 5 | .108 | .813 | 5 | .103 |

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|------------|---------|---|----------------|-----------------|
| Pair 1 | post_buni | 24.8377 | 5 | 8.44492 | 3.77668 |
| | pre_buni | 26.5946 | 5 | 5.72383 | 2.55978 |
| Pair 2 | post_simva | 28.3773 | 5 | 14.92887 | 6.67639 |
| | pre_simva | 29.8757 | 5 | 11.25731 | 5.03442 |
| Pair 3 | post_hfd | 40.4943 | 5 | 10.21376 | 4.56773 |
| | pre_hfd | 37.0840 | 5 | 9.03823 | 4.04202 |
| Pair 4 | post_nd | 9.2070 | 5 | 2.01247 | .90000 |
| | pre_nd | 8.1219 | 5 | 2.46222 | 1.10114 |

Paired Samples Test

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) | | | |
|--------|------------------------|--------------------|----------------|-----------------|---|----------|-------|----|-----------------|--|--|--|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | | | | |
| | | | | | Lower | Upper | | | | | | |
| Pair 1 | post_buni - pre_buni | -1.75684 | 12.53095 | 5.60401 | -17.31607 | 13.80238 | -.313 | 4 | .770 | | | |
| Pair 2 | post_simva - pre_simva | -1.49848 | 12.31502 | 5.50744 | -16.78960 | 13.79263 | -.272 | 4 | .799 | | | |
| | post_hfd - pre_hfd | 3.41034 | 6.87728 | 3.07561 | -5.12893 | 11.94961 | 1.109 | 4 | .330 | | | |
| | post_nd - pre_nd | 1.08511 | 3.03035 | 1.35522 | -2.67757 | 4.84779 | .801 | 4 | .468 | | | |



Lampiran 7. Uji ANOVA dan Post HOC untuk Perubahan HDL

ANOVA

perubahan_hdl

| | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|------|------|
| Between Groups | 88.777 | 3 | 29.592 | .324 | .808 |
| Within Groups | 1460.657 | 16 | 91.291 | | |
| Total | 1549.434 | 19 | | | |

Post Hoc Tests

Multiple Comparisons

Dependent Variable: perubahan_hdl

LSD

| (I) kelompok | (J) kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|--------------|--------------|-----------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| buni | simva | -.25836 | 6.04288 | .966 | -13.0687 | 12.5520 |
| | hfd | -5.16718 | 6.04288 | .405 | -17.9775 | 7.6432 |
| | nd | -2.84195 | 6.04288 | .644 | -15.6523 | 9.9684 |
| | buni | .25836 | 6.04288 | .966 | -12.5520 | 13.0687 |
| | simva | -4.90882 | 6.04288 | .429 | -17.7192 | 7.9015 |
| | nd | -2.58359 | 6.04288 | .675 | -15.3939 | 10.2267 |
| hfd | buni | 5.16718 | 6.04288 | .405 | -7.6432 | 17.9775 |
| | simva | 4.90882 | 6.04288 | .429 | -7.9015 | 17.7192 |
| | nd | 2.32523 | 6.04288 | .705 | -10.4851 | 15.1356 |
| nd | buni | 2.84195 | 6.04288 | .644 | -9.9684 | 15.6523 |
| | simva | 2.58359 | 6.04288 | .675 | -10.2267 | 15.3939 |
| | hfd | -2.32523 | 6.04288 | .705 | -15.1356 | 10.4851 |



Lampiran 8. Normality test dan Paired t test untuk OX-LDL

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|------------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| pre_buni | .196 | 5 | .200* | .933 | 5 | .618 |
| post_buni | .193 | 5 | .200* | .949 | 5 | .731 |
| pre_simva | .219 | 5 | .200* | .911 | 5 | .473 |
| post_simva | .288 | 5 | .200* | .864 | 5 | .243 |
| pre_hfd | .200 | 5 | .200* | .971 | 5 | .879 |
| post_hfd | .174 | 5 | .200* | .969 | 5 | .871 |
| pre_nd | .323 | 5 | .095 | .802 | 5 | .084 |
| post_nd | .279 | 5 | .200* | .836 | 5 | .155 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|------------|--------|---|----------------|-----------------|
| Pair 1 | post_buni | 1.4088 | 5 | .53048 | .23724 |
| | pre_buni | 1.1574 | 5 | .58304 | .26074 |
| Pair 2 | post_simva | 2.1421 | 5 | .68763 | .30752 |
| | pre_simva | 1.8418 | 5 | .68958 | .30839 |
| Pair 3 | post_hfd | 3.7274 | 5 | .37283 | .16673 |
| | pre_hfd | 1.3320 | 5 | .19379 | .08666 |
| Pair 4 | post_nd | 1.5764 | 5 | .47979 | .21457 |
| | pre_nd | 1.4228 | 5 | .47107 | .21067 |

Paired Samples Test

| | | Paired Differences | | | | t | df | Sig. (2-tailed) | | |
|--------|------------------------|--------------------|-------------------|-----------------------|---|---------|--------|--------------------|--|--|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | | |
| | | | | | Lower | Upper | | | | |
| Pair 1 | post_buni - pre_buni | .25141 | .06246 | .02793 | .17385 | .32897 | 9.000 | 4 .001 | | |
| Pair 2 | post_simva - pre_simva | .30030 | .19062 | .08525 | .06362 | .53698 | 3.523 | 4 .024 | | |
| | post_hfd - pre_hfd | 2.39539 | .38852 | .17375 | 1.91298 | 2.87780 | 13.786 | 4 .000 | | |
| | post_nd - pre_nd | .15364 | .05843 | .02613 | .08109 | .22619 | 5.880 | 4 .004 | | |



Lampiran 9. Normality test dan Paired t test untuk Ekspresi PON1

Tests of Normality

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|-----------------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| pre_buni_pon1 | .146 | 5 | .200* | .977 | 5 | .919 |
| post_buni_pon1 | .206 | 5 | .200* | .934 | 5 | .621 |
| pre_simva_pon1 | .303 | 5 | .149 | .883 | 5 | .325 |
| post_simva_pon1 | .162 | 5 | .200* | .968 | 5 | .860 |
| pre_hfd_pon1 | .135 | 5 | .200* | .990 | 5 | .980 |
| post_hfd_pon1 | .179 | 5 | .200* | .969 | 5 | .868 |
| pre_nd | .204 | 5 | .200* | .958 | 5 | .794 |
| post_nd | .319 | 5 | .106 | .830 | 5 | .139 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

D.

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|-----------------|-----------|---|----------------|-----------------|
| Pair 1 | post_buni_pon1 | 6.7193580 | 5 | .26765250 | .11969784 |
| | pre_buni_pon1 | 6.2400740 | 5 | .15968707 | .07141423 |
| Pair 2 | post_simva_pon1 | 6.8313440 | 5 | .25428481 | .11371962 |
| | pre_simva_pon1 | 6.3341380 | 5 | .18839304 | .08425193 |
| Pair 3 | post_hfd_pon1 | 4.8060380 | 5 | .29586418 | .13231449 |
| | pre_hfd_pon1 | 6.2359620 | 5 | .13335947 | .05964017 |
| Pair 4 | post_nd | 6.2711520 | 5 | .15128121 | .06765501 |
| | pre_nd | 6.2525180 | 5 | .13869770 | .06202749 |



Paired Samples Test

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) | | | |
|------------|---|--------------------|----------------|-----------------|---|--------|---------|-------|--------------------|--|--|--|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | | | | |
| | | | | | Lower | Upper | | | | | | |
| Pai r 1 | post_buni_pon1 - pre_buni_pon1 | 0.479 | 0.329 | 0.147 | 0.070 | 0.888 | 3.253 | 4.000 | 0.031 | | | |
| Pai r 2 | post_simva_pon 1 - pre_simva_pon1 | 0.497 | 0.340 | 0.152 | 0.075 | 0.919 | 3.272 | 4.000 | 0.031 | | | |
| Pai r 3 | post_hfd_pon1 - pre_hfd_pon1 | -1.430 | 0.243 | 0.108 | -1.731 | -1.129 | -13.184 | 4.000 | 0.000 | | | |
| Pai r 4 | post_nd - pre_nd | 0.019 | 0.101 | 0.045 | -0.107 | 0.144 | 0.412 | 4.000 | 0.701 | | | |







Optimization Software:
www.balesio.com

PENELITI : dr. SURYANI TAWALLI (081343771450)



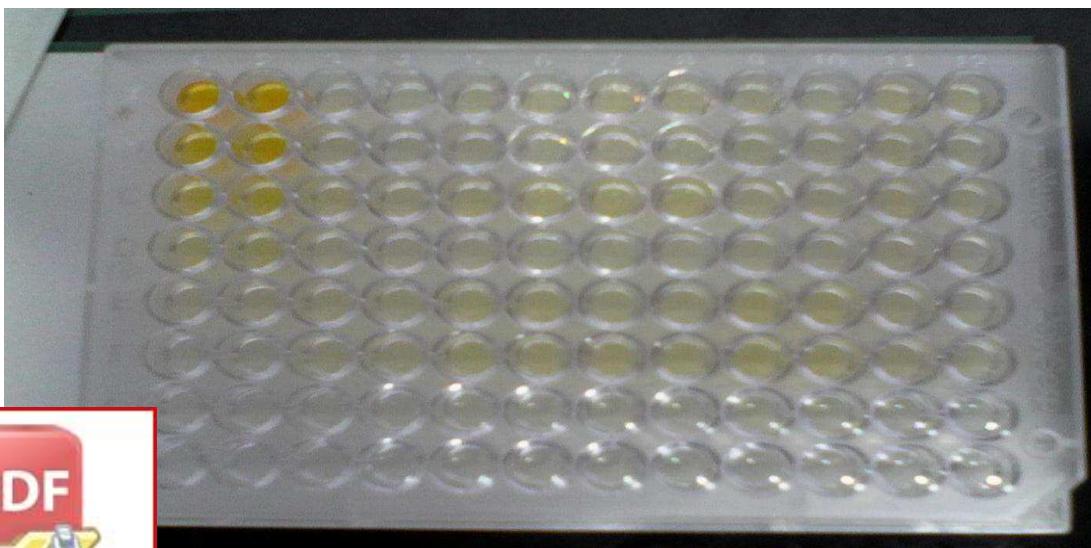
| No | MAKANAN | Sep-17 | | | Selasa, 19 September | | | Rabu, 20 September | | | |
|----|---------|---------------------|-----------------|-------|----------------------|------------------|-----------------|--------------------|-----|------------------|-----------------|
| | | Senin, 18 September | | sonde | BB | MAKANAN | | sonde | BB | MAKANAN | |
| | | Berat Pakan (gr) | Berat sisa (gr) | | | Berat Pakan (gr) | Berat sisa (gr) | | | Berat Pakan (gr) | Berat sisa (gr) |
| 1 | 3.8 | 2.2 | ✓ | 31.7 | 3.7 | 1.8 | ✓ | 31.2 | 3.8 | | |
| 2 | 3.7 | 1.8 | ✓ | 35.1 | 3.5 | 1.3 | ✓ | 35.3 | 3.8 | | |
| 3 | 3.8 | 1.2 | ✓ | 36.0 | 3.9 | 2.7 | ✓ | 34.5 | 4.0 | | |
| 4 | 4.1 | 2.5 | ✓ | 42.1 | 4.6 | 1.7 | ✓ | 42.4 | 4.3 | | |
| 5 | 4.1 | 3.2 | ✓ | 36.4 | 4.0 | 2.1 | ✓ | 32.0 | 4.3 | | |
| 6 | 5.3 | 2.5 | ✓ | 58.2 | 5.2 | 2.2 | ✓ | 58.4 | 5.4 | | |
| 7 | 5.4 | 1.3 | ✓ | 49.5 | 5.2 | 1.9 | ✓ | 48.7 | 5.0 | | |
| 8 | 4.8 | 2.1 | ✓ | 46.9 | 4.8 | 1.0 | ✓ | 48.0 | 4.5 | | |
| 9 | 4.5 | 1.2 | ✓ | 40.2 | 4.6 | 0.4 | ✓ | 39.2 | 4.6 | | |
| 10 | 4.8 | 2.3 | ✓ | 41.0 | 4.7 | 2.9 | ✓ | 39.5 | 4.8 | | |
| 11 | 4.5 | 0.8 | ✓ | 37.5 | 4.5 | 1.3 | ✓ | 37.7 | 4.4 | | |
| 12 | 3.8 | 1.2 | ✓ | 30.4 | 3.5 | 0.5 | ✓ | 31.0 | 3.6 | | |
| 13 | 4.6 | 2.3 | ✓ | 40.2 | 4.6 | 2.0 | ✓ | 39.6 | 4.6 | | |
| 14 | 3.6 | 1.0 | ✓ | 34.3 | 3.6 | 1.6 | ✓ | 34.0 | 3.8 | | |
| 15 | 4.0 | 2.0 | ✓ | 34.0 | 4.3 | 2.0 | ✓ | 34.3 | 4.0 | | |
| 16 | 3.8 | 1.5 | ✓ | 32.2 | 4.2 | 1.9 | ✓ | 32.3 | 4.6 | | |
| 17 | 4.1 | 2.4 | ✓ | 42.4 | 5.0 | 3.7 | ✓ | 42.0 | 4.7 | | |

| KLPK | NO | KODE | Sep-17 | | | | | | Rabu, 20 September | | |
|----------------------|----|------|--------------------|-----|---------------------|------|----------------------|-----|--------------------|-----|-----|
| | | | Ahad, 17 September | | Senin, 18 September | | Selasa, 19 September | | Rabu, 20 September | | |
| | | | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 |
| LHFO (BHU) | 20 | 3.1. | 36.6 | 4.8 | 1.8 | 34.5 | 4.0 | 1.9 | 36.3 | 4.5 | 1.2 |
| | 21 | 3.2. | 36.9 | 4.8 | 1.0 | 37.0 | 4.5 | 1.8 | 36.2 | 4.5 | 0.7 |
| | 22 | 3.3. | 43.9 | 5.0 | 2.4 | 43.0 | 5.0 | 3.0 | 41.8 | 5.1 | 0 |
| | 23 | 3.4. | 35.4 | 4.2 | 1.8 | 36.1 | 4.3 | 0.8 | 36.5 | 4.2 | 1.7 |
| | 24 | 3.5. | 26.7 | 4.6 | 2.3 | 37.2 | 4.8 | 2.2 | 37.0 | 4.4 | 2.2 |
| | 25 | 3.6. | 36.3 | 4.4 | 2.7 | 36.1 | 4.4 | 2.6 | 35.7 | 4.3 | 2.0 |
| | 26 | 3.7. | 35.2 | 4.8 | 1.4 | 37.8 | 5.0 | 2.6 | 39.5 | 5.0 | 1.8 |
| | 27 | 4.1. | 39.0 | 4.1 | 3.3 | 39.1 | 4.1 | 1.9 | 38.5 | 4.0 | 1.6 |
| | 28 | 4.2. | 34.6 | 4.0 | 2.1 | 34.5 | 3.9 | 0.7 | 34.0 | 3.9 | 1.2 |
| | 29 | 4.3. | 41.2 | 4.4 | 1.7 | 40.4 | 4.4 | 1.3 | 40.5 | 4.1 | 0 |
| NORMAL DIET (NUNING) | 30 | 4.4. | 41.3 | 5.3 | 0.8 | 40.8 | 5.3 | 2.2 | 40.3 | 5.2 | 1.8 |
| | 31 | 4.5. | 45.8 | 5.5 | 0.9 | 45.3 | 5.4 | 2.5 | 44.1 | 5.6 | 1.9 |
| | 32 | 4.6. | 44.5 | 4.0 | 0.6 | 44.3 | 3.9 | 1.0 | 43.4 | 5.0 | 1.8 |
| | 33 | 4.7. | 32.3 | 4.0 | 2.3 | 32.6 | 3.8 | 1.4 | 32.8 | 3.9 | 1.5 |

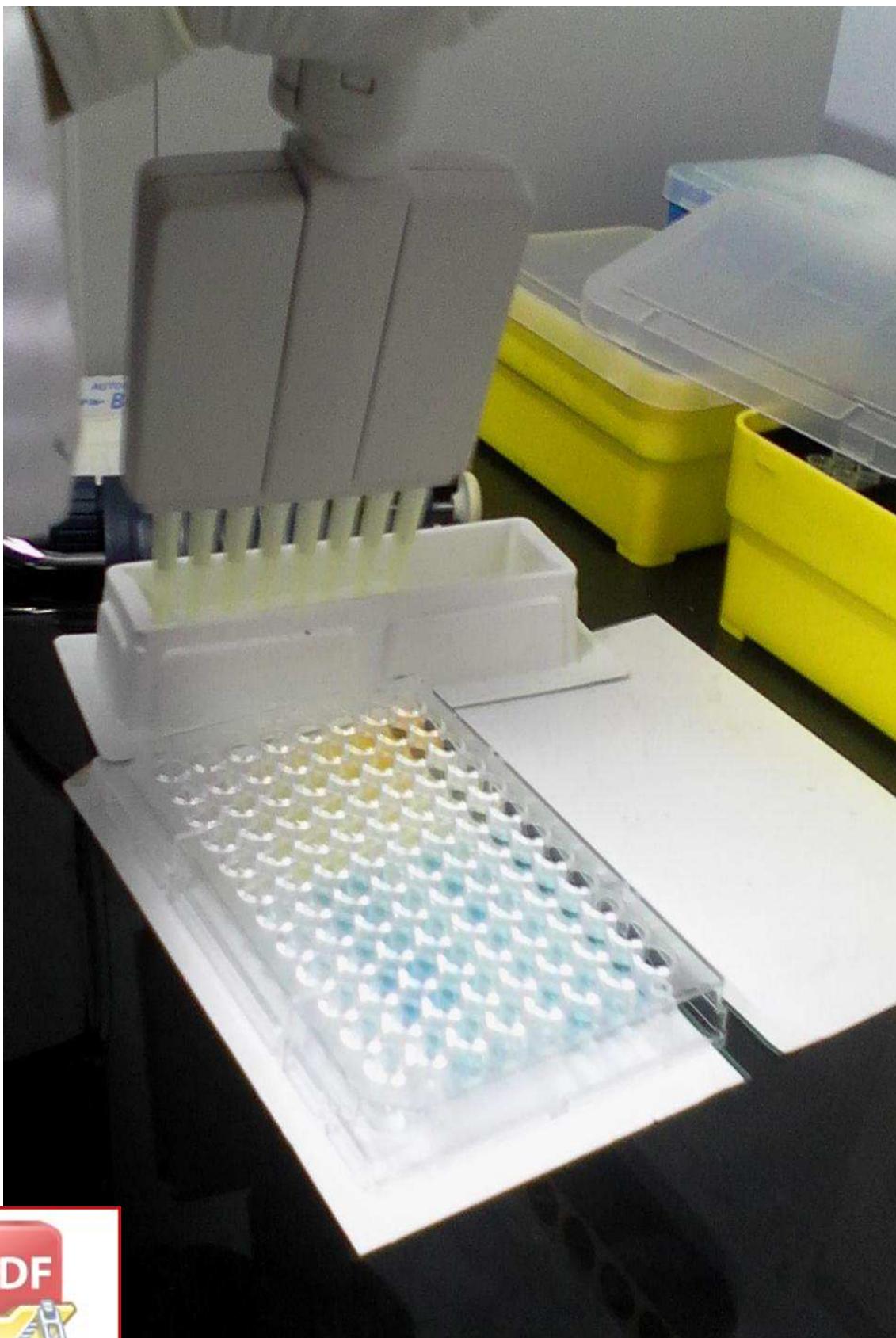
* HFD = High Fat Diet ; **ND = Normal diet (lihat lampiran komposisi pakan)

CATATAN :





Optimization Software:
www.balesio.com



Optimization Software:
www.balesio.com



Optimization Software:
www.balesio.com

