DAFTAR PUSTAKA

[1] Tessaro FHG, Ayala TS, Nolasco EL, Bella LM MJ. Insulin Influences LPS-Induced TNF-α and IL-6 Release Through Distinct Pathways in Mouse Macrophages from Different Compartments. Cell Physiol Biochem 2017;42:2093–104. https://doi.org/10.1159/000479904.

[2] Insuela D, Coutinho D, Martins M, Ferrero M, Carvalho V. Neutrophil Function Impairment Is a Host Susceptibility Factor to Bacterial Infection in Diabetes. Cells Immune Syst 2020:1–22. https://doi.org/10.5772/intechopen.86600.

[3] Eze ED, Afodun AM, Kasolo J, Kasozi KI. Lycopene improves on basic hematological and immunological parameters in diabetes mellitus. BMC Res Notes 2019;12:1–7. https://doi.org/10.1186/s13104-019-4841-8.

[4] Fachinello MR, Fernandes NLM, de Souto ER, dos Santos TC, da Costa AER, Pozza PC. Lycopene affects the immune responses of finishing pigs. Ital J Anim Sci 2018;17:666–74. https://doi.org/10.1080/1828051X.2017.1401438.

[5] Wang R, Sheng M, Shi F, Zhao Y, Zhao L, Wu J, et al. Dysfunctional phagocytosis capacity, granulocyte recruitment and inflammatory factor secretion of Kupffer cells in diabetes mellitus reversed by Lidocaine. Diabetes, Metab Syndr Obes Targets Ther 2018;11:827–34. https://doi.org/10.2147/DMSO.S186695.

[6] Lecube A, Pachón G, Petriz J, Hernández C, Simó R. Phagocytic activity is impaired in type 2 diabetes mellitus and increases after metabolic improvement. PLoS One 2011;6:6–11. https://doi.org/10.1371/journal.pone.0023366.

[7] Jafar N, Edriss H, Nugent K. The effect of short-term hyperglycemia on the innate immune system. Am J Med Sci 2016;351:201–11. https://doi.org/10.1016/j.amjms.2015.11.011.

[8] Berbudi A, Rahmadika N, Tjahjadi AI, Ruslami R. Type 2 Diabetes and its Impact on the Immune System. Curr Diabetes Rev 2019;16:442–9. https://doi.org/10.2174/1573399815666191024085838.

[9] Hodgson K, Morris J, Bridson T, Govan B, Rush C, Ketheesan N. Immunological mechanisms contributing to the double burden of diabetes and intracellular bacterial infections. Immunology 2015;144:171–85. https://doi.org/10.1111/imm.12394.

[10] Pavlou S, Lindsay J, Ingram R, Xu H, Chen M. Sustained high glucose exposure sensitizes macrophage responses to cytokine stimuli but reduces their phagocytic activity. BMC Immunol 2018;19:1–13. https://doi.org/10.1186/s12865-018-0261-0.

[11] Huang J, Xiao Y, Zheng P, Zhou W, Wang Y, Huang G, et al. Distinct neutrophil counts and functions in newly diagnosed type 1 diabetes, latent autoimmune diabetes in adults, and type 2 diabetes. Diabetes Metab Res Rev 2019;35. https://doi.org/10.1002/dmrr.3064.

[12] Singh VP, Bali A, Singh N, Jaggi AS. Advanced glycation end products and diabetic complications. Korean J Physiol Pharmacol 2014;18:1–14. https://doi.org/10.4196/kjpp.2014.18.1.1.

[13] Adela R, Nethi SK, Bagul PK, Barui AK, Mattapally S, Kuncha M, et al. Hyperglycaemia enhances nitric oxide production in diabetes: A study from South Indian patients. PLoS One 2015;10:1–17. https://doi.org/10.1371/journal.pone.0125270.

[14] Ridzuan N, John CM, Sandrasaigaran P, Maqbool M, Liew LC, Lim J, et al. Preliminary study on overproduction of reactive oxygen species by neutrophils in diabetes mellitus. World J Diabetes 2016;7:271. https://doi.org/10.4239/wjd.v7.i13.271.

[15] Indyk D, Bronowicka-Szydełko A, Gamian A, Kuzan A. Advanced glycation end products and their receptors in serum of patients with type 2 diabetes. Sci Rep 2021;11:1–14. https://doi.org/10.1038/s41598-021-92630-0.

[16] Berezin A. Metabolic memory phenomenon in diabetes mellitus: Achieving and perspectives. Diabetes Metab Syndr Clin Res Rev 2016;10:S176–83. https://doi.org/10.1016/j.dsx.2016.03.016.

[17] American Diabetes Association. Standards of Medical Care in diabetes—2020 abridged for primary care providers. Clin Diabetes 2020;38:10–38. https://doi.org/10.2337/dc12-s011.

[18] Cho NH, Shaw JE, Karuranga S, Huang Y, da Rocha Fernandes JD, Ohlrogge AW, et al. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. Diabetes Res Clin Pract 2018;138:271–81. https://doi.org/10.1016/j.diabres.2018.02.023.

[19] Chang CH, Wang JL, Wu LC, Chuang LM, Lin HH. Diabetes, Glycemic Control, and Risk of Infection Morbidity and Mortality: A Cohort Study. Open Forum Infect Dis 2019;6:1–12. https://doi.org/10.1093/ofid/ofz358.

[20] Soelistijo S. Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia 2021. Glob Initiat Asthma 2021:46.

[21] Cheng G, Lanza-Jacoby S. Metformin decreases growth of pancreatic cancer cells by decreasing reactive oxygen species: Role of NOX4. Biochem Biophys Res Commun 2015;465:41–6. https://doi.org/10.1016/j.bbrc.2015.07.118.

[22] Abd-Elsameea AA, Moustaf AA, Mohamed AM. Modulation of the oxidative stress by metformin in the cerebrum of rats exposed to global cerebral ischemia and ischemia/reperfusion. Eur Rev Med Pharmacol Sci 2014;18:2387–92.

[23] Hyun B, Shin S, Lee A, Lee S, Song Y, Ha N-J, et al. Metformin Down-regulates TNF-α Secretion via Suppression of Scavenger Receptors in Macrophages. Immune Netw 2013;13:123. https://doi.org/10.4110/in.2013.13.4.123.

[24] Abbaszadeh A, Koushki S, Koushki S, Eskandarzadeh M, Hasanvand A. Metformin; a mini-review to its antioxidative and anti-inflammatory properties. J Ren Inj Prev 2018;7:7–10. https://doi.org/10.15171/jrip.2018.02.

[25] Saisho Y. Metformin and Inflammation: Its Potential Beyond Glucose-lowering Effect. Endocrine, Metab Immune Disord Targets 2015;15:196–205.

[26] Liu Y, Huang C, Ceng C, Zhan H, Zheng D, Han W. Metformin enhances nitric oxide production and diminishes Rho kinase activity in rats with hyperlipidemia. Lipids Health Dis 2014;13:1–7. https://doi.org/10.1186/1476-511X-13-115.

[27] Zheng Z, Chen H, Li J, Li T, Zheng B, Zheng Y, et al. Sirtuin 1-mediated cellular metabolic memory of high glucose via the LKB1/AMPK/ROS pathway and therapeutic effects of metformin. Diabetes 2012;61:217–28. https://doi.org/10.2337/db11-0416.

[28] Figueiredo ID, Lima TFO, Inácio MD, Costa MC, Assis RP, Brunetti IL, et al. Lycopene improves the metformin effects on glycemic control and decreases biomarkers of glycoxidative stress in diabetic rats. Diabetes, Metab Syndr Obes Targets Ther 2020;13:3117–35. https://doi.org/10.2147/DMSO.S265944.

[29] Feng X, Chen W, Ni X, Little PJ, Xu S, Tang L, et al. Metformin, Macrophage Dysfunction and Atherosclerosis. Front Immunol 2021;12. https://doi.org/10.3389/fimmu.2021.682853.

[30] Guerra BA, Otton R. I1. Guerra, B. A. & Otton, R. Impact of the carotenoid astaxanthin on phagocytic capacity and ROS/RNS production of human neutrophils treated with free fatty acids and high glucose. Int. Immunopharmacol. 11, 2220–2226 (2011).mpact of the carotenoid astaxa. Int Immunopharmacol 2011;11:2220–6. https://doi.org/10.1016/j.intimp.2011.10.004.

[31] Iswari RS, Yuniastuti A, Dafip M. Tomato extract as an immunomodulator in mice (mus musculus) infected with Plasmodium berghei. Pakistan J Nutr 2016;15:515–8. https://doi.org/10.3923/pjn.2016.515.518.

[32] Ejike DE, Adam MA, Sheu OS, Nganda P, Iliya E, Moses DA, et al. Lycopene attenuates diabetes-induced oxidative stress in Wistar rats. J Diabetes Endocrinol 2018;9:11–9. https://doi.org/10.5897/jde2018.0118.

[33] Sachdeva AK, Chopra K. Lycopene abrogates Aβ(1-42)-mediated neuroinflammatory cascade in an experimental model of Alzheimer's disease. J Nutr Biochem 2015;26:736–44. https://doi.org/10.1016/j.jnutbio.2015.01.012.

[34] Kumar PVN, Elango P, Asmathulla S, Kavimani S. A systematic review on lycopene and its beneficial effects. Biomed Pharmacol J 2017;10:2113–20. https://doi.org/10.13005/bpj/1335.

[35] Cheng HM, Koutsidis G, Lodge JK, Ashor AW, Siervo M, Lara J. Lycopene and tomato and risk of cardiovascular diseases: A systematic review and meta-analysis of epidemiological evidence. Crit Rev Food Sci Nutr 2019;59:141–58. https://doi.org/10.1080/10408398.2017.1362630.

[36] Holzapfel NP, Holzapfel BM, Champ S, Feldthusen J, Clements J, Hutmacher DW. The potential role of lycopene for the prevention and therapy of prostate cancer: From molecular mechanisms to clinical evidence. Int J Mol Sci 2013;14:14620–46. https://doi.org/10.3390/ijms140714620.

[37] Tokaç M, Aydin S, Taner G, Özkardeş AB, Yavuz Taşlipinar M, Doğan M, Dündar HZ, Kiliç M, Başaran AA BA. Antioxidant effects of lycopeHepatoprotective and antne in acute cholestasis. Turk J Med Sci 2015;45:857–64. https://doi.org/10.3906/sag-1404-57.

[38] Zou J, Feng D, Ling WH, Duan RD. Lycopene suppresses proinflammatory response in lipopolysaccharide-stimulated macrophages by inhibiting ROS-induced trafficking of TLR4 to lipid raft-like domains. J Nutr Biochem 2013;24:1117–22. https://doi.org/10.1016/j.jnutbio.2012.08.011.

[39] Tabrez S, Al-Shali KZ AS. Lycopene powers the inhibition of glycation-induced diabetic nephropathy: a novel approach to halt the AGE-RAGE axis menace. Biofactors 2015;41:372–81. https://doi.org/10.1002/biof.1238.

[40] Leh HE, Mohd Sopian M, Abu Bakar MH, Lee LK. The role of lycopene for the amelioration of glycaemic status and peripheral antioxidant capacity among the Type II diabetes mellitus patients: a case–control study. Ann Med 2021;53:1058–64.

https://doi.org/10.1080/07853890.2021.1943515.

[41] Yin Y, Zheng Z, Jiang Z. Effects of lycopene on metabolism of glycolipid in type 2 diabetic rats. Biomed Pharmacother 2019;109:2070–7. https://doi.org/10.1016/j.biopha.2018.07.100.

[42] Liang X, Ma C, Yan X, Liu X, Liu F. Advances in research on bioactivity, metabolism, stability and delivery systems of lycopene. Trends Food Sci Technol 2019;93:185–96. https://doi.org/10.1016/j.tifs.2019.08.019.

[43] Haribabu T, Divakar K, Goli D. Evaluation of anti-diabetic activity of Lycopene and its synergistic effect with Metformin hydrochloride and Glipizide in Alloxan induced diabetes in rats. Sch Acad J Pharm 2013;2:119–24.

[44] Motta BP, Pinheiro CG, Figueiredo ID, Cardoso FN, Oliveira JO, Machado RTA, et al. Combined Effects of Lycopene and Metformin on Decreasing Oxidative Stress by Triggering Endogenous Antioxidant Defenses in Diet-Induced Obese Mice. Molecules 2022;27. https://doi.org/10.3390/molecules27238503.

[45] Valero MA, Vidal A, Burgos R, Calvo FL, Martínez C, Luengo LM CC. Meta-analysis on the role of lycopene in type 2 diabetes mellitus. Nutr Hosp, 2011;6:1236–41.

[46] Uribe-Querol E, Rosales C. Phagocytosis: Our Current Understanding of a Universal Biological Process. Front Immunol 2020;11:1–13. https://doi.org/10.3389/fimmu.2020.01066.

[47] Rosales C, Uribe-Querol E. Phagocytosis: A Fundamental Process in Immunity. Biomed Res Int 2017;2017. https://doi.org/10.1155/2017/9042851.

[48] Jeffrey K. Actor. Introductory Immunology: Basic Concepts for Interdiciplinary Applications, Second Edition. 2019. https://doi.org/10.1017/CBO9781107415324.004.

[49] Robert RR, Thomas AF, William TS, Harry WS, Cornelia MW, Anthony JF. Clinical Immunology : Principles and Practice. Clin. Immunol. fifth, USA: Elsevier; 2018, p. 1049–63.

[50] Zhang F, Liu AL, Gao S, Ma S, Guo S Bin. Neutrophil dysfunction in sepsis. Chin Med J (Engl) 2016;129:2741–4. https://doi.org/10.4103/0366-6999.193447.

[51] Phan QT, Sipka T, Gonzalez C, Levraud JP, Lutfalla G, Nguyen-Chi M. Neutrophils use superoxide to control bacterial infection at a distance. PLoS Pathog 2018;14:1–

29. https://doi.org/10.1371/journal.ppat.1007157.

[52] Pavlou S, Wang L, Xu H, Chen M. Higher phagocytic activity of thioglycollate-elicited peritoneal macrophages is related to metabolic status of the cells. J Inflamm (United Kingdom) 2017;14:12–7. https://doi.org/10.1186/s12950-017-0151-x.

[53] Abbas AK, Lichtman AH, Pillai S. Cellular and molecular immunology. 10th ed. Elsevier EELX India Pvt. Ltd.; 2021.

[54] Duque GA, Descoteaux A. Macrophage cytokines: Involvement in immunity and infectious diseases. Front Immunol 2014;5:1–12. https://doi.org/10.3389/fimmu.2014.00491.

[55] Kaiser GCC of BC (Cantonsville). Microbiology 2019:782. Available from: https://libretexts.org.

[56] Abu-Ashour W, Twells L, Valcour J, Randell A, Donnan J, Howse P, et al. The association between diabetes mellitus and incident infections: A systematic review and meta-analysis of observational studies. BMJ Open Diabetes Res Care 2017;5:1–10. https://doi.org/10.1136/bmjdrc-2016-000336.

[57] Dunachie S, Chamnan P. The double burden of diabetes and global infection in low and middle-income countries. Trans R Soc Trop Med Hyg 2019;113:56–64. https://doi.org/10.1093/trstmh/try124.

[58] Mulyati S. Peranan Advanced Glycation End-products pada Diabetes. Cdk 2016;43:422–6.

[59] Yang M, Liu J, Xu J, Sun T, Sheng L, Chen Z, et al. Elevated systemic neutrophil count is associated with diabetic macroalbuminuria among elderly Chinese. Int J Endocrinol 2015;2015. https://doi.org/10.1155/2015/348757.

[60] Collison KS, Parhar RS, Saleh SS, Meyer BF, Kwaasi AA, Hammami MM, et al. RAGE-mediated neutrophil dysfunction is evoked by advanced glycation end products (AGEs). J Leukoc Biol 2002;71:433–44. https://doi.org/10.1189/jlb.71.3.433.

[61] Restrepo BI, Twahirwa M, Rahbar MH, Schlesinger LS. Phagocytosis via complement or Fc-gamma receptors is compromised in monocytes from type 2 diabetes patients with chronic hyperglycemia. PLoS One 2014;9:1–8. https://doi.org/10.1371/journal.pone.0092977.

[62] Liu HF, Zhang HJ, Hu QX, Liu XY, Wang ZQ, Fan JY, et al. Altered polarization, morphology, and impaired innate immunity germane to resident peritoneal macrophages in mice with long-term type 2 diabetes. J Biomed Biotechnol 2012;2012. https://doi.org/10.1155/2012/867023.

[63] Grossmannm V, Schmitt VH, Zeller T, Panova-Noeva M, Schulz A, Laubert-Reh D, et al. Profile of the immune and inflammatory response in individuals with prediabetes and type 2 diabetes. Diabetes Care 2015;38:1356–64. https://doi.org/10.2337/dc14-3008.

[64] Toniolo A, Cassani G, Puggioni A, Rossi A, Colombo A, Onodera T, et al. The diabetes pandemic and associated infections: Suggestions for clinical microbiology. Rev Med Microbiol 2019;30:1–17. https://doi.org/10.1097/MRM.0000000000000155.

[65] Hazeldine J, Hampson P, Lord JM. The impact of trauma on neutrophil function. Injury 2014;45:1824–33. https://doi.org/10.1016/j.injury.2014.06.021.

[66] Flory JH, Mushlin AI. Effect of cost and formulation on persistence and adherence to initial metformin therapy for type 2 diabetes. Diabetes Care 2020;43:E66–7. https://doi.org/10.2337/dc19-2426.

[67] Madiraju AK, Qiu Y, Perry RJ, Rahimi Y, Zhang XM, Zhang D, et al. Metformin inhibits gluconeogenesis via a redox-dependent mechanism in vivo. Nat Med 2018;24:1384–94. https://doi.org/10.1038/s41591-018-0125-4.

[68] Rena G, Pearson ER, Sakamoto K. Molecular mechanism of action of metformin: Old or new insights? Diabetologia 2013;56:1898–906. https://doi.org/10.1007/s00125-013-2991-0.

[69] Campbell JM, Bellman SM, Stephenson MD, Lisy. K. Metformin reduces all-cause mortality and diseases of ageing independent of its effect on diabetes control: A systematic review and meta-analysis. Ageing Res Rev 2017;40:31–44. https://doi.org/10.1016/j.arr.2017.08.003.

[70] Zhu A, Teng Y, Ge D, Zhang X, Hu M, Yao X. Role of metformin in treatment of patients with chronic obstructive pulmonary disease: A systematic review. J Thorac Dis 2019;11:4371–8. https://doi.org/10.21037/jtd.2019.09.84.

[71] Karbalaee-Hasani A, Khadive T, Eskandari M, Shahidi S, Mosavi M, Nejadebrahimi Z, Khalkhali L, Sangdari A, Mohammadi D, Soltani A, Khodabandehloo H, Hosseini H KM. Effect of Metformin on Circulating Levels of Inflammatory Markers in Patients With Type 2 Diabetes: A Systematic Review and Meta-analysis of

Randomized Controlled Trials. Ann Pharmacother 2021 Sep;55(9) n.d.;55:1096–109. https://doi.org/10.1177/1060028020985303.

[72] Aroda VR, Edelstein SL, Goldberg RB, Knowler WC, Marcovina SM, Orchard TJ, et al. Long-term metformin use and vitamin B12 deficiency in the diabetes prevention program outcomes study. J Clin Endocrinol Metab 2016;101:1754–61. https://doi.org/10.1210/jc.2015-3754.

[73] Kemenkes RI. Hasil Riset Kesehatan Dasar Tahun 2018. Kementrian Kesehat RI 2018;53:1689–99.

[74] Przybylska S. Lycopene – a bioactive carotenoid offering multiple health benefits: a review. Int J Food Sci Technol 2020;55:11–32. https://doi.org/10.1111/ijfs.14260.

[75] Zhu R, Chen B, Bai Y, Miao T, Rui L, Zhang H, et al. Lycopene in protection against obesity and diabetes: A mechanistic review. Pharmacol Res 2020;159. https://doi.org/10.1016/j.phrs.2020.104966.

[76] Ford ES, Li C, Cunningham TJ, Croft JB. Associations between antioxidants and all-cause mortality among US adults with obstructive lung function. Br J Nutr 2014;112:1662–73. https://doi.org/10.1017/S0007114514002669.

[77] Durairajanayagam D, Agarwal A, Ong C, Prashast P. Lycopene and male infertility. Asian J Androl 2014;16:420–5. https://doi.org/10.4103/1008-682X.126384.

[78] Zeng Z, He W, Jia Z, Hao S. Lycopene Improves Insulin Sensitivity through Inhibition of STAT3/Srebp-1c-Mediated Lipid Accumulation and Inflammation in Mice fed a High-Fat Diet. Exp Clin Endocrinol Diabetes 2017;125:610–7. https://doi.org/10.1055/s-0043-101919.

[79] Baş H, Pandir D, Kalender S. Furan-induced hepatotoxic and Hematologic changes in diabetic rats: The protective role of lycopene. Arh Hig Rada Toksikol 2016;67:194–203. https://doi.org/10.1515/aiht-2016-67-2762.

[80] Pierine DT, Navarro MEL, Minatel IO, Luvizotto RAM, Nascimento AF, Ferreira ALA, et al. Lycopene supplementation reduces TNF-α via RAGE in the kidney of obese rats. Nutr Diabetes 2014;4:1–6. https://doi.org/10.1038/nutd.2014.39.

[81] Trejo-Solís C, Pedraza-Chaverrí J, Torres-Ramos M, Jiménez-Farfán D, Cruz Salgado A, Serrano-García N, et al. Multiple molecular and cellular mechanisms of action of lycopene in cancer inhibition. Evidence-Based Complement Altern Med 2013;2013. https://doi.org/10.1155/2013/705121.

[82] Jonker D, Kuper CF, Fraile N, Estrella A ROC. Ninety-day oral toxicity study of lycopene from Blakeslea trispora in rats. Regul Toxicol Pharmacol n.d.;37:396–406. https://doi.org/10.1016/s0273-2300(03)00013-8.

[83] Imran M, Ghorat F, Ul-haq I, Ur-rehman H, Aslam F, Heydari M, et al. Lycopene as a natural antioxidant used to prevent human health disorders. Antioxidants 2020;9:1–27. https://doi.org/10.3390/antiox9080706.

[84] Gulati K, Anand R, Ray A. Nutraceuticals as adaptogens: Their role in health and disease. Elsevier Inc.; 2016. https://doi.org/10.1016/B978-0-12-802147-7.00016-4.

[85] Dave M, Gupta AK, Patel P, Heernath H. Correlation between Fasting Blood Sugar Level, HbA1C Level and Serum Lipid Levels in Type 2 Diabetes Mellitus Patients. Int J Contemp Med Res [IJCMR] 2019;6. https://doi.org/10.21276/ijcmr.2019.6.7.13.

[86] Weiss, Douglas J. Wardrop K, Jane. Schalm OW (Oscar W. Schalm's Veterinary hematology. In: Marjory B. Brooks, Kendal E. Harr, Davis M. Seelig , K. Jane Wardrop DJW, editor. 7th ed., USA: Blackwell Publishing Ltd Fifth; 2022, p. 1026-1029,.

[87] Ketema EB, Kibret KT. Correlation of fasting and postprandial plasma glucose with HbA1c in assessing glycemic control; systematic review and meta-analysis. Arch Public Heal 2015;73:1–9. https://doi.org/10.1186/s13690-015-0088-6.

[88] Knowler WC, Edelstein SL, Goldberg RB, Ackermann RT, Crandall JP, Florez JC, et al. HbA1c as a predictor of diabetes and as an outcome in the diabetes prevention program: A randomized clinical trial. Diabetes Care 2015;38:51–8. https://doi.org/10.2337/dc14-0886.

[89] Skovsø S. Modeling type 2 diabetes in rats using high fat diet and streptozotocin. J Diabetes Investig 2014;5:349–58. https://doi.org/10.1111/jdi.12235.

[90] Husna F, Suyatna FD, Arozal W, Purwaningsih EH. Model Hewan Coba pada Penelitian Diabetes. Pharm Sci Res 2019;6:131–41. https://doi.org/10.7454/psr.v6i3.4531.

[91] Ghasemi A, Khalifi S, Jedi S. Streptozotocin-nicotinamide-induced rat model of type 2 diabetes (review). Acta Physiol Hung 2014;101:408–20. https://doi.org/10.1556/APhysiol.101.2014.4.2.

[92] Er CN. HbA1c elisa kit | Human Glycosylated hemoglobin A1c ELISA Kit. n.d.

[93] Cell Biolabs I. CytoSelect ™ 96-Well Phagocytosis Assay (Zymosan Substrate). 2020; Available from: https://www.cellbiolabs.com/phagocytosis-assay-zymosan-substrate

[94] Nos R, Synthase O, Kit IE, Er CN. Rat NOS2/iNOS(Nitric Oxide Synthase 2, Inducible) ELISA Kit. n.d.

[95] Cusabio. Rat Advanced Glycation End Products (AGEs) ELISA Kit.2020 [cited 2020 Jul 14] :1–14. Available from: https://www.cusabio.com/ELISA-Kit/Rat-advanced-glycation-end-productsAGEs-ELISA-Kit-63625.html

[96] Tang Q, Su Y-W, Xian C. Determining Oxidative Damage by Lipid Peroxidation Assay in Rat Serum. Bio-Protocol 2019;9:1–5. https://doi.org/10.21769/bioprotoc.3263.

[97] Eka-Pratiwi IGAP, Soetjiningsih S, Mantik-Astawa IN, Trisna Windiani IGA. Virgin Coconut Oil Compared to Corn Oil in World Health Organization Formula on Glutathione, TNF-α, and Body Weight Gain in Severe Malnourished Wistar Rat. Bali Med J 2016;5:99. https://doi.org/10.15562/bmj.v5i3.321.

[98] Wiyani L, Rahmawati, Aminah, Aladin A, Mustafiah, Juniar ME. Antioxidant activity of virgin coconut oil and virgin coconut oil emulsion. Syst Rev Pharm 2020;11:973–6. https://doi.org/10.31838/srp.2020.5.139.

[99] Roxo DF, Arcaro CA, Gutierres VO, Costa MC, Oliveira JO, Lima TFO, et al. Curcumin combined with metformin decreases glycemia and dyslipidemia, and increases paraoxonase activity in diabetic rats. Diabetol Metab Syndr 2019;11:1–9. https://doi.org/10.1186/s13098-019-0431-0.

[100] Gutierres VO, Assis RP AC. Curcumin improves the effect of a reduced insulin dose on glycemic control and oxidative stress in streptozotocin-diabetic rats. Phytother Res 2019;33:976–988. https://doi.org/10.1002/ptr.6291 pubmed.

[101] Lima TFO, Costa MC, Figueiredo ID, Inácio MD, Rodrigues MR, Assis RP, et al. Curcumin, Alone or in Combination with Aminoguanidine, Increases Antioxidant Defenses and Glycation Product Detoxification in Streptozotocin-Diabetic Rats: A Therapeutic Strategy to Mitigate Glycoxidative Stress. Oxid Med Cell Longev 2020;2020. https://doi.org/10.1155/2020/1036360.

[102] Cicih A, Aligita W, Susilawati E. A Review : The pharmacokinetics and pharmacodynamics of metformin-herb interactions Review : Interaksi farmakokinetik dan farmakodinamik metformin-herbal Intisari hiperglikemia yang dapat mengakibatkan gangguan mikrovaskular jangka panjang , makrovaskular. J Ilm Farm (Scientific J Pharmacy) 2022;18:13–25.

[103] Zake DM, Kurlovics J, Zaharenko L, Komasilovs V, Klovins J, Stalidzans E. Physiologically based metformin pharmacokinetics model of mice and scale-up to humans for the estimation of concentrations in various tissues. PLoS One 2021;16:1–27. https://doi.org/10.1371/journal.pone.0249594.

[104] Riso P, Visioli F, Erba D, Testolin G, Porrini M. Lycopene and vitamin C concentrations increase in plasma and lymphocytes after tomato intake. Effects on cellular antioxidant protection. Eur J Clin Nutr 2004;58:1350–8. https://doi.org/10.1038/sj.ejcn.1601974.

[105] Geerlings SE, Hoepelman AIM. Immune dysfunction in patients with diabetes mellitus (DM). FEMS Immunol Med Microbiol 1999;26:259–65.

[106] Park B, Lim JW KH. Lycopene treatment inhibits activation of Jak1/Stat3 and Wnt/β-catenin signaling and attenuates hyperproliferation in gastric epithelial cells. Nutr Res n.d.;70:70–81. https://doi.org/10.1016/j.nutres.2018.07.010.

[107] Liu TY, Chen SB. Sarcandra glabra combined with lycopene protect rats from lipopolysaccharide induced acute lung injury via reducing inflammatory response. Biomed Pharmacother 2016;84:34–41. https://doi.org/10.1016/j.biopha.2016.09.009.

[108] Roh M-K, Jeon M-H, Moon J-N, Moon W-S, Park S-M, Choi J-S. A simple method for the isolation of lycopene from Lycopersicon esculentum Hair growth promoting effects of rice bran supercritical CO2 extract View project Project on "Improvement in Pangas Farming by Using Silver Carp (Hypophthalmichthys molitrix) to Re. Bot Sci 2013:187–92.

[109] Górecka D, Wawrzyniak A, Jędrusek-Golińska A, Dziedzic K, Hamułka J, Kowalczewski PŁ, et al. Lycopene in tomatoes and tomato products. Open Chem 2020;18:752–6. https://doi.org/10.1515/chem-2020-0050.

[110] Arkoub-Djermoune L, Bellili S, Khenouce L, Benmeziane F, Madani K, Boulekbache-Makhlouf L. Effect of domestic cooking on physicochemical parameters, phytochemicals and antioxidant properties of algerian tomato (Solanum Lycopersicum L. Var. Marmande). J Food Technol Res 2019;6:1–17. https://doi.org/10.18488/journal.58.2019.61.1.17.

[111] Fiza S, Imran S, Tanweer A. Thermal Processing And Lycopene Content Of Tomatoes- A Public Health Perspective. Nurture 2020;14:12–7. https://doi.org/10.55951/nurture.v14i1.9.

[112] Cunningham AT, Crittendon DR, White N, Mills GD, Diaz V, Lanoue MD. The effect of diabetes self-management education on HbA1c and quality of life in African-Americans: A systematic review and meta-analysis. BMC Health Serv Res 2018;18. https://doi.org/10.1186/s12913-018-3186-7.

[113] Sianturi M. Self Management and Immune Status Diabetes Mellitus Patients. Nurs Care J 2022;1:1–7.

Lampiran 1:

Ijin penelitian

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI
UNIVERSITAS DIPONEGORO
FAKULTAS KEDOKTERAN

Jalan Prof. Mr. Sunarto
Kampus Universitas Diponegoro
Tembalang, Semarang, Kode Pos 50275
Telepon/Faksimile (024) 76928010/ 76928011
Laman: www.fk.undip.ac.id,
Pos-el: dean(at)fk.undip.ac.id

27 JUN 2022

Nomor : 4727 /UN7.F4/PP/VI/2022
Lamp. :
Hal : **Permohonan Ijin Penelitian**

Yth. Kepala Laboratorium Pusat Studi Pangan dan Gizi
Universitas Gadjah Mada
Yogyakarta

Bersama ini dengan hormat kami kirimkan *permohonan ijin penelitian* untuk keperluan penyusunan Disertasi mahasiswa Program Studi Doktor Ilmu Kedokteran dan Kesehatan Fakultas Kedokteran Universitas Diponegoro, yaitu atas nama :

Nama	NIM	Judul
Medina Sianturi, S.Kp, MSi.Med	22010119510007	EFEKTIVITAS KOMBINASI LIKOPEN DAN METFORMIN TERHADAP FUNGSI NEUTROFIL MELALUI PENURUNAN KADAR GULA DARAH, ROS, NO dan AGEs PADA TIKUS (RATTUS NORVEGICUS) DM TIPE 2

Yang bersangkutan adalah mahasiswa aktif Program Studi Doktor Ilmu Kedokteran dan Kesehatan Fakultas Kedokteran Universitas Diponegoro, dengan Sertifikat Ethical Clearence No. 28/EC/H/FK-UNDIP/IV//2022. Dan sehubungan dengan penelitian Disertasi yang akan dilaksanakan, maka kami *memohonkan ijin* bagi mahasiswa yang bersangkutan untuk dapat melakukan penelitian di *wilayah kerja Laboratorium Pusat Studi Pangan dan Gizi Universitas Gadjah Mada, Yogyakarta.*
Atas perhatian dan kerjasamanya, kami ucapkan terima kasih.

Dekan,

Prof.Dr.dr. Dwi Pudjonarko,MKes,Sp.S(K)
NIP. 196607201995121001

Tembusan Yth :
1. Mahasiswa yang bersangkutan
2. Pertinggal

Lampiran 2.

Ethical Clearance

KOMISI ETIK PENELITIAN KESEHATAN
HEALTH RESEARCH ETHICS COMMITTE
UNIVERSITAS DIPONEGORO
FAKULTAS KEDOKTERAN

Sekretariat :
Kantor Dekanat Lama
FK UNDIP Lt. 1
Jl. Dr. Soetomo 18 Semarang,
Telp. 024-769280010; 769280011 pswt
7820, email : komisietik@gmail.com

ETHICAL CLEARANCE
No. 28/EC/H/FK-UNDIP/IV/2022

Komisi Etik Penelitian Kesehatan Fakultas Kedokteran Universitas Diponegoro Semarang, setelah membaca dan menelaah Usulan Penelitian dengan judul :

Efektivitas Kombinasi Likopen dan Metformin terhadap Fungsi Neutrofil melalui Penurunan Kadar Gula darah, ROS, NO dan AGEs pada Tikus (*Rattus Norvegicus*) DM Tipe 2

Nama Peneliti : ***Medina Sianturi, S.Kp, M.Si.Med***

Promotor : **Dr. dr. Neni Susilaningsih, M.Si**

Ko-Promotor : **Dr. dr. K. Heri Nugroho HS, SpPD, K-EMD, FINASM**

Institusi : Program Doktor Ilmu Kedokteran dan Kesehatan
Fakultas Kedokteran Universitas Diponegoro Semarang

Penelitian : Dilaksanakan di Laboratorium Pangan dan Gizi Pusat antar Universitas Universitas Gadjah Mada (PAU UGM) Yogyakarta

Setuju untuk dilaksanakan, dengan memperhatikan prinsip-prinsip yang dinyatakan dalam Deklarasi Helsinki 1975, yang diamandemen di Seoul 2008 dan Pedoman Nasional Etik Penelitian Kesehatan (PNEPK) Departemen Kesehatan RI 2011.

Pada laporan akhir peneliti harus melampirkan cara pemeliharaan & dekapitasi hewan coba dan melaporkan ke KEPK bahwa penelitian sudah selesai dilampiri Abstrak Penelitian.

Semarang, 22 April 2022

Komisi Etik Penelitian Kesehatan
Fakultas Kedokteran Undip,
Ketua,

Prof. Dr. dr. Banundari Rachmawati, Sp.PK(K)
NIP. 19600606 198811 2 002

Lampiran 3

UNIVERSITAS GADJAH MADA
PUSAT STUDI PANGAN DAN GIZI
Alamat: Gedung PAU-UGM, Jalan Teknika Utara, Barek, Yogyakarta 55281, Telp./Fax. (0274) 589242
http://cfns.ugm.ac.id, E-mail: cfns@ugm.ac.id

SURAT KETERANGAN

No. : 57/UN.1/ PS.24/Adm.PSPG/TA.00.03/2023

Yang bertanda tangan di bawah ini, Kepala Pusat Studi Pangan dan Gizi Universitas Gadjah Mada menerangkan bahwa mahasiswa berikut :

Nama	:	Medina Sianturi
NIM	:	22010119510007
Institusi	:	Program Studi Doktor Ilmu Kedokteran dan Kesehatan Fakultas Kedokteran Universitas Diponegoro
Judul Penelitian	:	Efektivitas Kombinasi Ekstrak Likopen dan Metformin terhadap Fungsi Fagositosis Melalui Penurunan Kadar Gula Darah, ROS, NO dan AGEs pada Tikus (*Rattus Norvegicus*) DM Tipe 2

Telah melakukan penelitian di Laboratorium Gizi (Kandang Hewan Coba) di Pusat Studi Pangan dan Gizi Universitas Gadjah Mada pada tanggal 1 Agustus 2022 – 3 September 2022.

Demikian Surat Keterangan ini kami buat untuk dapat digunakan sebagaimana perlunya.

Yogyakarta, 22 Februari 2023
Kepala,

Prof. Dr. Ir. Sri Raharjo, M.Sc.
NIP. 196307231986031001

UNIVERSITAS GADJAH MADA

Pusat Studi Pangan dan Gizi
Jln. Teknika Utara, Barek, YOGYAKARTA 55281
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Email : cfns@ugm.ac.id

SURAT KETERANGAN BEBAS PEMINJAMAN

Menerangkan bahwa :

Nama Mahasiswa/Peneliti	:	Medina Sianturi
No. Mahasiswa	:	22010119510007
Jurusan/Fakultas/Universitas	:	Program Studi Doktor Ilmu Kedokteran dan Kesehatan Fakultas Kedokteran Universitas Diponegoro
Alamat Rumah & Nomor Telpon/HP	:	Jl. Tanjungsari RT 9 RW 2 Sumurboto Banyumanik Semarang / 08161839418

Tidak mempunyai pinjaman peralatan dan bon bahan di laboratorium Pusat Studi Pangan dan Gizi Universitas Gadjah Mada

Yogyakarta, 22 Februari 2023

Teknisi,
Laboratorium Mikrobiologi

M. Agus Sarwoko

Teknisi,
Laboratorium Kimia dan Biokimia

Purwadi

Teknisi,
Laboratorium Gizi

Yuli Yanto

Teknisi,
Laboratorium Rekayasa Pangan,

Suyadi

Mengetahui :
Kepala,

Prof. Dr. Ir. Sri Raharjo, M.Sc.
NIP. 196307231986031001

Lampiran 4.

Prosedur laboratorium

1. Prosedur pengambilan sampel darah

Anastesi tikus menggunakan ketamin, isi spuit 1 ml dengan heparin 5 U, kemudian darah diambil melalui vena jugularis atau retro-orbita dan dipindahkan ke tabung kaca ukuran 12x75 mm

2. Pembuatan kultur makrofag

a. Tikus dianastesi dengan cara diberi ketamine 100 mg/kg
b. Fiksasi tikus pada meja operasi, bersihkan daerah abdomen dengan alkohol, gunting kulit abdomen untuk membuka peritoneum.
c. Suntikkan RPMI yang dingin 10 cc ke dalam rongga peritoneum, ditepuk secara perlahan, kemudian cairan diaspirasi kembali ke dalam spuit.
d. Cairan peritoneum disentrifugasi 1200 RPM selama 10 menit.
e. Buang supernatan dan tambahkan medium RPMI 3 ml.
f. Hitung sel yang di dapat menggunakan hemositometer kemudian diresuspensikan dengan medium RPMI sehingga didapat suspensi sel dengan kepadatan 2,5x106 /ml.
g. Suspensi sel yang telah dihitung dikultur pada microplate 24 well yang telah diberi coverslips bulat, setiap sumuran 200µl (5x105 sel). Diinkubasi dalam inkubator CO_2 5%, 37^{o}C selama 24 jam

3. Pemeriksaan indeks fagositosis

a. Tahap uji fagositosis, lateks disuspensikan dalam PBS dengan konsentrasi $2{,}5\times10^{6}$/mL.

b. Sel makrofag telah dikultur selama 24 jam sebelumnya,

c. Ambil media menggunakan pipet tetes kemudian sel dicuci 2 kali dengan RPMI.

d. Tambahkan lateks yang telah diresuspensikan dengan RPMI ke dalam tiap-tiap sumuran sebanyak 200 µl dan inkubasi dilanjutkan dalam inkubator CO2 5% suhu 37°C selama 1jam

e. Cuci sel dengan PBS sebanyak 3 kali dan dikeringkan pada suhu ruangan dan difiksasi dengan metanol selama 30 detik.

f. Buang metanol dan *coverslip* didiamkan sampai kering.

g. Setelah kering, pulas coverslip dengan giemsa 20% (v/v) selama 20 menit, dicuci dengan aquades, diangkat dari sumuran kultur dan dikeringkan pada suhu kamar.

h. Hitung jumlah lateks yang dimakan oleh 100 sel makrofag menggunakan mikroskop optik dengan perbesaran 400x.

4. Pemeriksaan NO

a. Siapkan *nitrat reduktase*, kofaktor enzim, Griess Reagen 1 dan 2, kurva standar yang sesuai dan sampel dalam rangkap dua dalam pelat untuk standar (85 µL), sampel (85 µL) dan sampel sumur kosong (85 µL).

b. Tutup dan inkubasi pada suhu kamar selama 1 jam untuk mengkonversi nitrat menjadi nitric.

c. Tambahkan 5 µL *enhancer* ke sumur standar dan sampel saja. Inkubasi pada RT selama 10 menit.
d. Tambahkan 50 µL Griess Reagen R1 dan 50 µL Griess Reagen R2 ke sumur standar dan sampel saja. Inkubasi plate pada RT 10 menit.
e. Ukur pelat pada OD540 nm [116,117]**.**

5. Pemeriksaan ROS

Pemeriksaan produksi ROS dengan melihat banyaknya superoksida yang dihasilkan dengan menghitung panjang gelombang.

a. Tambahkan larutan reagen ke dalam sel hingga konsentrasi 0,1-20 µM.
b. Tentukan konsentrasi yang sesuai dengan rasio pengenceran 1:5000 – 1: 1000. Inkubasi pada suhu 37℃ selama 30 menit- 60 menit.
c. Suspensi sel di sentrifugasi 1000 g selama 5-10 menit kemudian cuci dengan reagen 3 sebanyak 2-3 kali.
d. Sentrifugasi dan kumpulkan presipitat sel untuk dilakukan deteksi fluoresensi.
e. Sel yang melekat diberi tripsin 0,25 %, tambahkan FBS untuk menghentikan pencernaan, kemudian suspense sel di sentrifugasi 1000 g selama 5-10 menit dan kumpulkan sel dan cuci dengan reagen 3 sebanyak 1-2 kali.
f. Sentrifugasi dan kumpulkan presipitat sel untuk deteksi fluoresensi.
g. Suspensi kembali sel yang dikumpulkan dengan reagen 3 kemudian di deteksi dengan panjang gelombang eksitasi 500 nm dan panjang gelombang emisi 525 nm [112,117]**.**

6. Pemeriksaan AGES

Menggunakan metode *sandwich*-ELISA.

a. Sampel darah vena 3 ml dimasukkan ke dalam tabung tanpa koagulasi, dibiarkan menggumpal pada suhu kamar selama 30 menit, kemudian disentrifugasi 3000 rpm selama 15020 menit. Serum dimasukkan ke dalam alikuot dan disimpan pada suhu -20 ° C (stabil 1 bulan) atau –80 ° C (stabil 6 bulan) untuk menghindari pencairan berulang [113]**.**
b. Tetapkan set standar, control. Catat posisi untuk menghindari duplikasi
c. Cuci plate 2 kali sebelum penentuan standar dan control
d. Masukkan sampel dan *Biotin-labeled Antibody*, tambahkan 50 ul standar, kosongan atau sampel tiap sumuran. Sumur yang kosong ditambahkan larutan penyangga standar dan tutup. Inkubasi pada suhu 37^0C selama 45 menit
e. Cuci dengan buffer sebanyak 5 kali, dan biarkan di dalam sumuran selama 1-2 menit setiap pencucian
f. Tambahkan 90 ul substrat TBM ke tiap sumuran, tutup dan inkubasi selam30 menit
g. Tambahkan larutan stop 50 ul
h. Baca hasil langsung di *Microplate Reader* dengan OD. absorbansi pada 450 nm

7. Pemeriksaan gula darah HbA1c

Pengambilan darah vena dilakukan melalui retro orbita yang dilakukan sesuah intervensi. Pemeriksaan gula darah dengan melihat kadar hemoglobin terglikosilasi dalam serum yaitu rata-rata glukosa darah tikus selama 60 hari diukur menggunakan metode Elisa.

Prosedur pemeriksaan sebagai berikut:

i. Tetapkan standar, tes sampel (diencerkan setidaknya 1/2 dengan larutan penyangga), dan sumuran kontrol (kosong)
j. Siapkan Standar: Tabung 0,1,2,3,4,5 dan 6 berisi Aliquot 100 ul, serta sampel larutan *buffer* di sumuran standar. 3.
k. Tambahkan Sampel: Tambahkan 100 ul sampel yang diencerkan ke dalam sumur sampel uji.
l. Inkubasi: Tutup plat dengan penutup dan inkubasi pada suhu 37°C selama 90 menit.
m. Lakukan pencucian: Lepas penutup dan buang isi plat, dan cuci sebanyak 2 kali dengan *buffer.*
n. Tambahkan 100 ul larutan antibodi berlabel Biotin ke dalam sumur standar, sampel uji dan sumur kosong. Tambahkan larutan di bagian bawah setiap sumur tanpa menyentuh dinding samping, tutupi pelat dan inkubasi pada suhu 37°C selama 60 menit.
o. Cuci kembali: Lepaskan penutup, dan cuci plate 3 kali dengan *buffer*, dan biarkan tetap berada di sumur selama 1-2 menit setiap pencucian..
p. Tambahkan 100 ul larutan *HRP-streptavidin conjugate (SABC)* ke tiap sumur, tutup plate dan inkubasi pada suhu 37°C selama 30 menit.
q. Cuci kembali: Lepas penutup dan cuci plate 5 kali dengan *buffer*, dan biarkan berada di sumur selama 1-2 menit setiap kali.

r. Tambahkan Substrat TMB 90 ul ke dalam masing-masing sumur, tutupi plate dan inkubasi pada suhu 37°C dalam gelap dalam waktu 10-20 menit.

s. Tambahkan 50 ul larutan stop ke dalam masing-masing sumur. Warnanya akan langsung menguning

t. Baca hasil di Microplate Reader dengan OD. absorbansi pada 450 nm

Lampiran 5.

Hasil analisis data dengan SPSS

1. Analisis deskriptif

Descriptives

	Kelompok			Statistic	Std. Error
BB_Pre	normal	Mean		171.6000	3.07571
		95% Confidence Interval for Mean	Lower Bound	163.0605	
			Upper Bound	180.1395	
		5% Trimmed Mean		171.5000	
		Median		170.0000	
		Variance		47.300	
		Std. Deviation		6.87750	
		Minimum		163.00	
		Maximum		182.00	
		Range		19.00	
		Interquartile Range		11.00	
		Skewness		.619	.913
		Kurtosis		1.602	2.000
	DM	Mean		165.6000	1.56844
		95% Confidence Interval for Mean	Lower Bound	161.2453	
			Upper Bound	169.9547	
		5% Trimmed Mean		165.5000	
		Median		164.0000	
		Variance		12.300	
		Std. Deviation		3.50714	
		Minimum		162.00	
		Maximum		171.00	
		Range		9.00	
		Interquartile Range		6.00	
		Skewness		1.018	.913
		Kurtosis		.553	2.000
	DM+ Metformin	Mean		164.4000	1.69115
		95% Confidence Interval for Mean	Lower Bound	159.7046	
			Upper Bound	169.0954	
		5% Trimmed Mean		164.4444	
		Median		165.0000	
		Variance		14.300	
		Std. Deviation		3.78153	

		Minimum		160.00	
		Maximum		168.00	
		Range		8.00	
		Interquartile Range		7.50	
		Skewness		-.239	.913
		Kurtosis		-2.838	2.000
	DM+Metformin +Likopen 10 mg	Mean		165.8000	1.15758
		95% Confidence Interval for Mean	Lower Bound	162.5860	
			Upper Bound	169.0140	
		5% Trimmed Mean		165.7778	
		Median		165.0000	
		Variance		6.700	
		Std. Deviation		2.58844	
		Minimum		163.00	
		Maximum		169.00	
		Range		6.00	
		Interquartile Range		5.00	
		Skewness		.363	.913
		Kurtosis		-2.413	2.000
	DM+Metformin+Likopen 20 mg	Mean		166.8000	1.82757
		95% Confidence Interval for Mean	Lower Bound	161.7259	
			Upper Bound	171.8741	
		5% Trimmed Mean		166.7778	
		Median		165.0000	
		Variance		16.700	
		Std. Deviation		4.08656	
		Minimum		162.00	
		Maximum		172.00	
		Range		10.00	
		Interquartile Range		7.50	
		Skewness		.312	.913
		Kurtosis		-1.780	2.000
	DM+Metformin+Likopen 40 mg	Mean		166.8000	1.56205
		95% Confidence Interval for Mean	Lower Bound	162.4631	
			Upper Bound	171.1369	
		5% Trimmed Mean		166.8333	
		Median		167.0000	
		Variance		12.200	
		Std. Deviation		3.49285	
		Minimum		162.00	
		Maximum		171.00	
		Range		9.00	

		Interquartile Range		6.50	
		Skewness		-.310	.913
		Kurtosis		-.644	2.000
BB_adaptasi	normal	Mean		176.8000	2.85307
		95% Confidence Interval for Mean	Lower Bound	168.8786	
			Upper Bound	184.7214	
		5% Trimmed Mean		176.6111	
		Median		175.0000	
		Variance		40.700	
		Std. Deviation		6.37966	
		Minimum		170.00	
		Maximum		187.00	
		Range		17.00	
		Interquartile Range		10.50	
		Skewness		1.157	.913
		Kurtosis		1.837	2.000
	DM	Mean		171.6000	1.50333
		95% Confidence Interval for Mean	Lower Bound	167.4261	
			Upper Bound	175.7739	
		5% Trimmed Mean		171.5000	
		Median		171.0000	
		Variance		11.300	
		Std. Deviation		3.36155	
		Minimum		168.00	
		Maximum		177.00	
		Range		9.00	
		Interquartile Range		5.50	
		Skewness		1.169	.913
		Kurtosis		2.034	2.000
	DM+ Metformin	Mean		169.8000	1.65529
		95% Confidence Interval for Mean	Lower Bound	165.2042	
			Upper Bound	174.3958	
		5% Trimmed Mean		169.7222	
		Median		169.0000	
		Variance		13.700	
		Std. Deviation		3.70135	
		Minimum		166.00	
		Maximum		175.00	
		Range		9.00	
		Interquartile Range		7.00	
		Skewness		.607	.913
		Kurtosis		-1.174	2.000
	DM+Metformin +Likopen 10 mg	Mean		171.2000	1.46287
		95% Confidence Interval for Mean	Lower Bound	167.1384	

			Upper Bound	175.2616	
		5% Trimmed Mean		171.1667	
		Median		171.0000	
		Variance		10.700	
		Std. Deviation		3.27109	
		Minimum		168.00	
		Maximum		175.00	
		Range		7.00	
		Interquartile Range		6.50	
		Skewness		.134	.913
		Kurtosis		-2.763	2.000
	DM+Metformin+Likopen 20 mg	Mean		172.0000	1.92354
		95% Confidence Interval for Mean	Lower Bound	166.6594	
			Upper Bound	177.3406	
		5% Trimmed Mean		172.0000	
		Median		170.0000	
		Variance		18.500	
		Std. Deviation		4.30116	
		Minimum		167.00	
		Maximum		177.00	
		Range		10.00	
		Interquartile Range		8.00	
		Skewness		.251	.913
		Kurtosis		-2.383	2.000
	DM+Metformin+Likopen 40 mg	Mean		172.0000	1.54919
		95% Confidence Interval for Mean	Lower Bound	167.6987	
			Upper Bound	176.3013	
		5% Trimmed Mean		171.8889	
		Median		171.0000	
		Variance		12.000	
		Std. Deviation		3.46410	
		Minimum		169.00	
		Maximum		177.00	
		Range		8.00	
		Interquartile Range		6.50	
		Skewness		.782	.913
		Kurtosis		-1.021	2.000
BB_pre_intervensi	normal	Mean		193.2000	2.63439
		95% Confidence Interval for Mean	Lower Bound	185.8858	
			Upper Bound	200.5142	
		5% Trimmed Mean		193.1111	
		Median		192.0000	
		Variance		34.700	
		Std. Deviation		5.89067	
		Minimum		186.00	

		Maximum	202.00	
		Range	16.00	
		Interquartile Range	10.00	
		Skewness	.615	.913
		Kurtosis	1.053	2.000
	DM	Mean	186.2000	1.59374
		95% Confidence Interval for Mean Lower Bound	181.7751	
		95% Confidence Interval for Mean Upper Bound	190.6249	
		5% Trimmed Mean	186.0556	
		Median	185.0000	
		Variance	12.700	
		Std. Deviation	3.56371	
		Minimum	183.00	
		Maximum	192.00	
		Range	9.00	
		Interquartile Range	6.00	
		Skewness	1.385	.913
		Kurtosis	1.784	2.000
	DM+ Metformin	Mean	184.6000	1.43527
		95% Confidence Interval for Mean Lower Bound	180.6151	
		95% Confidence Interval for Mean Upper Bound	188.5849	
		5% Trimmed Mean	184.6667	
		Median	185.0000	
		Variance	10.300	
		Std. Deviation	3.20936	
		Minimum	180.00	
		Maximum	188.00	
		Range	8.00	
		Interquartile Range	6.00	
		Skewness	-.608	.913
		Kurtosis	-.681	2.000
	DM+Metformin +Likopen 10 mg	Mean	186.2000	1.28062
		95% Confidence Interval for Mean Lower Bound	182.6444	
		95% Confidence Interval for Mean Upper Bound	189.7556	
		5% Trimmed Mean	186.1667	
		Median	186.0000	
		Variance	8.200	
		Std. Deviation	2.86356	
		Minimum	183.00	
		Maximum	190.00	
		Range	7.00	
		Interquartile Range	5.50	
		Skewness	.307	.913
		Kurtosis	-1.544	2.000
		Mean	187.8000	1.65529

	DM+Metformin+Likopen 20 mg	95% Confidence Interval for Mean	Lower Bound	183.2042	
			Upper Bound	192.3958	
		5% Trimmed Mean		187.8333	
		Median		187.0000	
		Variance		13.700	
		Std. Deviation		3.70135	
		Minimum		183.00	
		Maximum		192.00	
		Range		9.00	
		Interquartile Range		7.00	
		Skewness		-.083	.913
		Kurtosis		-1.621	2.000
	DM+Metformin+Likopen 40 mg	Mean		186.6000	1.36382
		95% Confidence Interval for Mean	Lower Bound	182.8134	
			Upper Bound	190.3866	
		5% Trimmed Mean		186.6111	
		Median		187.0000	
		Variance		9.300	
		Std. Deviation		3.04959	
		Minimum		183.00	
		Maximum		190.00	
		Range		7.00	
		Interquartile Range		6.00	
		Skewness		-.162	.913
		Kurtosis		-2.501	2.000
BB_Mg4	normal	Mean		221.2000	3.02324
		95% Confidence Interval for Mean	Lower Bound	212.8061	
			Upper Bound	229.5939	
		5% Trimmed Mean		221.2222	
		Median		220.0000	
		Variance		45.700	
		Std. Deviation		6.76018	
		Minimum		212.00	
		Maximum		230.00	
		Range		18.00	
		Interquartile Range		12.00	
		Skewness		-.074	.913
		Kurtosis		.017	2.000
	DM	Mean		161.4000	1.43527
		95% Confidence Interval for Mean	Lower Bound	157.4151	
			Upper Bound	165.3849	
		5% Trimmed Mean		161.4444	

		Median		161.0000	
		Variance		10.300	
		Std. Deviation		3.20936	
		Minimum		157.00	
		Maximum		165.00	
		Range		8.00	
		Interquartile Range		6.00	
		Skewness		-.299	.913
		Kurtosis		-1.021	2.000
	DM+ Metformin	Mean		205.4000	1.88680
		95% Confidence Interval for Mean	Lower Bound	200.1614	
			Upper Bound	210.6386	
		5% Trimmed Mean		205.4444	
		Median		207.0000	
		Variance		17.800	
		Std. Deviation		4.21900	
		Minimum		200.00	
		Maximum		210.00	
		Range		10.00	
		Interquartile Range		8.00	
		Skewness		-.431	.913
		Kurtosis		-2.146	2.000
	DM+Metformin +Likopen 10 mg	Mean		203.6000	2.24944
		95% Confidence Interval for Mean	Lower Bound	197.3545	
			Upper Bound	209.8455	
		5% Trimmed Mean		203.5556	
		Median		205.0000	
		Variance		25.300	
		Std. Deviation		5.02991	
		Minimum		198.00	
		Maximum		210.00	
		Range		12.00	
		Interquartile Range		9.50	
		Skewness		.019	.913
		Kurtosis		-1.856	2.000
	DM+Metformin+Likopen 20 mg	Mean		210.8000	1.65529
		95% Confidence Interval for Mean	Lower Bound	206.2042	
			Upper Bound	215.3958	
		5% Trimmed Mean		210.8333	
		Median		210.0000	
		Variance		13.700	
		Std. Deviation		3.70135	

		Minimum	206.00	
		Maximum	215.00	
		Range	9.00	
		Interquartile Range	7.00	
		Skewness	-.083	.913
		Kurtosis	-1.621	2.000
	DM+Metformin+Likopen 40 mg	Mean	211.8000	1.71464
		95% Confidence Interval for Mean Lower Bound	207.0394	
		95% Confidence Interval for Mean Upper Bound	216.5606	
		5% Trimmed Mean	211.8333	
		Median	212.0000	
		Variance	14.700	
		Std. Deviation	3.83406	
		Minimum	207.00	
		Maximum	216.00	
		Range	9.00	
		Interquartile Range	7.50	
		Skewness	-.190	.913
		Kurtosis	-2.167	2.000

Descriptives

	Kelompok penelitian			Statistic	Std. Error
GDP_1_Pre	N	Mean		71.10	1.093
		95% Confidence Interval for Mean	Lower Bound	68.07	
			Upper Bound	74.14	
		5% Trimmed Mean		71.06	
		Median		69.85	
		Variance		5.977	
		Std. Deviation		2.445	
		Minimum		69	
		Maximum		74	
		Range		6	
		Interquartile Range		5	
		Skewness		.600	.913
		Kurtosis		-2.498	2.000
	DM	Mean		268.75	2.920
		95% Confidence Interval for Mean	Lower Bound	260.64	
			Upper Bound	276.85	
		5% Trimmed Mean		268.60	
		Median		268.38	
		Variance		42.626	
		Std. Deviation		6.529	
		Minimum		261	
		Maximum		279	
		Range		18	
		Interquartile Range		10	
		Skewness		.928	.913
		Kurtosis		2.176	2.000
	DMet	Mean		273.60	4.643
		95% Confidence Interval for Mean	Lower Bound	260.71	

		Upper Bound	286.49	
	5% Trimmed Mean		273.45	
	Median		269.12	
	Variance		107.779	
	Std. Deviation		10.382	
	Minimum		264	
	Maximum		286	
	Range		22	
	Interquartile Range		20	
	Skewness		.502	.913
	Kurtosis		-2.971	2.000
DML-10 mg	Mean		269.56	4.194
	95% Confidence Interval for Mean	Lower Bound	257.91	
		Upper Bound	281.20	
	5% Trimmed Mean		269.48	
	Median		265.81	
	Variance		87.964	
	Std. Deviation		9.379	
	Minimum		260	
	Maximum		280	
	Range		20	
	Interquartile Range		18	
	Skewness		.424	.913
	Kurtosis		-3.036	2.000
DML-20 mg	Mean		268.67	3.347
	95% Confidence Interval for Mean	Lower Bound	259.38	
		Upper Bound	277.97	
	5% Trimmed Mean		268.24	
	Median		266.54	
	Variance		56.021	
	Std. Deviation		7.485	

		Minimum		264	
		Maximum		282	
		Range		18	
		Interquartile Range		11	
		Skewness		1.887	.913
		Kurtosis		3.724	2.000
	DML-40 mg	Mean		269.93	3.354
		95% Confidence Interval for Mean	Lower Bound	260.61	
			Upper Bound	279.24	
		5% Trimmed Mean		269.77	
		Median		269.12	
		Variance		56.247	
		Std. Deviation		7.500	
		Minimum		262	
		Maximum		281	
		Range		19	
		Interquartile Range		14	
		Skewness		.653	.913
		Kurtosis		-.219	2.000
GDP_5_post	N	Mean		76.2460	.60463
		95% Confidence Interval for Mean	Lower Bound	74.5673	
			Upper Bound	77.9247	
		5% Trimmed Mean		76.3100	
		Median		76.6300	
		Variance		1.828	
		Std. Deviation		1.35199	
		Minimum		73.95	
		Maximum		77.39	
		Range		3.44	
		Interquartile Range		2.10	
		Skewness		-1.704	.913
		Kurtosis		3.173	2.000

DM	Mean		274.2520	2.35429
	95% Confidence Interval for Mean	Lower Bound	267.7154	
		Upper Bound	280.7886	
	5% Trimmed Mean		274.0944	
	Median		273.1800	
	Variance		27.713	
	Std. Deviation		5.26436	
	Minimum		268.58	
	Maximum		282.76	
	Range		14.18	
	Interquartile Range		8.43	
	Skewness		1.203	.913
	Kurtosis		2.254	2.000
DMet	Mean		112.2600	1.03374
	95% Confidence Interval for Mean	Lower Bound	109.3899	
		Upper Bound	115.1301	
	5% Trimmed Mean		112.2811	
	Median		112.6400	
	Variance		5.343	
	Std. Deviation		2.31150	
	Minimum		109.20	
	Maximum		114.94	
	Range		5.74	
	Interquartile Range		4.40	
	Skewness		-.315	.913
	Kurtosis		-1.421	2.000
DML-10 mg	Mean		128.5060	1.61121
	95% Confidence Interval for Mean	Lower Bound	124.0326	
		Upper Bound	132.9794	
	5% Trimmed Mean		128.5872	
	Median		129.8900	
	Variance		12.980	

		Std. Deviation		3.60277	
		Minimum		123.75	
		Maximum		131.80	
		Range		8.05	
		Interquartile Range		6.90	
		Skewness		-.599	.913
		Kurtosis		-2.288	2.000
	DML-20 mg	Mean		95.6320	1.03313
		95% Confidence Interval for Mean	Lower Bound	92.7636	
			Upper Bound	98.5004	
		5% Trimmed Mean		95.7217	
		Median		96.1700	
		Variance		5.337	
		Std. Deviation		2.31015	
		Minimum		91.95	
		Maximum		97.70	
		Range		5.75	
		Interquartile Range		4.02	
		Skewness		-1.228	.913
		Kurtosis		1.235	2.000
	DML-40 mg	Mean		88.8120	1.41061
		95% Confidence Interval for Mean	Lower Bound	84.8955	
			Upper Bound	92.7285	
		5% Trimmed Mean		88.8461	
		Median		88.1200	
		Variance		9.949	
		Std. Deviation		3.15423	
		Minimum		84.67	
		Maximum		92.34	
		Range		7.67	
		Interquartile Range		5.94	
		Skewness		-.127	.913
		Kurtosis		-1.537	2.000
GD_delta	N	Mean		-5.1440	1.00801

	95% Confidence Interval for Mean	Lower Bound	-7.9427	
		Upper Bound	-2.3453	
	5% Trimmed Mean		-5.1233	
	Median		-5.2000	
	Variance		5.080	
	Std. Deviation		2.25398	
	Minimum		-7.91	
	Maximum		-2.75	
	Range		5.16	
	Interquartile Range		4.43	
	Skewness		-.110	.913
	Kurtosis		-2.349	2.000
DM	Mean		-5.5020	.67972
	95% Confidence Interval for Mean	Lower Bound	-7.3892	
		Upper Bound	-3.6148	
	5% Trimmed Mean		-5.4878	
	Median		-5.4900	
	Variance		2.310	
	Std. Deviation		1.51991	
	Minimum		-7.55	
	Maximum		-3.71	
	Range		3.84	
	Interquartile Range		2.87	
	Skewness		-.258	.913
	Kurtosis		-1.045	2.000
DMet	Mean		161.3420	3.74784
	95% Confidence Interval for Mean	Lower Bound	150.9363	
		Upper Bound	171.7477	
	5% Trimmed Mean		161.1050	
	Median		156.4700	
	Variance		70.232	
	Std. Deviation		8.38043	

	Minimum		154.71	
	Maximum		172.24	
	Range		17.53	
	Interquartile Range		15.63	
	Skewness		.689	.913
	Kurtosis		-2.653	2.000
DML-10 mg	Mean		141.0540	2.83771
	95% Confidence Interval for Mean	Lower Bound	133.1753	
		Upper Bound	148.9327	
	5% Trimmed Mean		140.9339	
	Median		136.8300	
	Variance		40.263	
	Std. Deviation		6.34531	
	Minimum		135.92	
	Maximum		148.35	
	Range		12.43	
	Interquartile Range		11.76	
	Skewness		.604	.913
	Kurtosis		-3.272	2.000
DML-20 mg	Mean		173.0440	3.55731
	95% Confidence Interval for Mean	Lower Bound	163.1673	
		Upper Bound	182.9207	
	5% Trimmed Mean		172.7517	
	Median		173.0000	
	Variance		63.272	
	Std. Deviation		7.95439	
	Minimum		165.90	
	Maximum		185.45	
	Range		19.55	
	Interquartile Range		13.93	
	Skewness		1.026	.913
	Kurtosis		.865	2.000
	Mean		181.1140	2.20946

	DML-40 mg	95% Confidence Interval for Mean	Lower Bound	174.9796	
			Upper Bound	187.2484	
		5% Trimmed Mean		180.8822	
		Median		180.8200	
		Variance		24.409	
		Std. Deviation		4.94050	
		Minimum		177.09	
		Maximum		189.31	
		Range		12.22	
		Interquartile Range		7.94	
		Skewness		1.493	.913
		Kurtosis		2.439	2.000

Descriptives

	Kelompok penelitian			Statistic	Std. Error
Fungsi fagositosis (%)	N	Mean		.1920	.02557
		95% Confidence Interval for Mean	Lower Bound	.1210	
			Upper Bound	.2630	
		5% Trimmed Mean		.1922	
		Median		.2000	
		Variance		.003	
		Std. Deviation		.05718	
		Minimum		.12	
		Maximum		.26	
		Range		.14	
		Interquartile Range		.11	
		Skewness		-.173	.913
		Kurtosis		-1.751	2.000
	DM	Mean		.1600	.02550
		95% Confidence Interval for Mean	Lower Bound	.0892	
			Upper Bound	.2308	
		5% Trimmed Mean		.1594	
		Median		.1400	
		Variance		.003	
		Std. Deviation		.05701	

	Minimum		.09	
	Maximum		.24	
	Range		.15	
	Interquartile Range		.10	
	Skewness		.405	.913
	Kurtosis		-.178	2.000
DMet	Mean		.2280	.02835
	95% Confidence Interval for Mean	Lower Bound	.1493	
		Upper Bound	.3067	
	5% Trimmed Mean		.2250	
	Median		.1900	
	Variance		.004	
	Std. Deviation		.06340	
	Minimum		.18	
	Maximum		.33	
	Range		.15	
	Interquartile Range		.11	
	Skewness		1.392	.913
	Kurtosis		1.124	2.000
DML-10 mg	Mean		.2080	.00917
	95% Confidence Interval for Mean	Lower Bound	.1826	
		Upper Bound	.2334	
	5% Trimmed Mean		.2072	
	Median		.2100	
	Variance		.000	
	Std. Deviation		.02049	
	Minimum		.19	
	Maximum		.24	
	Range		.05	
	Interquartile Range		.03	
	Skewness		1.022	.913
	Kurtosis		.918	2.000
DML-20 mg	Mean		.3340	.04411
	95% Confidence Interval for Mean	Lower Bound	.2115	
		Upper Bound	.4565	
	5% Trimmed Mean		.3361	
	Median		.3300	
	Variance		.010	
	Std. Deviation		.09864	
	Minimum		.19	
	Maximum		.44	
	Range		.25	
	Interquartile Range		.18	
	Skewness		-.606	.913
	Kurtosis		-.198	2.000
DML-40 mg	Mean		.5540	.01806
		Lower Bound	.5039	

		95% Confidence Interval for Mean	Upper Bound	.6041	
		5% Trimmed Mean		.5533	
		Median		.5400	
		Variance		.002	
		Std. Deviation		.04037	
		Minimum		.51	
		Maximum		.61	
		Range		.10	
		Interquartile Range		.07	
		Skewness		.579	.913
		Kurtosis		-1.221	2.000
Kadar HbA1c (ng/ml)	N	Mean		25.6540	.84831
		95% Confidence Interval for Mean	Lower Bound	23.2987	
			Upper Bound	28.0093	
		5% Trimmed Mean		25.5683	
		Median		25.1400	
		Variance		3.598	
		Std. Deviation		1.89687	
		Minimum		24.00	
		Maximum		28.85	
		Range		4.85	
		Interquartile Range		3.00	
		Skewness		1.631	.913
		Kurtosis		2.936	2.000
	DM	Mean		76.3400	.57570
		95% Confidence Interval for Mean	Lower Bound	74.7416	
			Upper Bound	77.9384	
		5% Trimmed Mean		76.3528	
		Median		76.2300	
		Variance		1.657	
		Std. Deviation		1.28730	
		Minimum		74.51	
		Maximum		77.94	
		Range		3.43	
		Interquartile Range		2.28	
		Skewness		-.331	.913
		Kurtosis		.236	2.000
	DMet	Mean		39.6400	.50536
		95% Confidence Interval for Mean	Lower Bound	38.2369	
			Upper Bound	41.0431	
		5% Trimmed Mean		39.6339	
		Median		39.7000	
		Variance		1.277	
		Std. Deviation		1.13002	
		Minimum		38.27	
		Maximum		41.12	
		Range		2.85	
		Interquartile Range		2.14	
		Skewness		.118	.913

		Kurtosis		-1.187	2.000
	DML-10 mg	Mean		46.5480	.34946
		95% Confidence Interval for Mean	Lower Bound	45.5777	
			Upper Bound	47.5183	
		5% Trimmed Mean		46.5322	
		Median		46.5500	
		Variance		.611	
		Std. Deviation		.78142	
		Minimum		45.69	
		Maximum		47.69	
		Range		2.00	
		Interquartile Range		1.43	
		Skewness		.609	.913
		Kurtosis		-.111	2.000
	DML-20 mg	Mean		34.3880	.64269
		95% Confidence Interval for Mean	Lower Bound	32.6036	
			Upper Bound	36.1724	
		5% Trimmed Mean		34.3372	
		Median		33.7000	
		Variance		2.065	
		Std. Deviation		1.43710	
		Minimum		33.13	
		Maximum		36.56	
		Range		3.43	
		Interquartile Range		2.57	
		Skewness		1.043	.913
		Kurtosis		-.332	2.000
	DML-40 mg	Mean		29.0820	.40720
		95% Confidence Interval for Mean	Lower Bound	27.9514	
			Upper Bound	30.2126	
		5% Trimmed Mean		29.0756	
		Median		28.8500	
		Variance		.829	
		Std. Deviation		.91053	
		Minimum		28.00	
		Maximum		30.28	
		Range		2.28	
		Interquartile Range		1.71	
		Skewness		.306	.913
		Kurtosis		-1.349	2.000
Kadar NO (ng/ml)	N	Mean		.4620	.06086
		95% Confidence Interval for Mean	Lower Bound	.2930	
			Upper Bound	.6310	
		5% Trimmed Mean		.4622	
		Median		.4400	
		Variance		.019	
		Std. Deviation		.13609	
		Minimum		.30	
		Maximum		.62	
		Range		.32	
		Interquartile Range		.27	

	Skewness	.090	.913
	Kurtosis	-2.250	2.000
DM	Mean	11.5960	.41433
	95% Confidence Interval for Mean — Lower Bound	10.4456	
	95% Confidence Interval for Mean — Upper Bound	12.7464	
	5% Trimmed Mean	11.6156	
	Median	11.6700	
	Variance	.858	
	Std. Deviation	.92646	
	Minimum	10.18	
	Maximum	12.66	
	Range	2.48	
	Interquartile Range	1.59	
	Skewness	-.798	.913
	Kurtosis	1.100	2.000
DMet	Mean	3.1200	.03808
	95% Confidence Interval for Mean — Lower Bound	3.0143	
	95% Confidence Interval for Mean — Upper Bound	3.2257	
	5% Trimmed Mean	3.1183	
	Median	3.1000	
	Variance	.007	
	Std. Deviation	.08515	
	Minimum	3.03	
	Maximum	3.24	
	Range	.21	
	Interquartile Range	.16	
	Skewness	.607	.913
	Kurtosis	-1.048	2.000
DML-10 mg	Mean	6.2580	.10646
	95% Confidence Interval for Mean — Lower Bound	5.9624	
	95% Confidence Interval for Mean — Upper Bound	6.5536	
	5% Trimmed Mean	6.2628	
	Median	6.2900	
	Variance	.057	
	Std. Deviation	.23805	
	Minimum	5.90	
	Maximum	6.53	
	Range	.63	
	Interquartile Range	.42	
	Skewness	-.738	.913
	Kurtosis	.657	2.000
DML-20 mg	Mean	2.6600	.13183
	95% Confidence Interval for Mean — Lower Bound	2.2940	
	95% Confidence Interval for Mean — Upper Bound	3.0260	
	5% Trimmed Mean	2.6667	
	Median	2.7100	
	Variance	.087	
	Std. Deviation	.29479	
	Minimum	2.21	
	Maximum	2.99	
	Range	.78	

		Interquartile Range		.52	
		Skewness		-.841	.913
		Kurtosis		.871	2.000
	DML-40 mg	Mean		1.3720	.11052
		95% Confidence Interval for Mean	Lower Bound	1.0652	
			Upper Bound	1.6788	
		5% Trimmed Mean		1.3589	
		Median		1.2600	
		Variance		.061	
		Std. Deviation		.24712	
		Minimum		1.19	
		Maximum		1.79	
		Range		.60	
		Interquartile Range		.39	
		Skewness		1.715	.913
		Kurtosis		2.832	2.000
Kadar ROS (nmol/ml)	N	Mean		1.2480	.09367
		95% Confidence Interval for Mean	Lower Bound	.9879	
			Upper Bound	1.5081	
		5% Trimmed Mean		1.2456	
		Median		1.2100	
		Variance		.044	
		Std. Deviation		.20945	
		Minimum		1.02	
		Maximum		1.52	
		Range		.50	
		Interquartile Range		.40	
		Skewness		.353	.913
		Kurtosis		-1.937	2.000
	DM	Mean		10.2920	.20730
		95% Confidence Interval for Mean	Lower Bound	9.7164	
			Upper Bound	10.8676	
		5% Trimmed Mean		10.2967	
		Median		10.3400	
		Variance		.215	
		Std. Deviation		.46354	
		Minimum		9.66	
		Maximum		10.84	
		Range		1.18	
		Interquartile Range		.87	
		Skewness		-.332	.913
		Kurtosis		-.898	2.000
	DMet	Mean		4.0560	.08501
		95% Confidence Interval for Mean	Lower Bound	3.8200	
			Upper Bound	4.2920	
		5% Trimmed Mean		4.0544	
		Median		4.0700	
		Variance		.036	
		Std. Deviation		.19008	
		Minimum		3.82	
		Maximum		4.32	

		Range		.50	
		Interquartile Range		.34	
		Skewness		.249	.913
		Kurtosis		-.176	2.000
	DML-10 mg	Mean		5.1360	.12404
		95% Confidence Interval for Mean	Lower Bound	4.7916	
			Upper Bound	5.4804	
		5% Trimmed Mean		5.1339	
		Median		5.1200	
		Variance		.077	
		Std. Deviation		.27736	
		Minimum		4.81	
		Maximum		5.50	
		Range		.69	
		Interquartile Range		.53	
		Skewness		.221	.913
		Kurtosis		-1.401	2.000
	DML-20 mg	Mean		3.0620	.10307
		95% Confidence Interval for Mean	Lower Bound	2.7758	
			Upper Bound	3.3482	
		5% Trimmed Mean		3.0644	
		Median		3.1400	
		Variance		.053	
		Std. Deviation		.23048	
		Minimum		2.76	
		Maximum		3.32	
		Range		.56	
		Interquartile Range		.43	
		Skewness		-.421	.913
		Kurtosis		-1.788	2.000
	DML-40 mg	Mean		2.2800	.12268
		95% Confidence Interval for Mean	Lower Bound	1.9394	
			Upper Bound	2.6206	
		5% Trimmed Mean		2.2744	
		Median		2.2700	
		Variance		.075	
		Std. Deviation		.27432	
		Minimum		1.96	
		Maximum		2.70	
		Range		.74	
		Interquartile Range		.47	
		Skewness		.781	.913
		Kurtosis		1.270	2.000
Kadar AGEs (ng/ml)	N	Mean		.7080	.07317
		95% Confidence Interval for Mean	Lower Bound	.5048	
			Upper Bound	.9112	
		5% Trimmed Mean		.7011	
		Median		.6700	
		Variance		.027	
		Std. Deviation		.16362	

	Minimum	.56	
	Maximum	.98	
	Range	.42	
	Interquartile Range	.27	
	Skewness	1.511	.913
	Kurtosis	2.549	2.000
DM	Mean	21.8940	.12636
	95% Confidence Interval for Mean — Lower Bound	21.5432	
	95% Confidence Interval for Mean — Upper Bound	22.2448	
	5% Trimmed Mean	21.9056	
	Median	22.0000	
	Variance	.080	
	Std. Deviation	.28254	
	Minimum	21.43	
	Maximum	22.15	
	Range	.72	
	Interquartile Range	.47	
	Skewness	-1.446	.913
	Kurtosis	2.077	2.000
DMet	Mean	3.8700	.14467
	95% Confidence Interval for Mean — Lower Bound	3.4683	
	95% Confidence Interval for Mean — Upper Bound	4.2717	
	5% Trimmed Mean	3.8794	
	Median	3.8900	
	Variance	.105	
	Std. Deviation	.32350	
	Minimum	3.37	
	Maximum	4.20	
	Range	.83	
	Interquartile Range	.57	
	Skewness	-.953	.913
	Kurtosis	.811	2.000
DML-10 mg	Mean	5.7960	.11526
	95% Confidence Interval for Mean — Lower Bound	5.4760	
	95% Confidence Interval for Mean — Upper Bound	6.1160	
	5% Trimmed Mean	5.7967	
	Median	5.8200	
	Variance	.066	
	Std. Deviation	.25774	
	Minimum	5.45	
	Maximum	6.13	
	Range	.68	
	Interquartile Range	.47	
	Skewness	-.116	.913
	Kurtosis	-.251	2.000
DML-20 mg	Mean	1.9780	.07331
	Lower Bound	1.7745	

		95% Confidence Interval for Mean	Upper Bound	2.1815	
		5% Trimmed Mean		1.9733	
		Median		1.9700	
		Variance		.027	
		Std. Deviation		.16392	
		Minimum		1.81	
		Maximum		2.23	
		Range		.42	
		Interquartile Range		.29	
		Skewness		.917	.913
		Kurtosis		.702	2.000
	DML-40 mg	Mean		1.2380	.08581
		95% Confidence Interval for Mean	Lower Bound	.9997	
			Upper Bound	1.4763	
		5% Trimmed Mean		1.2350	
		Median		1.2400	
		Variance		.037	
		Std. Deviation		.19189	
		Minimum		1.03	
		Maximum		1.50	
		Range		.47	
		Interquartile Range		.36	
		Skewness		.360	.913
		Kurtosis		-1.255	2.000

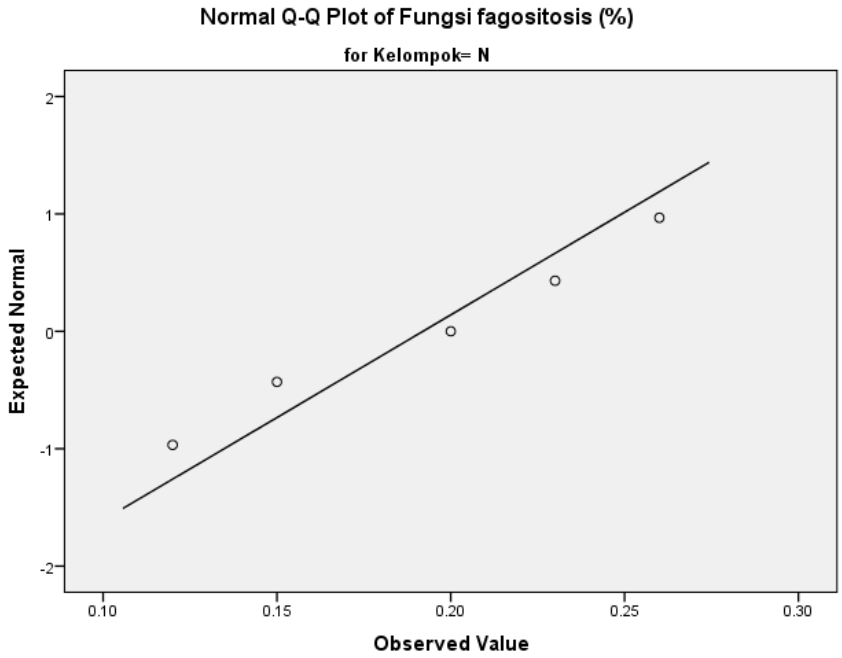
2. Uji Normalitas

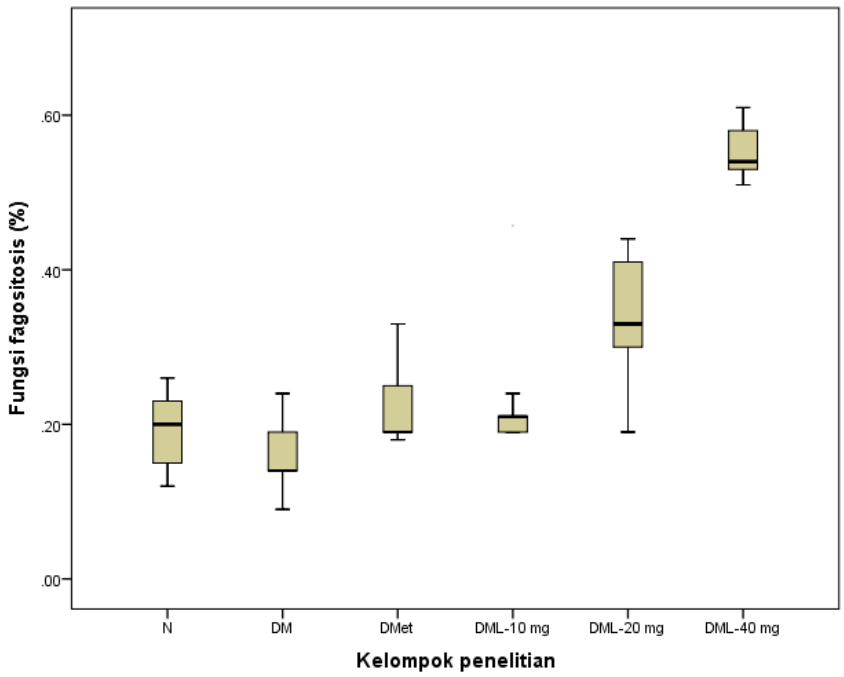
Tests of Normality

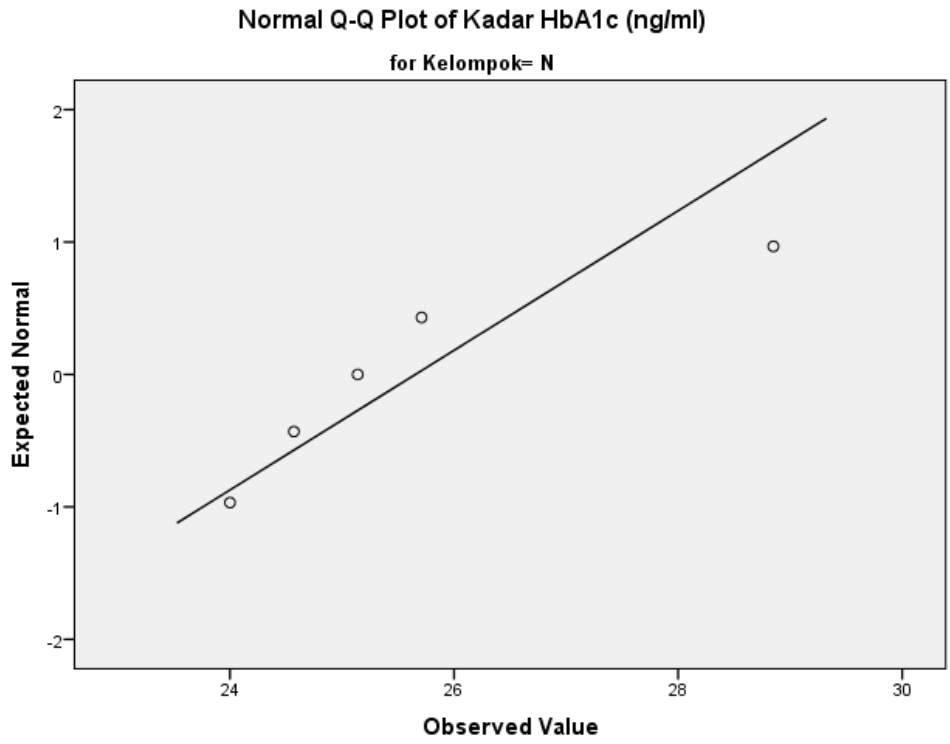
	Kelompok penelitian	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
GDP_1_Pre	N	.296	5	.176	.865	5	.248
	DM	.300	5	.161	.917	5	.510
	DMet	.267	5	.200*	.838	5	.160
	DML-10 mg	.255	5	.200*	.840	5	.165
	DML-20 mg	.335	5	.068	.759	5	.036
	DML-40 mg	.157	5	.200*	.967	5	.853
GDP_5_post	N	.301	5	.156	.834	5	.150
	DM	.265	5	.200*	.915	5	.498
	DMet	.165	5	.200*	.970	5	.877
	DML-10 mg	.250	5	.200*	.874	5	.285
	DML-20 mg	.196	5	.200*	.897	5	.396
	DML-40 mg	.209	5	.200*	.939	5	.661
GD_delta	N	.220	5	.200*	.919	5	.526
	DM	.160	5	.200*	.981	5	.940
	DMet	.319	5	.105	.797	5	.077
	DML-10 mg	.347	5	.049	.743	5	.026
	DML-20 mg	.223	5	.200*	.889	5	.352
	DML-40 mg	.309	5	.133	.830	5	.139
BB_Pre	N	.219	5	.200*	.942	5	.682
	DM	.276	5	.200*	.914	5	.492
	DMet	.229	5	.200*	.858	5	.222
	DML-10 mg	.221	5	.200*	.915	5	.501
	DML-20 mg	.270	5	.200*	.923	5	.551
	DML-40 mg	.136	5	.200*	.989	5	.976
BB_adaptasi	N	.225	5	.200*	.924	5	.555
	DM	.253	5	.200*	.925	5	.560
	DMet	.186	5	.200*	.943	5	.687
	DML-10 mg	.236	5	.200*	.870	5	.265
	DML-20 mg	.279	5	.200*	.885	5	.335
	DML-40 mg	.214	5	.200*	.887	5	.341
BB_pre_intervensi	N	.181	5	.200*	.969	5	.871
	DM	.232	5	.200*	.885	5	.334
	DMet	.173	5	.200*	.958	5	.794
	DML-10 mg	.179	5	.200*	.962	5	.823
	DML-20 mg	.206	5	.200*	.943	5	.687
	DML-40 mg	.203	5	.200*	.923	5	.549
BB_Mg4	N	.172	5	.200*	.984	5	.955
	DM	.191	5	.200*	.958	5	.794
	DMet	.248	5	.200*	.920	5	.532
	DML-10 mg	.220	5	.200*	.923	5	.550
	DML-20 mg	.206	5	.200*	.943	5	.687
	DM+Metformin+Likopen 40 mg	.198	5	.200*	.939	5	.658

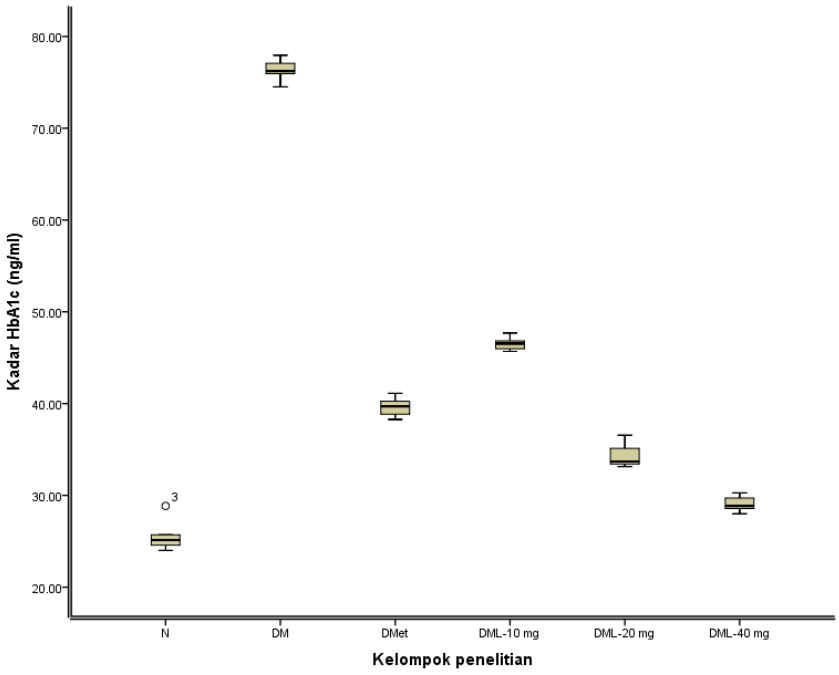
Fagositosis (%)	N	.169	5	.200*	.965	5	.843
	DM	.237	5	.200*	.961	5	.814
	DMet	.326	5	.090	.811	5	.099
	DML-10 mg	.261	5	.200*	.862	5	.236
	DML-20 mg	.179	5	.200*	.954	5	.767
	DML-40 mg	.236	5	.200*	.946	5	.708
Kadar HbA1c (ng/ml)	N	.288	5	.200*	.850	5	.196
	DM	.178	5	.200*	.985	5	.958
	DMet	.161	5	.200*	.982	5	.944
	DML-10 mg	.166	5	.200*	.964	5	.835
	DML-20 mg	.284	5	.200*	.878	5	.298
	DML-40 mg	.201	5	.200*	.967	5	.854
Kadar NO (ng/ml)	N	.207	5	.200*	.936	5	.640
	DM	.208	5	.200*	.964	5	.838
	DMet	.193	5	.200*	.952	5	.749
	DML-10 mg	.172	5	.200*	.972	5	.888
	DML-20 mg	.180	5	.200*	.964	5	.833
	DML-40 mg	.275	5	.200*	.801	5	.082
Kadar ROS (nmol/ml)	N	.175	5	.200*	.945	5	.699
	DM	.141	5	.200*	.984	5	.953
	DMet	.149	5	.200*	.990	5	.978
	DML-10 mg	.160	5	.200*	.976	5	.910
	DML-20 mg	.232	5	.200*	.940	5	.669
	DML-40 mg	.228	5	.200*	.961	5	.811
Kadar AGEs (ng/ml)	N	.271	5	.200*	.873	5	.278
	DM	.246	5	.200*	.877	5	.296
	DMet	.202	5	.200*	.938	5	.649
	DML-10 mg	.137	5	.200*	.997	5	.998
	DML-20 mg	.199	5	.200*	.939	5	.662
	DML-40 mg	.195	5	.200*	.955	5	.776

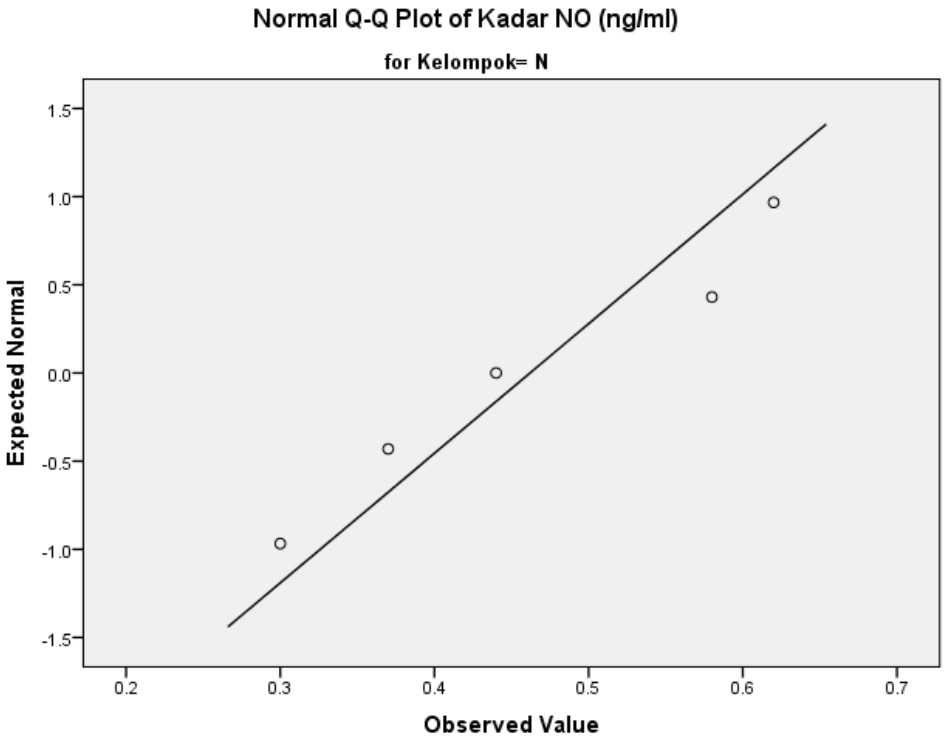
3. Uji Normalitas (Plot)

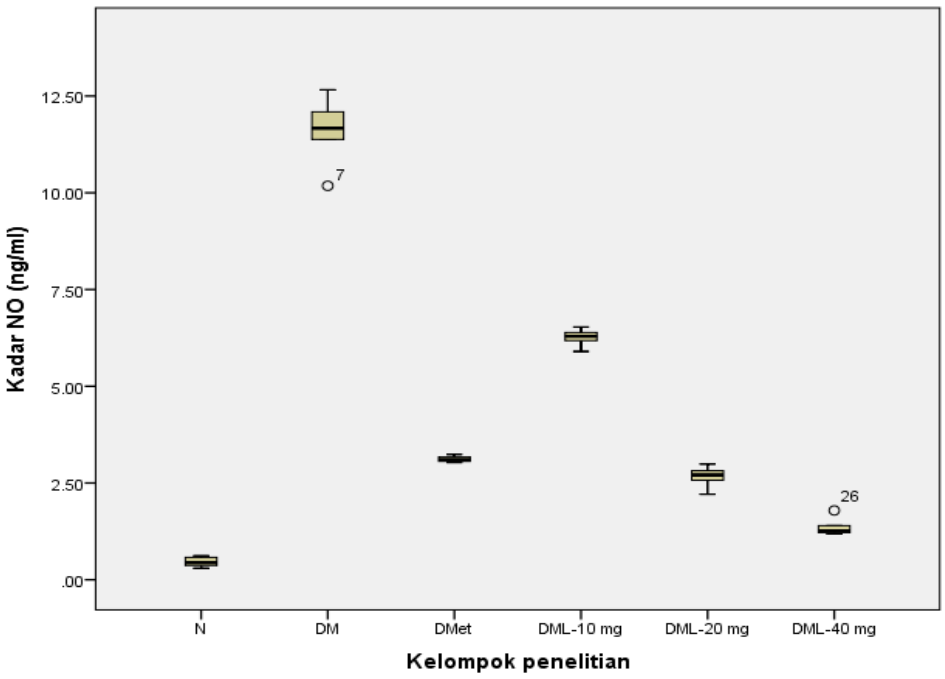


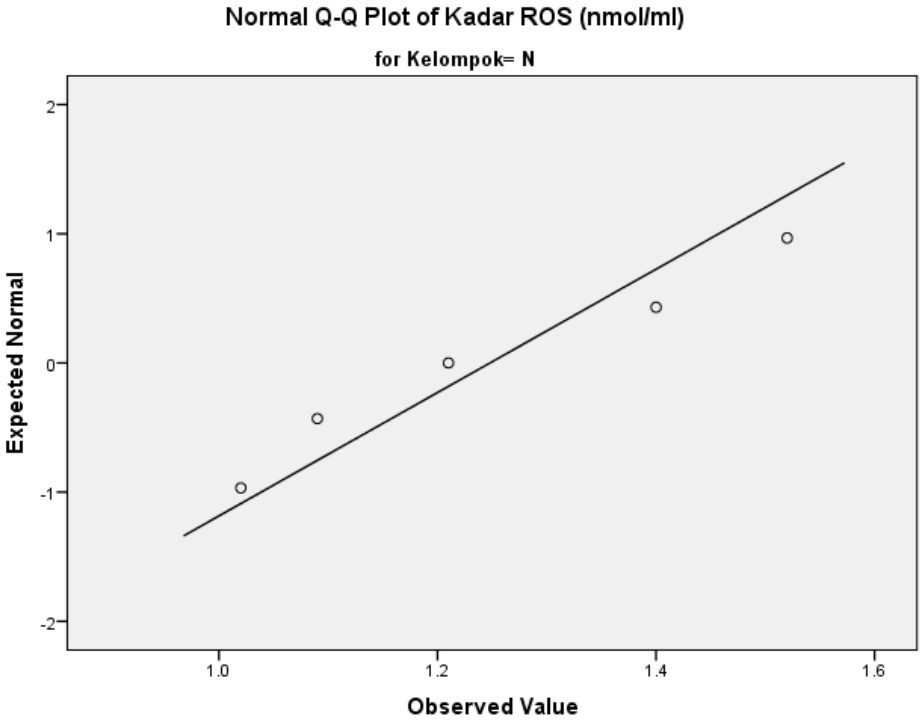


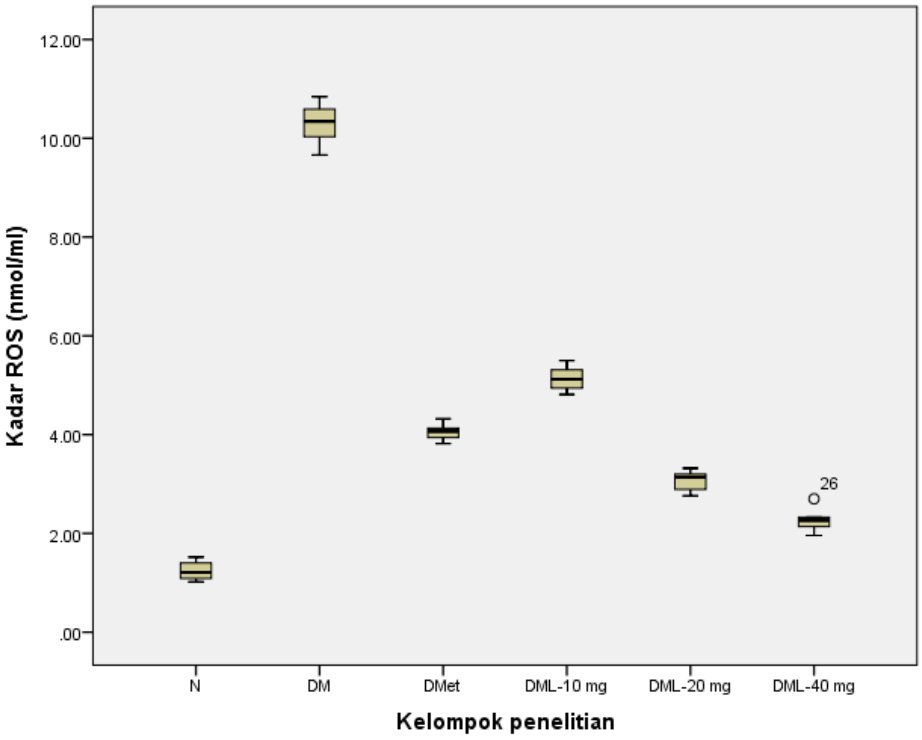

Normal Q-Q Plot of Kadar HbA1c (ng/ml)
for Kelompok= N
Expected Normal
Observed Value
2
1
0
-1
-2
24
26
28
30

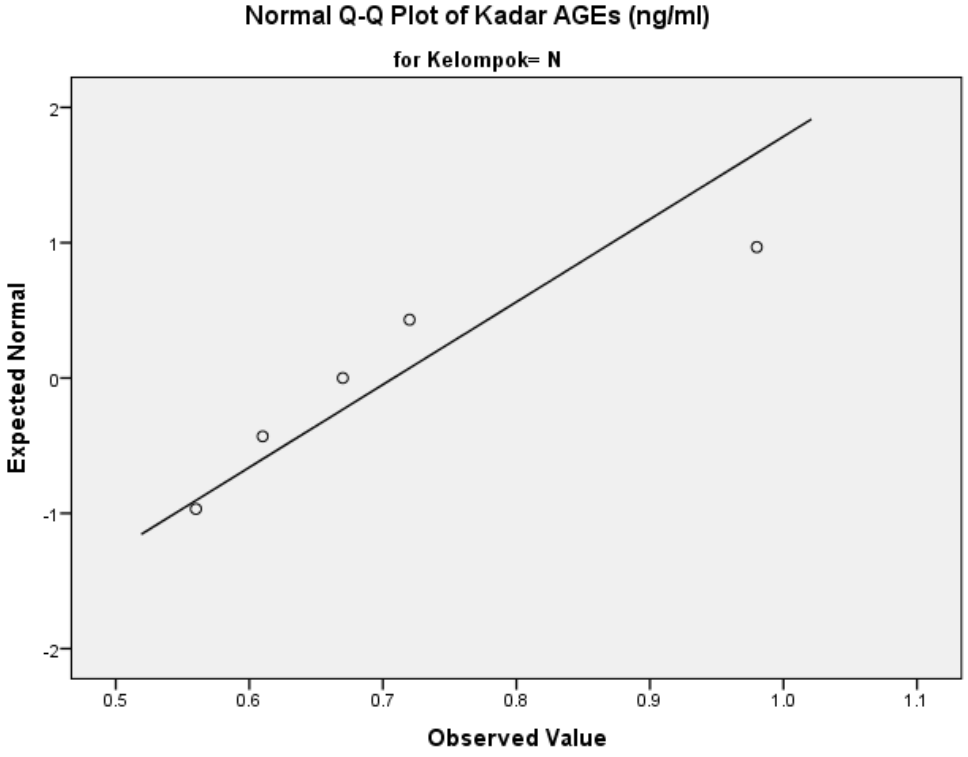

Kadar HbA1c (ng/ml)
Kelompok penelitian
80.00
70.00
60.00
50.00
40.00
30.00
20.00
3
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg

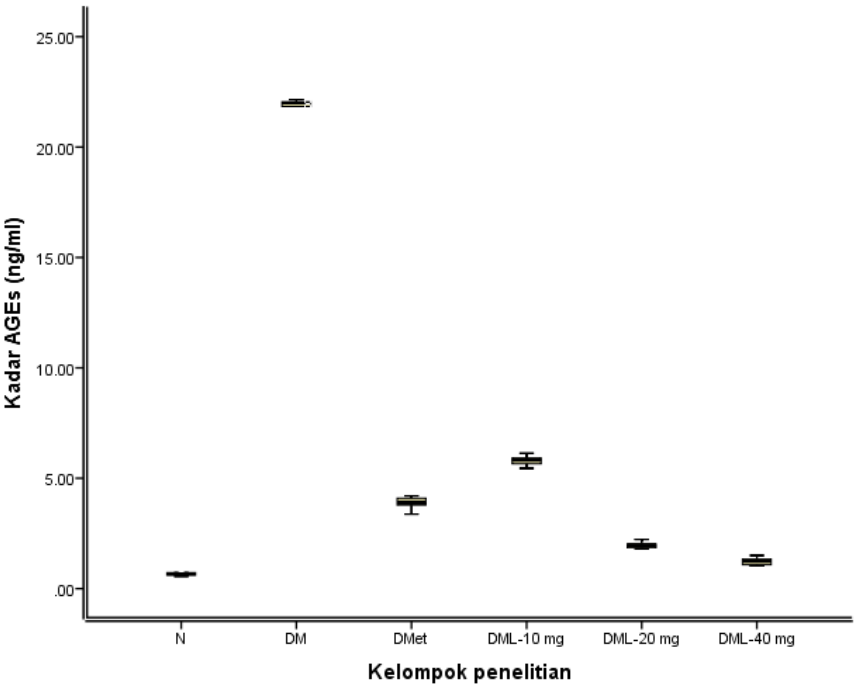

Normal Q-Q Plot of Kadar NO (ng/ml)
for Kelompok= N
Expected Normal
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
0.2
0.3
0.4
0.5
0.6
0.7
Observed Value


Kadar NO (ng/ml)
12.50
10.00
7.50
5.00
2.50
.00
7
26
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg
Kelompok penelitian


Normal Q-Q Plot of Kadar ROS (nmol/ml)
for Kelompok= N
Expected Normal
2
1
0
-1
-2
1.0
1.2
1.4
1.6
Observed Value


Kadar ROS (nmol/ml)
12.00
10.00
8.00
6.00
4.00
2.00
.00
26
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg
Kelompok penelitian


Normal Q-Q Plot of Kadar AGEs (ng/ml)
for Kelompok= N
Expected Normal
Observed Value
2
1
0
-1
-2
0.5
0.6
0.7
0.8
0.9
1.0
1.1


Kadar AGEs (ng/ml)
25.00
20.00
15.00
10.00
5.00
.00
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg
Kelompok penelitian

4. Uji Beda *One-way Anova*

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Fagositosis (%)	Between Groups	.540	5	.108	29.038	.000
	Within Groups	.089	24	.004		
	Total	.629	29			
Kadar HbA1c (ng/ml)	Between Groups	8487.392	5	1697.478	1014.713	.000
	Within Groups	40.149	24	1.673		
	Total	8527.540	29			
Kadar NO (ng/ml)	Between Groups	422.162	5	84.432	465.304	.000
	Within Groups	4.355	24	.181		
	Total	426.517	29			
Kadar ROS (nmol/ml)	Between Groups	257.889	5	51.578	618.722	.000
	Within Groups	2.001	24	.083		
	Total	259.889	29			
Kadar AGEs (ng/ml)	Between Groups	1620.059	5	324.012	5694.908	.000
	Within Groups	1.365	24	.057		
	Total	1621.424	29			

Ranks

	Kelompok penelitian	N	Mean Rank
GD_delta	N	5	5.80
	DM	5	5.20
	DMet	5	18.80
	DML-10 mg	5	13.00
	DML-20 mg	5	23.00
	DML-40 mg	5	27.20
	Total	30	

Test Statistics[a,b]

	GD_delta
Chi-Square	26.481

df	5
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: Kelompok penelitian

5. Uji *post hoc LSD*

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Fagositosis (%)	1.862	5	24	.139
Kadar HbA1c (ng/ml)	.705	5	24	.625
Kadar NO (ng/ml)	3.387	5	24	.019
Kadar ROS (nmol/ml)	1.318	5	24	.290
Kadar AGEs (ng/ml)	.644	5	24	.668

LSD **Multiple Comparison**

Dependent Variable	(I) Kelompok penelitian	(J) Kelompok penelitian	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Fagositosis (%)	N	DM	.03200	.03857	.415	-.0476	.1116
		DMet	-.03600	.03857	.360	-.1156	.0436
		DML-10 mg	-.01600	.03857	.682	-.0956	.0636
		DML-20 mg	-.14200*	.03857	.001	-.2216	-.0624
		DML-40 mg	-.36200*	.03857	.000	-.4416	-.2824
	DM	N	-.03200	.03857	.415	-.1116	.0476
		DMet	-.06800	.03857	.091	-.1476	.0116
		DML-10 mg	-.04800	.03857	.225	-.1276	.0316
		DML-20 mg	-.17400*	.03857	.000	-.2536	-.0944
		DML-40 mg	-.39400*	.03857	.000	-.4736	-.3144

	DMet	N	.03600	.03857	.360	-.0436	.1156
		DM	.06800	.03857	.091	-.0116	.1476
		DML-10 mg	.02000	.03857	.609	-.0596	.0996
		DML-20 mg	-.10600*	.03857	.011	-.1856	-.0264
		DML-40 mg	-.32600*	.03857	.000	-.4056	-.2464
	DML-10 mg	N	.01600	.03857	.682	-.0636	.0956
		DM	.04800	.03857	.225	-.0316	.1276
		DMet	-.02000	.03857	.609	-.0996	.0596
		DML-20 mg	-.12600*	.03857	.003	-.2056	-.0464
		DML-40 mg	-.34600*	.03857	.000	-.4256	-.2664
	DML-20 mg	N	.14200*	.03857	.001	.0624	.2216
		DM	.17400*	.03857	.000	.0944	.2536
		DMet	.10600*	.03857	.011	.0264	.1856
		DML-10 mg	.12600*	.03857	.003	.0464	.2056
		DML-40 mg	-.22000*	.03857	.000	-.2996	-.1404
	DML-40 mg	N	.36200*	.03857	.000	.2824	.4416
		DM	.39400*	.03857	.000	.3144	.4736
		DMet	.32600*	.03857	.000	.2464	.4056
		DML-10 mg	.34600*	.03857	.000	.2664	.4256
		DML-20 mg	.22000*	.03857	.000	.1404	.2996
Kadar HbA1c (ng/ml)	N	DM	-50.68600*	.81801	.000	-52.3743	-48.9977
		DMet	-13.98600*	.81801	.000	-15.6743	-12.2977
		DML-10 mg	-20.89400*	.81801	.000	-22.5823	-19.2057
		DML-20 mg	-8.73400*	.81801	.000	-10.4223	-7.0457
		DML-40 mg	-3.42800*	.81801	.000	-5.1163	-1.7397
	DM	N	50.68600*	.81801	.000	48.9977	52.3743
		DMet	36.70000*	.81801	.000	35.0117	38.3883
		DML-10 mg	29.79200*	.81801	.000	28.1037	31.4803
		DML-20 mg	41.95200*	.81801	.000	40.2637	43.6403
		DML-40 mg	47.25800*	.81801	.000	45.5697	48.9463
	DMet	N	13.98600*	.81801	.000	12.2977	15.6743
		DM	-36.70000*	.81801	.000	-38.3883	-35.0117
		DML-10 mg	-6.90800*	.81801	.000	-8.5963	-5.2197
		DML-20 mg	5.25200*	.81801	.000	3.5637	6.9403
		DML-40 mg	10.55800*	.81801	.000	8.8697	12.2463
	DML-10 mg	N	20.89400*	.81801	.000	19.2057	22.5823

		DM	-29.79200*	.81801	.000	-31.4803	-28.1037
		DMet	6.90800*	.81801	.000	5.2197	8.5963
		DML-20 mg	12.16000*	.81801	.000	10.4717	13.8483
		DML-40 mg	17.46600*	.81801	.000	15.7777	19.1543
	DML-20 mg	N	8.73400*	.81801	.000	7.0457	10.4223
		DM	-41.95200*	.81801	.000	-43.6403	-40.2637
		DMet	-5.25200*	.81801	.000	-6.9403	-3.5637
		DML-10 mg	-12.16000*	.81801	.000	-13.8483	-10.4717
		DML-40 mg	5.30600*	.81801	.000	3.6177	6.9943
	DML-40 mg	N	3.42800*	.81801	.000	1.7397	5.1163
		DM	-47.25800*	.81801	.000	-48.9463	-45.5697
		DMet	-10.55800*	.81801	.000	-12.2463	-8.8697
		DML-10 mg	-17.46600*	.81801	.000	-19.1543	-15.7777
		DML-20 mg	-5.30600*	.81801	.000	-6.9943	-3.6177
Kadar NO (ng/ml)	N	DM	-11.13400*	.26941	.000	-11.6900	-10.5780
		DMet	-2.65800*	.26941	.000	-3.2140	-2.1020
		DML-10 mg	-5.79600*	.26941	.000	-6.3520	-5.2400
		DML-20 mg	-2.19800*	.26941	.000	-2.7540	-1.6420
		DML-40 mg	-.91000*	.26941	.002	-1.4660	-.3540
	DM	N	11.13400*	.26941	.000	10.5780	11.6900
		DMet	8.47600*	.26941	.000	7.9200	9.0320
		DML-10 mg	5.33800*	.26941	.000	4.7820	5.8940
		DML-20 mg	8.93600*	.26941	.000	8.3800	9.4920
		DML-40 mg	10.22400*	.26941	.000	9.6680	10.7800
	DMet	N	2.65800*	.26941	.000	2.1020	3.2140
		DM	-8.47600*	.26941	.000	-9.0320	-7.9200
		DML-10 mg	-3.13800*	.26941	.000	-3.6940	-2.5820
		DML-20 mg	.46000	.26941	.101	-.0960	1.0160
		DML-40 mg	1.74800*	.26941	.000	1.1920	2.3040
	DML-10 mg	N	5.79600*	.26941	.000	5.2400	6.3520
		DM	-5.33800*	.26941	.000	-5.8940	-4.7820
		DMet	3.13800*	.26941	.000	2.5820	3.6940
		DML-20 mg	3.59800*	.26941	.000	3.0420	4.1540
		DML-40 mg	4.88600*	.26941	.000	4.3300	5.4420
	DML-20 mg	N	2.19800*	.26941	.000	1.6420	2.7540
		DM	-8.93600*	.26941	.000	-9.4920	-8.3800
		DMet	-.46000	.26941	.101	-1.0160	.0960

		DML-10 mg	-3.59800*	.26941	.000	-4.1540	-3.0420
		DML-40 mg	1.28800*	.26941	.000	.7320	1.8440
	DML-40 mg	N	.91000*	.26941	.002	.3540	1.4660
		DM	-10.22400*	.26941	.000	-10.7800	-9.6680
		DMet	-1.74800*	.26941	.000	-2.3040	-1.1920
		DML-10 mg	-4.88600*	.26941	.000	-5.4420	-4.3300
		DML-20 mg	-1.28800*	.26941	.000	-1.8440	-.7320
Kadar ROS (nmol/ml)	N	DM	-9.04400*	.18261	.000	-9.4209	-8.6671
		DMet	-2.80800*	.18261	.000	-3.1849	-2.4311
		DML-10 mg	-3.88800*	.18261	.000	-4.2649	-3.5111
		DML-20 mg	-1.81400*	.18261	.000	-2.1909	-1.4371
		DML-40 mg	-1.03200*	.18261	.000	-1.4089	-.6551
	DM	N	9.04400*	.18261	.000	8.6671	9.4209
		DMet	6.23600*	.18261	.000	5.8591	6.6129
		DML-10 mg	5.15600*	.18261	.000	4.7791	5.5329
		DML-20 mg	7.23000*	.18261	.000	6.8531	7.6069
		DML-40 mg	8.01200*	.18261	.000	7.6351	8.3889
	DMet	N	2.80800*	.18261	.000	2.4311	3.1849
		DM	-6.23600*	.18261	.000	-6.6129	-5.8591
		DML-10 mg	-1.08000*	.18261	.000	-1.4569	-.7031
		DML-20 mg	.99400*	.18261	.000	.6171	1.3709
		DML-40 mg	1.77600*	.18261	.000	1.3991	2.1529
	DML-10 mg	N	3.88800*	.18261	.000	3.5111	4.2649
		DM	-5.15600*	.18261	.000	-5.5329	-4.7791
		DMet	1.08000*	.18261	.000	.7031	1.4569
		DML-20 mg	2.07400*	.18261	.000	1.6971	2.4509
		DML-40 mg	2.85600*	.18261	.000	2.4791	3.2329
	DML-20 mg	N	1.81400*	.18261	.000	1.4371	2.1909
		DM	-7.23000*	.18261	.000	-7.6069	-6.8531
		DMet	-.99400*	.18261	.000	-1.3709	-.6171
		DML-10 mg	-2.07400*	.18261	.000	-2.4509	-1.6971
		DML-40 mg	.78200*	.18261	.000	.4051	1.1589
	DML-40 mg	N	1.03200*	.18261	.000	.6551	1.4089
		DM	-8.01200*	.18261	.000	-8.3889	-7.6351
		DMet	-1.77600*	.18261	.000	-2.1529	-1.3991
		DML-10 mg	-2.85600*	.18261	.000	-3.2329	-2.4791
		DML-20 mg	-.78200*	.18261	.000	-1.1589	-.4051

Kadar AGEs (ng/ml)	N	DM	-21.18600*	.15086	.000	-21.4974	-20.8746
		DMet	-3.16200*	.15086	.000	-3.4734	-2.8506
		DML-10 mg	-5.08800*	.15086	.000	-5.3994	-4.7766
		DML-20 mg	-1.27000*	.15086	.000	-1.5814	-.9586
		DML-40 mg	-.53000*	.15086	.002	-.8414	-.2186
	DM	N	21.18600*	.15086	.000	20.8746	21.4974
		DMet	18.02400*	.15086	.000	17.7126	18.3354
		DML-10 mg	16.09800*	.15086	.000	15.7866	16.4094
		DML-20 mg	19.91600*	.15086	.000	19.6046	20.2274
		DML-40 mg	20.65600*	.15086	.000	20.3446	20.9674
	DMet	N	3.16200*	.15086	.000	2.8506	3.4734
		DM	-18.02400*	.15086	.000	-18.3354	-17.7126
		DML-10 mg	-1.92600*	.15086	.000	-2.2374	-1.6146
		DML-20 mg	1.89200*	.15086	.000	1.5806	2.2034
		DML-40 mg	2.63200*	.15086	.000	2.3206	2.9434
	DML-10 mg	N	5.08800*	.15086	.000	4.7766	5.3994
		DM	-16.09800*	.15086	.000	-16.4094	-15.7866
		DMet	1.92600*	.15086	.000	1.6146	2.2374
		DML-20 mg	3.81800*	.15086	.000	3.5066	4.1294
		DML-40 mg	4.55800*	.15086	.000	4.2466	4.8694
	DML-20 mg	N	1.27000*	.15086	.000	.9586	1.5814
		DM	-19.91600*	.15086	.000	-20.2274	-19.6046
		DMet	-1.89200*	.15086	.000	-2.2034	-1.5806
		DML-10 mg	-3.81800*	.15086	.000	-4.1294	-3.5066
		DML-40 mg	.74000*	.15086	.000	.4286	1.0514
	DML-40 mg	N	.53000*	.15086	.002	.2186	.8414
		DM	-20.65600*	.15086	.000	-20.9674	-20.3446
		DMet	-2.63200*	.15086	.000	-2.9434	-2.3206
		DML-10 mg	-4.55800*	.15086	.000	-4.8694	-4.2466
		DML-20 mg	-.74000*	.15086	.000	-1.0514	-.4286

*. The mean difference is significant at the 0.05 level.

6. Uji Korelasi

Correlations

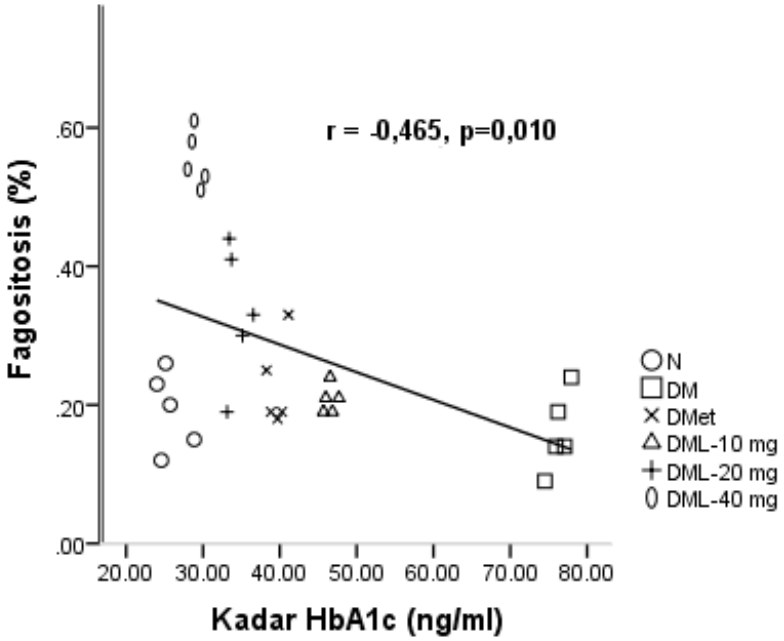
		Fagositosis (%)	Kadar HbA1c (ng/ml)	Kadar NO (ng/ml)	Kadar ROS (nmol/ml)	Kadar AGEs (ng/ml)	Kelompok penelitian
Fagositosis (%)	Pearson Correlation	1	-.465**	-.459*	-.433*	-.444*	.779**
	Sig. (2-tailed)		.010	.011	.017	.014	.000
	N	30	30	30	30	30	30
Kadar HbA1c (ng/ml)	Pearson Correlation	-.465**	1	.984**	.993**	.980**	-.295
	Sig. (2-tailed)	.010		.000	.000	.000	.114
	N	30	30	30	30	30	30
Kadar NO (ng/ml)	Pearson Correlation	-.459*	.984**	1	.983**	.955**	-.247
	Sig. (2-tailed)	.011	.000		.000	.000	.187
	N	30	30	30	30	30	30
Kadar ROS (nmol/ml)	Pearson Correlation	-.433*	.993**	.983**	1	.973**	-.256
	Sig. (2-tailed)	.017	.000	.000		.000	.172
	N	30	30	30	30	30	30
Kadar AGEs (ng/ml)	Pearson Correlation	-.444*	.980**	.955**	.973**	1	-.366*
	Sig. (2-tailed)	.014	.000	.000	.000		.047
	N	30	30	30	30	30	30
Kelompok penelitian	Pearson Correlation	.779**	-.295	-.247	-.256	-.366*	1
	Sig. (2-tailed)	.000	.114	.187	.172	.047	
	N	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

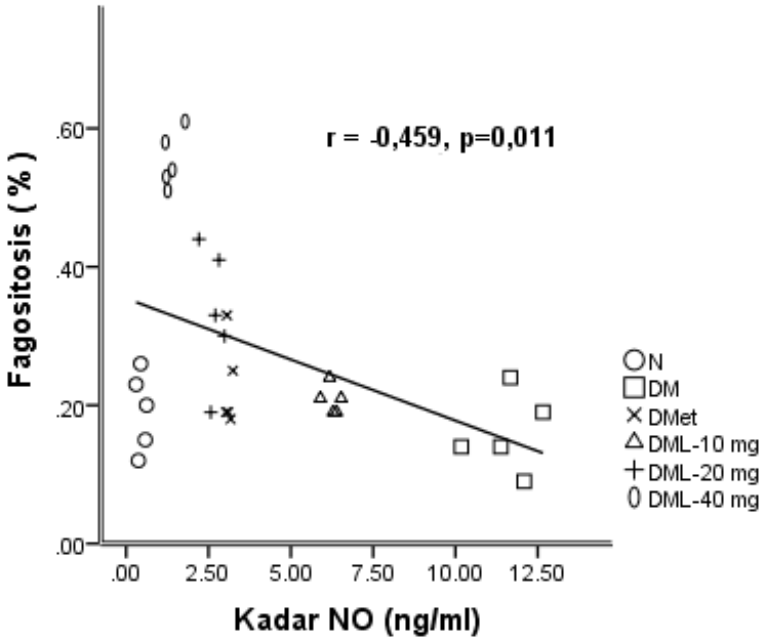
*. Correlation is significant at the 0.05 level (2-tailed).

7. Grafik regresi linier

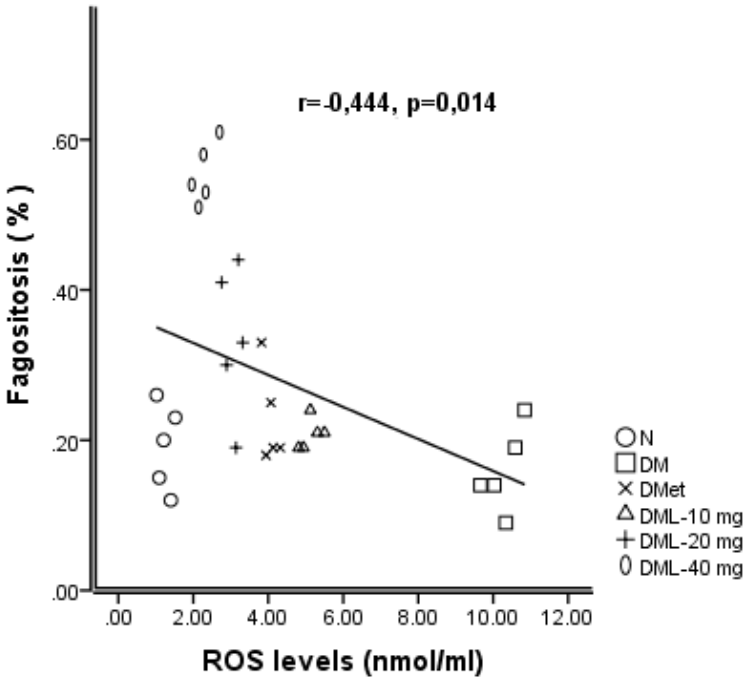
(A)



(B)



(C)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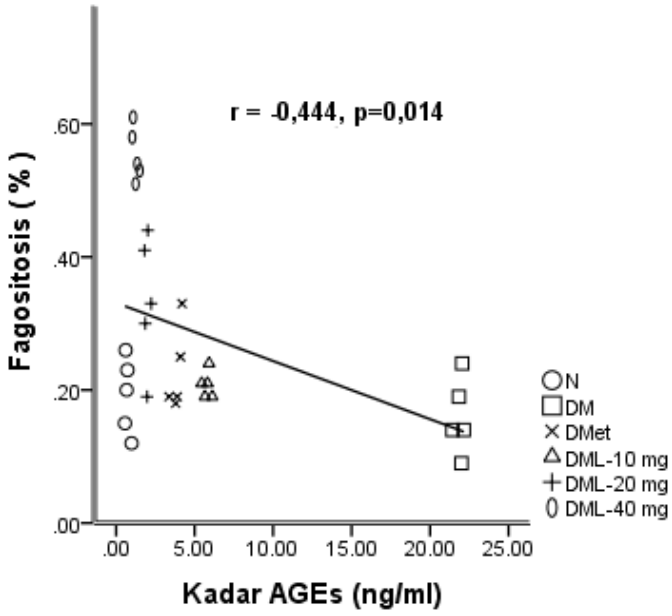
Fagositosis (%)
.60
.40
.20
.00
.00
2.00
4.00
6.00
8.00
10.00
12.00
ROS levels (nmol/ml)
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg

(D)


r = -0,444, p=0,014
Fagositosis (%)
.60
.40
.20
.00
.00
5.00
10.00
15.00
20.00
25.00
Kadar AGEs (ng/ml)
N
DM
DMet
DML-10 mg
DML-20 mg
DML-40 mg

8. Analisis jalur

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Kelompok intervensi[b]	.	Enter

a. Dependent Variable: Kadar HbA1c (ng/ml)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750[a]	.563	.538	4.55578

a. Predictors: (Constant), Kelompok intervensi

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	480.355	1	480.355	23.144	.000[b]
	Residual	373.592	18	20.755		
	Total	853.947	19			

a. Dependent Variable: Kadar HbA1c (ng/ml)

b. Predictors: (Constant), Kelompok intervensi

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	57.140	4.225		13.525	.000	48.264	66.016
	Kelompok intervensi	-4.383	.911	-.750	-4.811	.000	-6.298	-2.469

a. Dependent Variable: Kadar HbA1c (ng/ml)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Kadar HbA1c (ng/ml), Kelompok intervensi[b]	.	Enter

a. Dependent Variable: Fagositosis (%)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.887[a]	.786	.761	.07448

a. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.346	2	.173	31.207	.000[b]
	Residual	.094	17	.006		
	Total	.441	19			

a. Dependent Variable: Fagositosis (%)

b. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.437	.231		1.893	.075	-.050	.924
	Kelompok intervensi	.064	.023	.483	2.849	.011	.017	.112
	Kadar HbA1c (ng/ml)	-.011	.004	-.464	-2.737	.014	-.019	-.002

a. Dependent Variable: Fagositosis (%)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Kadar HbA1c (ng/ml), Kelompok intervensi[b]	.	Enter

a. Dependent Variable: Kadar AGEs (ng/ml)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.977[a]	.954	.949	.41408

a. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.670	2	30.335	176.923	.000[b]
	Residual	2.915	17	.171		
	Total	63.585	19			

a. Dependent Variable: Kadar AGEs (ng/ml)

b. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-6.688	1.283		-5.213	.000	-9.394	-3.981
	Kelompok intervensi	-.007	.125	-.004	-.055	.957	-.271	.257
	Kadar HbA1c (ng/ml)	.266	.021	.974	12.400	.000	.220	.311

a. Dependent Variable: Kadar AGEs (ng/ml)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Kadar HbA1c (ng/ml), Kelompok intervensi[b]	.	Enter

a. Dependent Variable: Kadar NO (ng/ml)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973[a]	.947	.941	.45174

a. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.868	2	30.934	151.585	.000[b]
	Residual	3.469	17	.204		
	Total	65.337	19			

a. Dependent Variable: Kadar NO (ng/ml)

b. Predictors: (Constant), Kadar HbA1c (ng/ml), Kelompok intervensi

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-11.901	1.400		-8.503	.000	-14.854	-8.948
	Kelompok intervensi	.591	.137	.366	4.328	.000	.303	.879
	Kadar HbA1c (ng/ml)	.337	.023	1.217	14.401	.000	.287	.386

a. Dependent Variable: Kadar NO (ng/ml)

Variables Entered/Removed[a]

a. Dependent Variable: Kadar ROS (nmol/ml)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.977[a]	.954	.942	.27125

a. Predictors: (Constant), Kadar NO (ng/ml), Kelompok intervensi, Kadar AGEs (ng/ml), Kadar HbA1c (ng/ml)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.835	4	5.709	77.589	.000[b]
	Residual	1.104	15	.074		
	Total	23.939	19			

a. Dependent Variable: Kadar ROS (nmol/ml)

b. Predictors: (Constant), Kadar NO (ng/ml), Kelompok intervensi, Kadar AGEs (ng/ml), Kadar HbA1c (ng/ml)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.851	1.989		.428	.675	-3.387	5.090
	Kelompok intervensi	-.181	.123	-.185	-1.469	.163	-.444	.082
	Kadar HbA1c (ng/ml)	.074	.058	.441	1.281	.220	-.049	.197
	Kadar AGEs (ng/ml)	.047	.169	.077	.278	.785	-.314	.408
	Kadar NO (ng/ml)	.204	.155	.337	1.313	.209	-.127	.534

a. Dependent Variable: Kadar ROS (nmol/ml)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Kadar ROS (nmol/ml), Kelompok intervensi, Kadar NO (ng/ml), Kadar AGEs (ng/ml), Kadar HbA1c (ng/ml)[b]	.	Enter

a. Dependent Variable: Fagositosis (%)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.915[a]	.836	.778	.07175

a. Predictors: (Constant), Kadar ROS (nmol/ml), Kelompok intervensi, Kadar NO (ng/ml), Kadar AGEs (ng/ml), Kadar HbA1c (ng/ml)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.369	5	.074	14.318	.000[b]
	Residual	.072	14	.005		
	Total	.441	19			

a. Dependent Variable: Fagositosis (%)

b. Predictors: (Constant), Kadar ROS (nmol/ml), Kelompok intervensi, Kadar NO (ng/ml), Kadar AGEs (ng/ml), Kadar HbA1c (ng/ml)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.208	.529		.394	.700	-.927	1.343
	Kelompok intervensi	.104	.035	.787	2.992	.010	.030	.179
	Kadar HbA1c (ng/ml)	-.011	.016	-.494	-.699	.496	-.046	.023
	Kadar AGEs (ng/ml)	.081	.045	.973	1.803	.093	-.015	.177
	Kadar NO (ng/ml)	-.066	.043	-.806	-1.527	.149	-.159	.027
	Kadar ROS (nmol/ml)	.009	.068	.069	.136	.893	-.137	.156

a. Dependent Variable: Fagositosis (%)

Lampiran 6

Dokumentasi Penelitian

Laboratorium

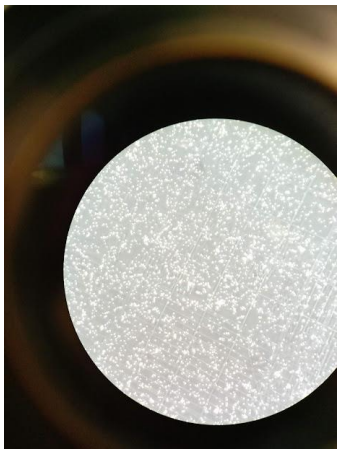
Pemeliharaan tikus

Penimbangan berat badan tikus

Pemberian intervensi melalui sode

Pengambilan darah

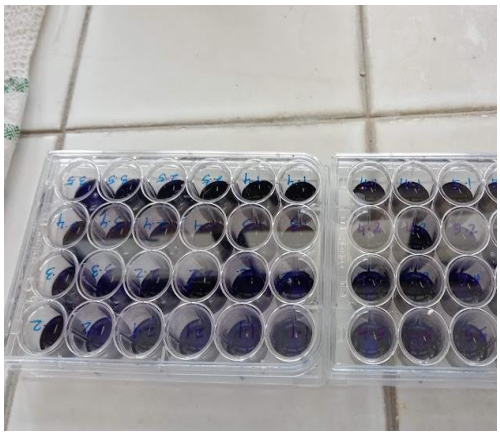
Pembuatan kultur makrofag



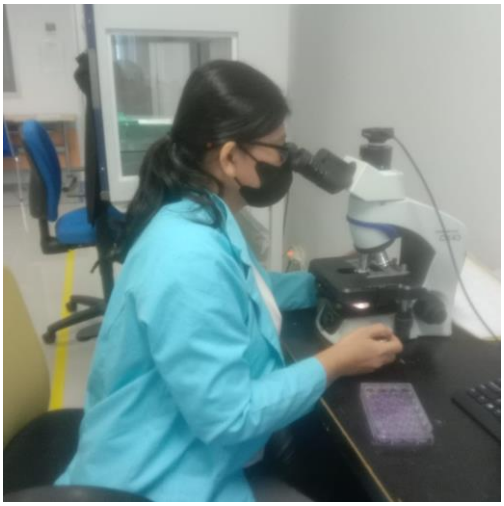
Penghitungan sel makrofag dengan hemocytometer

Inkubasi makrofag 24 jam

Pencucian sampel

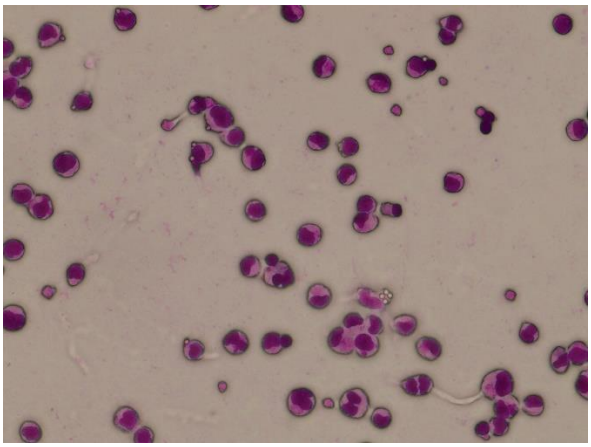


Proses pewarnaan giemsa

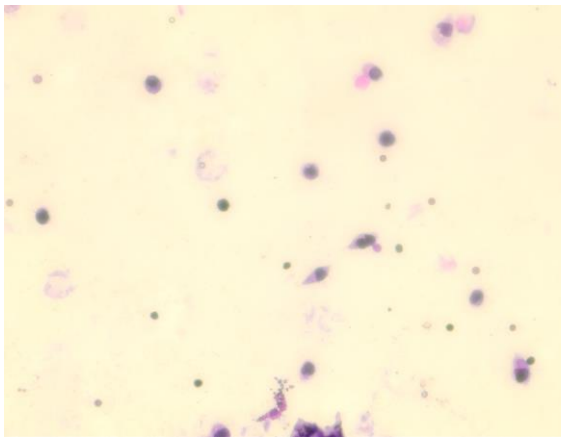


Pembacaan fagositosis

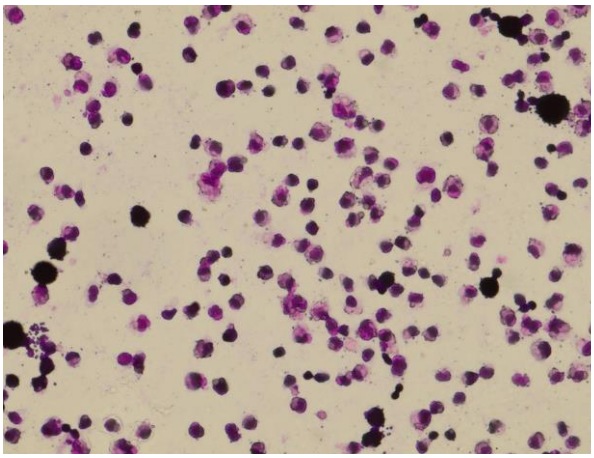
Hasil Fagositosis



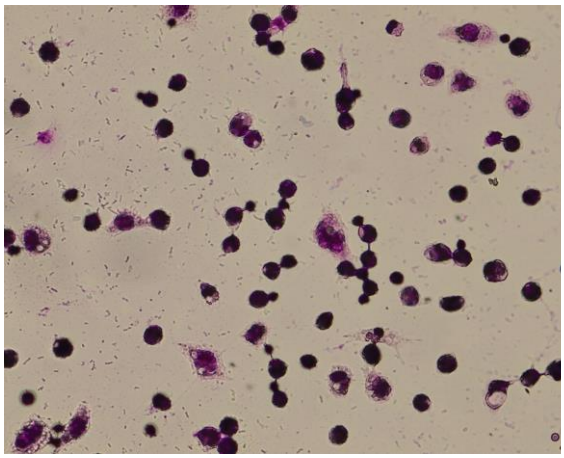
Kelompok Normal



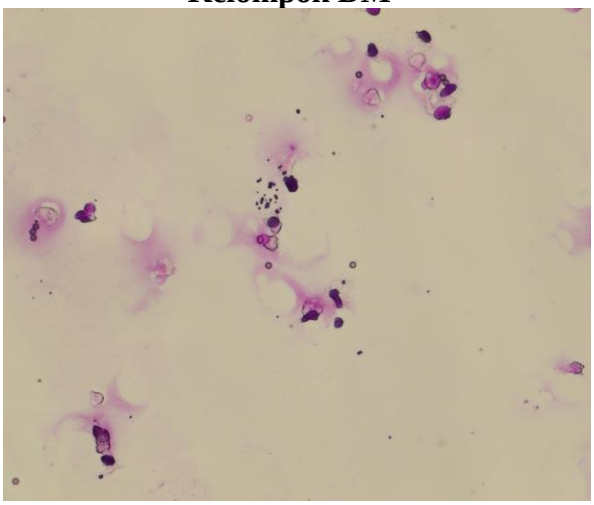
Kelompok DML-10



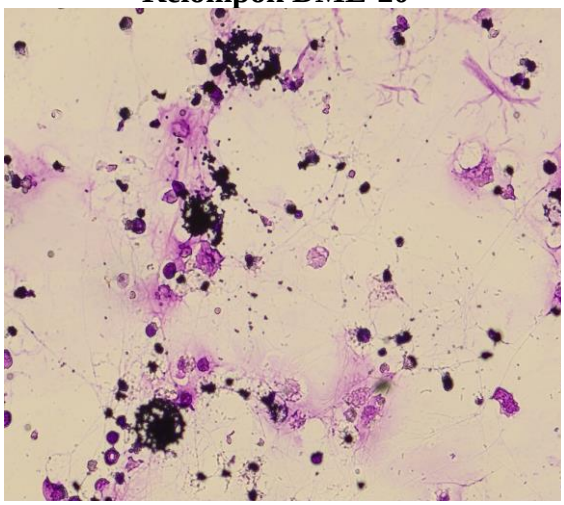
Kelompok DM



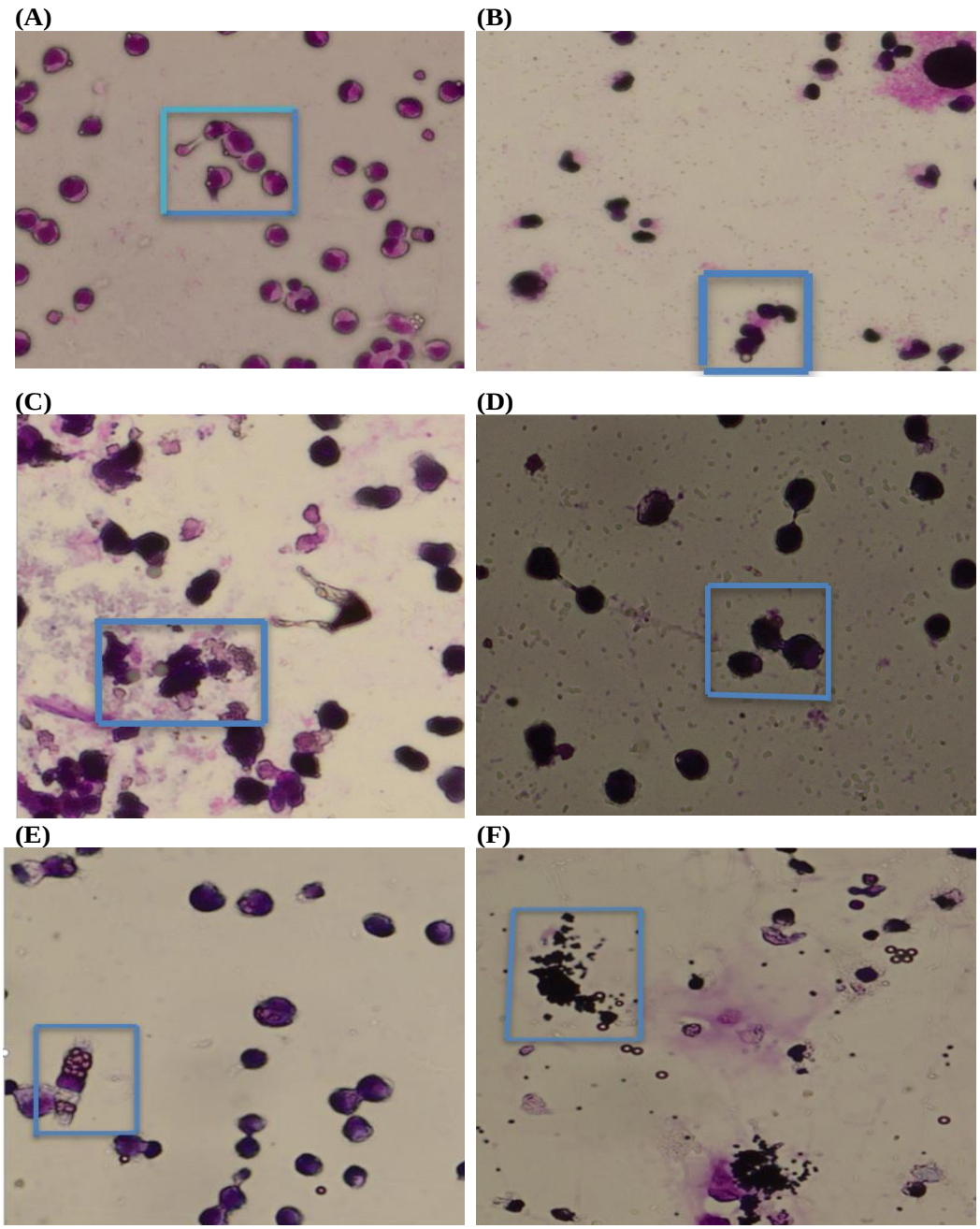
Kelompok DML-20



Kelompok DMet



Kelompok DML-40



Pemeriksaan menggunakan mikroskop optic dengan pembesaran 400x(A) Kelompok tikus normal, (B) kelompok tikus DMT2, (C) Kelompok tikus DMT2 dengan perlakuan metformin, (D) Kelompok tikus DMT2 dengan perlakuan kombinasi metformin dan likopen dosis 10mg/kg, (E) Kelompok tikus DMT2 dengn perlakuan kombinasi metformin dan likopen dosis 20 mg/kg, (F) Kelompok tikus DMT2 dengan perlakuan kombinasi metformin dan likopen dosis 40 mg/kg