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DAFTAR PUSTAKA

Abdou, H., M. And Mohamed, N., A., 2016. Centella asiatica ameliorates diabetic complications and oxidative stress in streptozotocin-induced diabetes mellitus in male rats. *Int. J. Pharm. Sci. Rev. Res*. 36 (2): 61-70.

Abd Allah, E. S., dan Gomaa, A. M., 2015. Effects of curcumin and kaptopril on the functions of kidney and nerve in streptozotocin-induced diabetic rats: role of angiotensin converting enzyme 1. *Appl. Physiol. Nutri. Metab*. 40(10): 1061-1067.

Ablat, A., Halabi, M. F., Mohamad, J., Hasnan, M. H. H., Hazni, H., Teh, S., and Awang, K., 2017. Antidiabetic effects of Brucea javanica seeds in type 2 diabetic rats. *BMC Complement. Alter. Med.*. 17 (1): 94.

Abuissa, H., Jones, P. G., Marso, S. P., and O'Keefe, J. H., 2005. Angiotensin-converting enzyme inhibitors or angiotensin receptor blockers for prevention of type 2 diabetes. *J.Am. Coll. Cardiol*. 46(5): 821-826.

Amir, N., Suprayitno, E., Hardoko, H., and Nursyam, H., 2016. Effect of Sipermetrin On Jambal Rotiterhadap Kadaru Reum and Creatinine Wistar Rat (Rattus norvegicus). *IPTEKS Journal of Fishery Resources Utilization*. 2 (3).

Arora, A., Sairam, R.K., and Srivastave, G.C., 2002. Oxidative stress and antioxidative systems in plants. *Curr. Sci*. 82: 1227–1238.

Al-Trad, B., Ashankyty, I. M., and Alaraj, M., 2015. Progesterone ameliorates diabetic nephropathy in streptozotocin-induced diabetic Rats. *Diabetol. Metab. Syndr*. 7(97).

Ashraf, H., Heidari, R., Nejati, V., and Ilkhanipoor, M., 2013. Aqueous extract of Berberis integerrima root improves renal dysfunction in streptozotocin induced diabetic rats. *Avicenna J. Phytomed*. 3(1): 82–90.

Bayrasheva, V. K., Babenko, A. Y., Dmitriev, Y. V., Chefu, S. G., Shatalov, I. S., and Grineva, E. N., 2015. Metformin restores tubular, but not glomerular, injury in type 2 diabetic rats. *Diabetes Technol. Ther*. 17(1): 179-180.

Bayrasheva, V. K., Babenko, A. Y., Dobronravov, V. A., Dmitriev, Y. V., Chefu, S. G., Pchelin, I. Y., and Grineva, E. N., 2016. Uninephrectomized High-Fat-Fed Nicotinamide-Streptozotocin-Induced Diabetic Rats: A Model for the Investigation of Diabetic Nephropathy in Type 2 Diabetes. *J. Diabetes Res*. 2016: 8317850.

Bhatti, A. B., and Usman, M., 2015. Drug targets for oxidative podocyte injury in diabetic nephropathy. *Cureus*.7(12).

UNIVERSITAS GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Brinkhaus, B., Lindner, M., Schuppan, D., and Hahn, E. G., 2000. Chemical pharmacological and clinical profile of the East Asian medical plant Centella asiatica. *Phytomedicine*. 7:427–48.

Bouayed J. and Bohn T. 2010. Exogenous antioxidants – Double edged swords in cellular redox state: Health beneficial effects at physiologic doses versus deleterious effects at high doses. *Oxid. Med. Cell. Longev*. 1:228-237

Campbell, K., Raij, L., and Mundel, P., 2011. Role of angiotensin II in the development of nephropathy and podocytopathy of diabetes. *Cur. diabetes Rev*. 7(1): 3-7.

Calder, P. C., Albers, R., Antoine, J. M., Blum, S., Bourdet-Sicard, R., Ferns, G. A., *et al*., 2009. Inflammatory disease processes and interactions with nutrition. *Br. J. Nutr.*101(S1): 1-45.

Cao, W., Li, X. Q., Zhang, X. N., Hou, Y., Zeng, A. G., Xie, Y. H., and Wang, S. W., 2010. Madecassoside suppresses LPS-induced TNF-α production in cardiomyocytes through inhibition of ERK, p38, and NF-κB activity. *Int. immunopharmacol*. 10(7): 723-729.

Caimi, G., Montana, M., Citarrella, R., Porretto, F., Catania, A., Lo Presti, R., 2002. Polymorphonuclear leukocyte integrin profile in diabetes mellitus. *Clin. Hemorheol. microcirc*. 27(2): 83-89.

Choi, K. M., Kashyap, P. C., Dutta, N., Stoltz, G. J., Ordog, T., Donohue, T. S., and Farrugia, G., 2010. CD206-positive M2 macrophages that express heme oxygenase-1 protect against diabetic gastroparesis in mice. *Gastroenterology*. 138(7): 2399-2409.

Choi, M. J., Zheng, H. M., Kim, J. M., Lee, K. W., Park, Y. H., and Lee, D. H., 2016. Protective effects of Centella asiatica leaf extract on dimethylnitrosamine-induced liver injury in rats. *Mol. Med. Rep*. 14(5): 4521-4528.

Chua D., Ignaszewski A., Schwenger E., 2011. Angiotensin-converting enzyme inhibitors: an ACE in the hole for everyone?. *BCMJ*. 53 (5).

Chatzigeorgiou, A., Halapas, A., Kalafatakis, K., and Kamper, E., 2009. The use of animal models in the study of diabetes mellitus. In Vivo. 23(2): 245-258.

De Llamas, L. G. S., Alberola, A. G., Lopez-Herrera, M. L., Jimenez, T. F., Pardo, J. F., dan Cascales, J. H., 1991. Effects of captotopril on diabetic nephropathy in hypertensive women. *Eur. J. Clin. Pharmacol.* 41 (5): 405-9.

Duchin, K. L., McKinstry, D. N., Cohen, A. I., Migdalof, B. H., 1988. Pharmacokinetics of kaptopril in healthy subjects and in patients with cardiovascular diseases. *Clin. Pharmacokinet.* 14(4): 241-259.

UNIVERSITAS GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

Favre, G. A., Esnault, V. L., Van Obberghen, E., 2015. Modulation of glucose metabolism by the renin-angiotensin-aldosterone system. *Am. J. Physiol. Endocrine. Metab*. 308(6): E435-E449.

Ferrante, C. J., and Leibovich, S. J., 2012. Regulation of macrophage polarization and wound healing. *Adv. Wound Care*.1(1): 10-16.

Fujiwara, N., and Kobayashi, K., 2005. Macrophages in inflammation. *Curr. Drug Targets Inflamm. Allergy*. 4(3): 281-286.

George, M., Joseph, L., Ramaswamy., 2009. Anti-allergic, anti-pruritic, and anti-inflammatory activities of centella asiatica extracts. *Af. J. Tradit. Complement. Altern. Med*. 6(4): 554–559.

Giacchetti, G., Sechi, L. A., Rilli, S., and Carey, R. M., 2005. The renin–angiotensin–aldosterone system, glucose metabolism and diabetes. *Trends Endocrinol. Metab*. 16(3): 120-126.

Ghasemi, A., Khalifi, S., and Jedi, S., 2014. Streptozotocin-nicotinamide-induced rat model of type 2 diabetes. *Acta Physiol. Hung*. 101(4): 408-420.

Gurley, S. B., Clare, S. E., Snow, K. P., Hu, A., Meyer, T. W., and Coffman, T. M., 2006. Impact of genetic background on nephropathy in diabetic mice. *Am. J. Physiol. Renal Physiol*. 290(1): F214-F222.

Gohil, Patel, Gajjar., 2010. Pharmacological review on centella asiatica: a potential herbal cure-all. *Indian. J. Pharm. Sci*. 72 (5): 548-558.

Gnanapragasam, A., Ebenezar, K. K., Sathish, V., Govindaraju, P., Devaki, T., 2004. Protective effect of Centella asiatica on antioxidant tissue defense system against adriamycin induced cardiomyopathy in rats. *Life Sci*. 76(5): 585-597.

Gray, N. E., Sampath, H., Zweig, J. A., Quinn, J. F., and Soumyanath, A., 2015. Centella asiatica attenuates amyloid-β-induced oxidative stress and mitochondrial dysfunction. *J. Alzheimers. Dis*. 45(3): 933-946.

Gross, M. L., Ritz, E., Schoof, A., Adamczak, M., Koch, A., Tulp, O., and Amann, K., 2004. Comparison of renal morphology in the Streptozotocin and the SHR/N-cp models of diabetes. *Lab. Invest*. 84(4): 452.

Gross, J. L., De Azevedo, M. J., Silveiro, S. P., Canani, L. H., Caramori, M. L., & Zelmanovitz, T., 2005. Diabetic nephropathy: diagnosis, prevention, and treatment. *Diabetes care*. 28(1): 164-176.

Harvey R. A. dan Champe P. C., 2013. Farmakologi ulasan bergambar edisi 4. *EGC*. Jakarta.

Haleagrahara, N., & Ponnusamy, K., 2010. Neuroprotective effect of Centella asiatica extract (CAE) on experimentally induced parkinsonism in aged Sprague-Dawley rats. *J. Toxicol. Sci*. 35(1): 41-47.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

Hardisari, R., 2017. Gambaran kadar trigliserida (metode GPO-PAP) pada sampel serum dan plasma edta. Jurnal Teknologi Laboratorium. 5(1): 27-31.

Howes, M. J. R., and Houghton, P. J., 2003. Plants used in Chinese and Indian traditional medicine for improvement of memory and cognitive function. *Pharmacol. Biochem. Behav*. 75(3): 513-527.

Islas-Andrade, S., Monsalve, M. C. R., de la Peña, J. E., Polanco, A. C., Palomino, M. A., and Velasco, A. F., 2001. Streptozotocin and alloxan in experimental diabetes: comparison of the two models in rats. *Acta Histochem Cytochem.* 33(3): 201-208.

Kabir, A. U., Samad, M. B., D'Costa, N. M., Akhter, F., Ahmed, A., Hannan, J. M. A., 2014. Anti-hyperglycemic activity of *Centella asiatica* is partly mediated by carbohydrase inhibition and glucose-fiber binding. *BMC Complement Altern Med*. 14(1): 31.

Katzung, B. G., 2007. Basic & Clinical Pharmacology, Tenth Edition. United States : Lange Medical Publications.

Katoh, M., Ohmachi, Y., Kurosawa, Y., Yoneda, H., Tanaka, N., and Narita, H., 2000. Effects of imidapril and kaptopril on streptozotocin-induced diabetic nephropathy in mice. *Eur. J. Pharmacol*. 398(3): 381-7.

Kawanami, D., Matoba, K., and Utsunomiya, K., 2016. Signaling pathways in diabetic nephropathy. *Histol Histopathol*. 31(10): 1059-1067.

Kemenkes RI. 2014. *Infodatin Pusat Data dan Informasi Kementerian Kesehatan RI: Situasi dan Analisis Diabetes*. Jakarta: Kemenkes RI. 2014.

Kemenkes RI., 2013. Peraturan menteri kesehatan republik indonesia nomor 88 tahun 2013 tentang rencana induk pengembangan bahan baku obat tradisional. Jakarta: Kemenkes RI.

Kolb, H., and Burkart, V., 1999. Nicotinamide in type 1 diabetes. *Diabetes care*. 22: B16.

Leng, D. D., Han, W. J., Rui, Y., Dai, Y., Xia, Y. F., 2013. In vivo disposition and metabolism of madecassoside, a major bioactive constituent in Centella asiatica (L.) Urb. *J.* Ethnopharmacol.150(2): 601-608.

Lenzen, S., 2008. The mechanisms of alloxan-and streptozotocin-induced diabetes. *Diabetologia.* 51(2): 216-226.

Lewis, E. J., Hunsicker, L. G., Bain, R. P., and Rohde, R. D., 1993. The effect of angiotensin-converting-enzyme inhibition on diabetic nephropathy. *N. Engl. J. Med*. 329(20): 1456-1462.

Lim, A. K., 2014. Diabetic nephropathy–complications and treatment. *Int. J. Nephrol. Renovasc. Dis*. 7: 361.

UNIVERSITAS GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Lim, J., Sanders, R. A., Snyder, A. C., Eells, J. T., Henshel, D. S., and Watkins, J. B., 2010. Effects of low-level light therapy on streptozotocin-induced diabetic kidney. *J. Photochem. Photobiol. B.* 99(2): 105-10.

Maneesai, P., Prasarttong, P., Bunbupha, S., Kukongviriyapan, U., Kukongviriyapan, V., Tangsucharit, P., and Pakdeechote, P., 2016. Synergistic antihypertensive effect of Carthamus tinctorius L. extract and kaptopril in L-NAME-induced hypertensive rats via restoration of eNOS and AT1R expression. *Nutrients*. 8(3): 122.

Maneesai, P., Bunbupha, S., Kukongviriyapan, U., Prachaney, P., Tangsucharit, P., Kukongviriyapan, V., Pakdeechote, P., 2016. Asiatic acid attenuates renin-angiotensin system activation and improves vascular function in high-carbohydrate, high-fat diet fed rats. *BMC complement. Altern. Med.*. 16(1): 123.

Maulidiani, Abas, F., Khatib, A., Perumal, V., Suppaiah, V., Ismail, A., Hamid, M., and Lajis, N. H., 2016. Metabolic alteration in obese diabetes rats upon treatment with Centella asiatica extract. *J.Ethnopharmacol*. 180: 60-69.

Muangnoi, C., Chareonkiatkul, S., Kriengsinyos, W., Chitchumroonchokchai, C., 2009. Bioaccessibility and angiotensin I converting enzyme (ACE) inhibitory activity of asiatic and medecassic acids from Centella asiatica. *FASEB J*. 23(1): 563-19.

Murali, B., and Goyal, R. K., 2001. Effect of chronic treatment with losartan on streptozotocin induced diabetic nephropathy. *Clin. Exe. Hypertens.* 23(7): 513-520.

Nakamura, T., Terajima, T., Ogata, T., Ueno, K., Hashimoto, N., Ono, K., and Yano, S., 2006. Establishment and pathophysiological characterization of type 2 diabetic mouse model produced by streptozotocin and nicotinamide. *Bio. Phar. Bulletin*. 29(6): 1167-1174.

Nayak, Y., Hillemane, V., Daroji, V. K., Jayashree, B. S., and Unnikrishnan, M. K., 2014. Antidiabetic activity of benzopyrone analogues in nicotinamide-Streptozotocin induced Type 2 diabetes in rats. *Sci. World J*. 2014.

Navarro, J. F., and Mora, C., 2005. Role of inflammation in diabetic complications. *Nephrol. Dialysis Transplantation*. 20(12): 2601-2604.

Nugroho, A. E., 2006. Hewan percobaan diabetes mellitus: patologi dan mekanisme aksi diabetogenik. *Biodiversitas.* 7(4): 378-382.

Orhan, I. E. 2012. *Centella asiatica* (L.) Urban: from traditional medicine to modern medicine with neuroprotective potential. *Evid. Based Complement Alternat. Med*. 2012.

UNIVERSITAS GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

Pakdeechote, P., Bunbupha, S., Kukongviriyapan, U., Prachaney, P., Khrisanapant, W., Kukongviriyapan, V., 2014. Asiatic acid alleviates hemodynamic and metabolic alterations via restoring eNOS/iNOS expression, oxidative stress, and inflammation in diet-induced metabolic syndrome rats. *Nutrients.* 6 (1): 355-370.

PERKENI., 2015. Konsensus pengelolaan dan pencegahan diabetes melitus tipe 2. PB. PERKENI. Indonesia.

Pittella, F., Dutra, R. C., Junior, D. D., Lopes, M. T. P., Barbosa, N. R., 2009. Antioxidant and cytotoxic activities of *Centella asiatica* (L) Urb. *Inter. J. Mol. Sci*. 10(9): 3713–3721.

Price, S. A. dan Wilson, L. M., 2006. Patofisiologi : Konsep Klinis ProsesProses Penyakit, Edisi 6, Volume 1. Jakarta: EGC.

Pozzi, A., and Zent, R., 2013. Integrins in Kidney Disease. J. *Am. Soc. Nephro. : JASN*. 24(7): 1034–1039.

POM Direktorat Obat asli Indonesia, 2010. Serial ilmiah terkini tumbuhan obat.: pegagan (*Centella asiatica* (L.) Urban. POM.

Qian, Y., Feldman, E., Pennathur, S., Kretzler, M., & Brosius, F. C. 2008. Mechanisms of Glomerulosclerosis in Diabetic Nephropathy. *Diabetes*. 57(6):1439-1445.

Rahman, S., Jamal, M. M., Parvin, A., Mahfuz-Al-Mamun, M., and Islam, M. R., 2012. Antidiabetic activity of Centella asiatica (L.) urbana in alloxan induced Type 1 diabetic model rats. *J. Bio. Sci*. 19: 23-27.

Rahman, M., Hossain, S., Rahaman, A., Fatima, N., Nahar, T., Uddin, B., and Basunia, M. A. 2013. Antioxidant activity of Centella asiatica (Linn.) urban: Impact of extraction solvent polarity. *J. Phar. Phyto*. 1(6): 27-32.

Rezaei Farimani, A., Saidijam, M., Goodarzi, M. T., Yadegar Azari, R., Asadi, S., Zarei, S., and Shabab, N., 2015. Effect of Resveratrol Supplementation on the SNARE Proteins Expression in Adipose Tissue of Stroptozotocin-Nicotinamide Induced Type 2 Diabetic Rats. *Iran. J. Med. Sci*. 40(3): 248–255.

Roth, T., Podesta, F., Stepp, M. A., Boeri, D., & Lorenzi, M. (1993). Integrin overexpression induced by high glucose and by human diabetes: potential pathway to cell dysfunction in diabetic microangiopathy. *Proc. Natl. Acad. Sci.* 90(20):9640-4.

Roshan, B., & Stanton, R. C. 2013. A story of microalbuminuria and diabetic nephropathy. *J. Nephropathol*. 2(4), 234–240.

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GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

Rodby, R. A., Firth, L. M., Lewis, E. J., & Collaborative Study Group. 1996. An economic analysis of kaptopril in the treatment of diabetic nephropathy. *Diabetes Care*, 19(10), 1051-1061.

Satoh, N., Shimatsu, A., Himeno, A., Sasaki, Y., Yamakage, H., Yamada, K., and Ogawa, Y., 2010. Unbalanced M1:M2 phenotype of peripheral blood monocytes in obese diabetic patients. *Diabetes care*. 33(1): e7-e7.

Sainath, S. B., Meena, R., Supriya, C., Reddy, K. P., & Reddy, P. S. (2011). Protective role of Centella asiatica on lead-induced oxidative stress and suppressed reproductive health in male rats. E*nviron. Toxicol Pharmacol*. 32(2): 146-154.

Sutardi., 2016. Kandungan bahan aktif tanaman pegagan dan khasiatnya untuk meningkatkan sistem imun tubuh. *J. Litbang Pertanian*. 35: 121-130

Sweitzer, N. K., 2003. What is an angiotensin converting enxyme inhibitor?. *Sirkulasi*. 108: e16-e18.

Szkudelski, T., 2001. The mechanism of alloxan and streptozotocin action in B cells of the rat pancreas. *Physiol. Res*. 50(6): 537-546.

Szkudelski, T., 2012. Streptozotocin–nicotinamide-induced diabetes in the rat. Characteristics of the experimental model. *Exp. Biol. Med*. 237(5), 481-490.

Smeets, B., Steenbergen, M. L., Dijkman, H. B., Verrijp, K. N., te Loeke, N. A., Aten, J., and Wetzels, J. F., 2006. Angiotensin converting enzyme inhibition prevents development of collapsing focal segmental glomerulosclerosis in Thy-1.1 transgenic mice. *Nephrol. Dial. Transplant*. 21(11): 3087-3097.

Sheela, N., Jose, M. A., Sathyamurthy, D., and Kumar, B. N., 2013. Effect of silymarin on streptozotocin-nicotinamide-induced type 2 diabetic nephropathy in rats. *Iran. J. Kidney. Dis*. 7(2): 117.

Stevens, M. J., Li, F., Drel, V. R., Abatan, O. I., Kim, H., Burnett, D., and Obrosova, I. G., 2007. Nicotinamide reverses neurological and neurovascular deficits in streptozotocin diabetic rats. *J. Pharmacol. Exp. Ther*. 320(1): 458-464.

Slaughter, T. N., Paige, A., Spires, D., Kojima, N., Kyle, P. B., Garrett, M. R., and Williams, J. M., 2013. Characterization of the development of renal injury in Type-1 diabetic Dahl salt-sensitive rats. *Am. J. Physiol. Regul. Integr. Comp. Physiol*. 305(7): R727–R734.

Tian, S., and Chen, S. Y., 2015. Macrophage polarization in kidney diseases. *Macrophage*. 2(1).

Underwood, P. C., and Adler, G. K., 2013. The renin angiotensin aldosterone system and insulin resistance in humans. *Curr Hypertens Rep*. 15(1), 59-70.

UNIVERSITAS GADJAH MADA
EFEK PEMBERIAN EKSTRAK Centella asiatica (L.) Urban TERHADAP KADAR UREUM SERUM, RASIO MAKROFAG M1:M2, DAN SKOR GLOMERULOSKLEROSIS GINJAL TIKUS MODEL DIABETES MELITUS
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Universitas Gadjah Mada, 2017 | Diunduh dari http://etd.repository.ugm.ac.id/

Üstündağ, B., Canatan, H., Çinkilinç, N., Halifeoğlu, İ., and Bahçecioğlu, İ. H. (2000). Angiotensin converting enzyme (ACE) activity levels in insulin-independent diabetes mellitus and effect of ACE levels on diabetic patients with nephropathy. *Cell Biochem Funct*. 18(1), 23-28.

Veerendra Kumar M.H. , and Gupta Y. K., 2003. Effect of Centella asiatica on cognition and oxidative stress in an intracerebroventricular streptozotocin model of Alzheimer's disease in rats. *Clin Exp Pharmacol Physiol*. 30(5-6):336-42.

Verdiansah, 2016. Pemeriksaan fungsi ginja l. *J. CDK*. 43 : 2.

Wan, J., Gong, X., Jiang, R., Zhang, Z., and Zhang, L., 2013. Antipyretic and Anti- inflammatory Effects of Asiaticoside in Lipopolysaccharide- treated Rat through Up- regulation of Heme Oxygenase- 1. *Phytotherapy Res*. 27(8): 1136-1142.

Wang, Z., Liu, J., and Sun, W., 2013. Effects of asiaticoside on levels of podocyte cytoskeletal proteins and renal slit diaphragm proteins in adriamycin-induced rat nephropathy. *Life Sci*. 93(8): 352-358.

Weinberg RB, VanderWerken BS, Anderson RA, Stegner JE, and Thomas MJ. 2001. Prooxidant effect of vitamin E in cigarette smokers consuming a high polyunsaturated fat diet. *Arterioscler Thromb Vasc Biol*. 6:1029-33.

Wilcox, G., 2005. Insulin and insulin resistance. *Clin. Biochem. Rev*. 26(2): 19–39.

WHO. 2016. *World health day 2016: Global report on diabetes.* WHO, Geneva.

Xue, W. A. N. G., Qian, L. U., Dong-Sheng, Y. U., Yu-Peng, C. H. E. N., SHANG, J., ZHANG, L. Y., and Jun, L. I. U., 2015. Asiatic acid mitigates hyperglycemia and reduces islet fibrosis in Goto-Kakizaki rat, a spontaneous type 2 diabetic animal model. *Chi. J. Natur. Med*. 13(7) :529-534.

You, H., Gao, T., Cooper, T. K., Brian Reeves, W., and Awad, A. S., 2013. Macrophages directly mediate diabetic renal injury. *Am. J. Physiol. Renal Physiol*. 305(12): F1719–F1727.

Zainol, M. K., Abd-Hamid, A., Yusof, S., and Muse, R., 2003. Antioxidative activity and total phenolic compounds of leaf, root and petiole of four accessions of Centella asiatica (L.) Urban. *Food Chemistry*. 81(4): 575-581.

Zhao, Y., Shu, P., Zhang, Y., Lin, L., Zhou, H., Xu, Z., Jin, X., 2014. Effect of centella asiatica on oxidative stress and lipid metabolism in hyperlipidemic animal models. *Oxid. Med. Cell. Longev*. 2014.

Zhang, J., Noble, N. A., Border, W. A., and Huang, Y., 2010. Infusion of angiotensin-(1–7) reduces glomerulosclerosis through counteracting

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SADLI SYARIFUDDIN, dr. Dwi Aris Agung Nugrahaningsih, M.Sc., Ph.D.; Dr. dr. Eti Nurwening S., M.Kes., M. Med.E
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angiotensin II in experimental glomerulonephritis. *Am. J. Physiol. Renal. Physiol*. 298(3): F579–F588.

Zheng, H. M., Choi, M. J., Kim, J. M., Cha, K. H., Lee, K. W., Park, Y. H., and Lee, D. H., 2016. Centella asiatica leaf extract protects against indomethacin-induced gastric mucosal injury in rats. *J. Med. food.* 19(1), 38-4.

Zhou, S. S., Da Li, W. P. S., Guo, M., Lun, Y. Z., Zhou, Y. M., Xiao, F. C., and Bian, F. N., 2009. Nicotinamide overload may play a role in the development of type 2 diabetes. *World J. Gastroenterol. WJG*. 15(45): 5674.

Zhou, Y. S., Ihmoda, I. A., Phelps, R. G., Bellamy, C. O., and Turner, A. N., 2015. Following specific podocyte injury kaptopril protects against progressive long term renal damage. *F1000Res*. 4: 172.