UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abdel-Aal, S.M., Young, J.C., Rabalski, I. 2006. Anthocyanin composition in Black, Blue, Pink, Purple, and Red Cereal Grains. *Journal of Agricultural and Food Chemistry* **54**: 4696 – 4704.

Abdullah, A., Wolfe, R., Stoelwinder, J.U., deCourten, M., Stevenson, C., Walls, H.L., Peeters, A. (2011). The number of years lived with obesity and the risk of all-cause and cause-specific mortality. *International Journal of Epidemiology* **40**: 985–996.

Al-Awwadi, N.A., Araiz, C., Bornet, A., Delbosc, S., Cristol, J.P., Linck, N., Azay, J., Teissedre, P.L., Cros, G. (2005). Extracts enriched in different polyphenolic families normalize increased cardiac NADPH oxidase expression while having differential effects on insulin resistance, hypertension, and cardiac hypertrophy in high-fructose-fed rats. *Journal of Agricultural and Food Chemistry* **53**:151-157.

Al-Faleh, A.A.A. (2013). The Effect of Ginger, Curcumin and Their Mixture on Blood Glucose, Lipids in Diabetic Rats. Tesis. Graduate Program of Food and Nutrition, Faculty of Home Economic, King Abdulaziz University, Jeddah.

Almatsier, S. (2004). *Prinsip dasar ilmu gizi*. Gramedia Pustaka Utama, Jakarta.

American Diabetes Association. (2006). Diagnosis and classification of diabetes mellitus. *Diabetes Care* **29**:43–48.

Arya, A., Al-Obaidi, M. M. J., Karim, R. B., Taha, H., Khan, A.K., Shahid, N., Sayem, A.S., Chung, Y.L., Mustafa, M.R., Mustafa A.M., Ali, H.M., (2015). Extract of Woodfordia fruticosa flowers ameliorates hyperglycemia, oxidative stress and improves β -cell function in streptozotocin–nicotinamide induced diabetic rats. *Journal of Ethnopharmacology* **175**: 229–240

Astadi, Ignasius Radix; Mary Astuti, Umar Santoso, Prihati Sih Nugraheni. (2008). In vitro antioxidant activity of anthocyanins of black soybean seed coat in human low density lipoprotein (LDL). *Food Chemistry* **112**: 659–663.

Antal, D.-S., Gârban, G., Gârban, Z. (2003). The anthocyanin: biologically active substances of food and pharmaceutic interest. Annals of University Dunarea de Jos of Galati, Food Technology **6**: 106-115.

Aura, A. M., Martin-Lopez, P., O'Leary, K. A., Williamson, G.,Oksman-Caldentey, K. M., Poutanen, K. (2005). In vitro metabolism of anthocyanins by human gut microflora. *European Journal of Nutrition* **44**: 133–142.

Avila, M., Hidalgo, M., Moreno, C.S., Pelaez, C., Requena, T., dePascuel, T.S., (2009). Bioconversion of anthocyanin glycosides by Bifidobacteria and Lactobacillus. *Food Research International* 42: 1453 – 1461.

UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Badan Penelitian dan Pengembangan Kesehatan. (2013). Riset Kesehatan Dasar Riskesdas 2013. Jakarta: Kementerian Kesehatan RI

Baker, R.G., Hayden, M.S., Ghosh, S. (2011). NF-κB, Inflammation, and Metabolic Disease. *Cell Metabolism* **13** (1): 11-22.

Bakowska-Barczak, A. (2005). Acylated anthocyanins as stable natural food colorants – a review. *Polandian Journal of Food Science* **14**: 107-116.

Barham, D., Trinder, P. (1972). An improved colour reagent for the determination of blood glucose by the oxidase system. *Analyst* **97**(151):142–145.

Benzie, I.F., Strain, J.J.(1996). The ferric reducing ability of plasma (FRAP) as a measure of "antioxidant power": the FRAP assay. *Analytical biochemistry* **article 0292**: 70-76.

Borges, G., Roowi, S., Rouanet, J.M., Duthie, G.G., Lean, M.E.J., Crozier, A. (2007). The bioavailability of raspberry anthocyanins and ellagitannins in rats. *Molecular Nutrition Food Research* **51**: 714-725.

Cabrita, L., Fossen, T., Andersen, O.M. (1999). Colours of pure anthocyanidin-3-glucosides in aqueous solutions during storage. *Proceedings of First International Congress on Pigments in Food Technology*: 217-221.

Castañeda-Ovando, A., Pacheco-Hernández, M.L., Páez-Hernández, M.E., Rodríguez J.A., Galán-Vidal, C. (2009). Chemical studies of anthocyanins: a review. *Food Chemistry* **113**: 859-871.

Cevallos-Casals, B. A., Cisneros-Zevallos, L. (2004). Stability of anthocyanin-based aqueous extracts of Andean purple corn and red-fleshed sweet potato compared to synthetic and natural colorants. *Food Chemistry* **86**: 69–77.

Chang, K.C., Tseng, C.D., Chou, T.F., Cho, Y.L., Chi, T.C., Su, M.J., Tseng, Y.Z. (2006). Arterial stiffening and cardiac hypertrophy in a new rat model of type 2 diabetes. *European Journal of Clinical Investigation* **36**: 1–7.

Chapman, D. G., Castilla, R. Campbell, J. A. (1959). Evaluation of protein in food: Determination of protein and food efficiency ratio. *Canadian Journal of Biochemistry and Physiology* **37**:679-686.

Chen, X.Q., Nagao, N., Itani, T., Irifune, K. (2012). Anti-oxidative analysis, and identification and quantification of anthocyanin pigments in different coloured rice. *Food Chemistry* **135**: 2783–2788.

Cheon, H., Cho, J.M., Kim, S., Baek, S.H., Lee, M.K., Kim, K.W., Yu, S.W., Solinas, G, Kim, S.S., Lee, M.S. (2010). Role of JNK activation in pancreatic beta-cell death by streptozotocin. *Molecular Cell Endocrinology* **321**:131–137.

Choung, M.G., Baek, I.Y., Kang, S.T., Han, W.Y., Shin, D.C., Moon, H.P. (2001). Isolation and determination of anthocyanins in seed coats of black soybean

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

(*Glycine max* (L.) Merr.). *Journal of Agricultural and Food Chemistry* **49:** 5848–5851.

Costantino, L., Albasini, A., Rastelli, G., Benvenuti,, S. (1992). Activity of polyphenolic crude extracts as scavengers of superoxide radicals and inhibitors of xanthine oxidase. *Plantation Medicine* **58**: 342-344.

Crouch, R.K., Gandy, S.E., Kimsey, G., Galbraith, R.A. , Galbraith, G.M.P., Buse, M.G. (1981). The inhibition of islet superoxide dismutase by diabetogenic drugs. *Diabetes* **30**: 235 – 241.

DeFronzo, R.A. (2009). From the triumvirate to the ominous octet: a new paradigm for the treatment of type 2 diabetes mellitus. *Diabetes* **58**: 773–795.

Du, X.L., Matsumura, T., Edelstein, D., Rossetti, L., Zsengellér, Z., Szabó, C., Brownlee, M. (2003). Inhibition of GAPDH activity by poly(ADP-ribose) polymerase activates three major pathways of hyperglycemic damage in endothelial cells. *The Journal of Clinical Investigation* **112**(7): 1049–1057.

El-Yamani, M.A.S. (2011). Cinnamon, cardamom and ginger impacts as evaluated on hyperglycemic rats. *Research Journal Specific Education of College of Applied Medical Sciences of University Of Om El- Qura, K.S.A.* **20**: 663-679.

Elsner, M., Guldbakke, B., Tiedge, M., Munday, R., Lenzen, S. (2000). Relative importance of transport and alkylation for pancreatic beta-cell toxicity of streptozotocin. *Diabetologia* **43**:1528–1533.

Ervika-Rahayu N.H. (2013). Pengaruh konsumsi ekstrak antosianin ubi jalar ungu (*Ipomoea batatas*) Terhadap glukosa darah, status antioksidan darah, dan gambaran histopatologi pankreas tikus hiperglikemia induksi aloksan. Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta.

Faid, S.M.A.F. (2013). Biological Study on the Beneficial Effects of Arabic Gum on Biological Parameters of Hyperglycemic Albino Rats. *Life Science Journal* **10**(4): 3570-3579.

Faria, A., Pestana, D., Azevedo, J., Martel, F., deFreitas, V., Azevedo, I. (2009). Absorption of anthocyanins through intestinal epithelial cells: Putative involvement of GLUT2. *Molecular Nutrition&Food Research* **53**:1430-1437.

Federer, W. (1991). *Statistics and Society: Data Collection and Interpretation*. 2nd ed. Marcel Dekker: New York.

Felgines, C., Texier, O., Besson, C., Lyan, B., Lamaison, J.L., Scalbert, A. (2007). Strawberry pelargonidin glycosides are excreted in urine as intact glycosides

UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

and glucuronidated pelargonidin derivatives in rats. *British Journal of Nutrition* **98**: 1126–1131.

Fernandes, I., Nave, F., Gonçalves, R., de Freitas, V., Mateus, N. (2012). On the bioavailability of flavanols and anthocyanins: Flavanol-anthocyanin dimers. Journal of Food Chemistry, **135**: 812–818.

Fiander, H., Schneider, H. (2000). Dietary ortho-phenols that induce glutathione S-transferase and increase the resistance of cells to hydrogen peroxide are potential cancer chemopreventives that act by two mechanisms: the alleviation of oxidative stress and the detoxification of mutagenic xenobiotics. Cancer Letter **156**: 117-124.

Fierabracci V, De Tata V, Pocai A, Novelli M, Barbera` A, Masiello P. (2002). Oral tungstate treatment improves only transiently alteration of glucose metabolism in a new rat model of type 2 diabetes. *Endocrine* **19**: 177–184.

Fitri Kharismawati. (2015). Dampak Konsumsi Ekstrak Antosianin Beras Merah, Kulit Kedelai Hitam, Dan Campurannya Terhadap Profil Lipid Tikus Hiperglikemia. Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta.

Forester S.C., Waterhouse A.L. (2008). Identification of Cabernet Sauvignon anthocyanin gut microflora metabolites. *Journal of Agricultural and Food Chemistry* **56**: 9299-9304.

Fujita, H., Fujishima, H., Chida,S., Takahashi, K., Qi, Z.H., Kanetsuna, Y.,Breyer, M.D., Harris, R.C., Yamada, Y., Takahashi, T. (2009). Reduction of Renal Superoxide Dismutase in Progressive Diabetic Nephropathy. *Journal of the American Society of Nephrology* **20**(6): 1303–1313.

Fujita, H., Sakamoto, T., Komatsu, K., Fujishima, H., Morii, T., Narita, T., Takahashi, T., Yamada, Y. (2011). Reduction of circulating superoxide dismutase activity in type 2 diabetic patients with microalbuminuria and its modulation by telmisartan therapy. *Hypertension Research* **34**(12): 1302-1308.

Fridovich, I. (1984) Overview: biological sources of O_2^-. *Methods Enzymology* **105**: 59-61.

Fukumoto, L.R., Mazza, G. (2000). Assessing antioxidant and prooxidant activities of phenolic compounds. *Journal of Agricultural and Food Chemistry* **48**(8): 3597–3604.

Galvano, F., La Fauci, L., Lazzarino, G., Fogliano, V., Ritieni, A., Ciappellano, S., Battistini, N.C., Tavazzi, B., Galvano, G. (2004). Cyanidins: metabolism and biological properties. *Journal of Nutrition and Biochemistry* **15**: 2-11.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Galvano, F., Frigiola, A., Gazzolo, D., Biondi, A., Malaguarnera, M., Li Volti, G. (2009). Endothelial protective effects of anthocyanins: the underestimated role of their metabolites. *Annual Nutrition and Metabolism* **54**:158–169.

García-Alonso, M., Matsugo, U., Rimbach, G., Rivas-Gonzalo, J.C., dePascual-Teresa, S. (2005). Electro spin resonance spectroscopy studies on the free radical scavenging activity of wine anthocyanins and pyranoanthocyanins. *Molecular and Nutrition Food Research* **49**: 1112-1119.

Gehm, B.D., McAndrew, J.M., Chien, P.Y., Jameson, J.L. (1997). Resveratrol, a polyphenolic compound found in grapes and wines, is an agonist for the estrogen receptor. *Proceeding of the National Academy of Science* **9**: 14138.

Giacco, F., Brownlee, M. (2010). Oxidative stress and diabetic complications. *Circulation Research* **107**: 1058-1070.

Gibney, M., Ian, A., Helen, M. (2003). *Nutrition and Metabolism.* Blackwell Publishing, United Kingdom.

Gulfraz M, Qadir G, Noshhen F, Parveen Z. (2007). Antihyperglycemic effects of *Berberis lyceum* royle in alloxan induced diabetic rats. *Diabetologia Croatica* **36**(3): 49–54.

Guo, S.L., Dai, C.H., Guo, M., Taylor, B., Harmon, J.S., Sander, M., Robertson, R.P., Powers, A.C., Stein, R. (2013). Inactivation of specific β cell transcription factors in type 2 diabetes. *The Journal of Clinical Investigation* **123**(8): 3305-3316.

Guo, H., Xia, M., Zou, T., Ling, W., Zhong, R., Zhang, W. (2012). Cyanidin 3-glucoside attenuates obesity-associated insulin resistance and hepatic steatosis in high-fat diet-fed and db/db mice via the transcription factor FoxO1. *Journal of nutritional biochemistry* **23**: 349-360.

Guo, H., Ling, W., Liu, C., Hu, Y., Xia, M., Feng, X., Xia, X. (2007). Effect of anthocyanin-rich extract from black rice (*Oryza sativa* L. indica) on hyperlipidemia and insulinresistance in fructose-fed rats. *Plant Foods for Human Nutrition* **62**:1–6.

Halliwell. B, Gutteridge, J.M.C. (1989) *Free Radicals in Biology and Medicine*, 2nd edn. Clarendon Press, Oxford, United Kingdom.

Harris, R.M., Picton, R., Singh, S., Waring, R.H. (2000). Activity of phenolsulfotransferases in the human gastrointestinal tract. *Life Sciences* **67**: 2051–2057.

Hassan, N., Janjua M.Z. (2001). The optimum dose of nicotinamide for protection of pancreatic beta-cells against the cytotoxic effect of streptozotocin in albino rat. *Journal of Ayub Medical Collaboration Abbottabad* **13**: 26–30.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Havsteen, B. (1983). Flavonoids, a class of natural products of high pharmacological potency. *Biochemistry and Pharmacology* **32**:1141-1148.

Hollman, P.C.H (2004). Absorption, bioavailability, and metabolism of flavonoids. *Pharmaceutical Biology* **42**: 74–83.

Howell, S.L. (1997). *The biosynthesis and secretion of insulin*. Dalam : Text Book of Diabetes, Pickup, J.C., William, G. (eds), 2nd ed, Blackwell Science Ltd: London

Huang, W.Y., Liu, Y.M., Wang, J., Wang , X.N., Li, C.Y. (2014. Anti-Inflammatory Effect of the Blueberry Anthocyanins Malvidin-3-Glucoside and Malvidin-3-Galactoside in Endothelial Cells. *Molecules* **19**: 12827-12841.

Indrasari, S.D. (2006). Padi Aek Sibundong: pangan fungsional. *Warta Penelitian dan Pengembangan Pertanian* **28**(6): 1−3.

Indrasari, S.D., Purwani, E.Y., Wibowo, P., Jumali. (2010). Glycemic indices of some rice varieties. *Indonesian Journal of Agriculture* **3**(1): 9-16.

Irawan, M. 2007. Glukosa dan Metabolisme Energi. Sports Science Brief 1 (6)

Jackson, T.M., Rawling, J.M., Roebuck, B.D., Kirkland, J.B. (1995). Large supplementsof nicotinic acid and nicotinamide increase tissue NAD^+ and poly(ADP-ribose) levels but do not affect diethylnitrosamine-induced altered hepatic foci in Fischer-344 rats. *Journal of Nutrition* **125**: 1455–1461.

Jay, M.A., Ren., J.(2007). Peroxisome proliferator-activated receptor (PPAR) in metabolic syndrome and type 2 diabetes mellitus. *Current Diabetes Review* **3**(1): 33-39.

Jeng, T.L., Shih,Y.J., Wua, M.T., Sung, J.M. (2010). Comparisons of flavonoids and anti-oxidative activities in seed coat, embryonic axis and cotyledon of black soybeans. *Food Chemistry* **123**: 1112–1116.

Jensen, J., Rustad, P. I., Kolnes, A. J., Lai, Y.-C. (2011). The Role of Skeletal Muscle Glycogen Breakdown for Regulation of Insulin Sensitivity by Exercise. *Frontiers in Physiology 2*, 112: 1-42.

(http://doi.org/10.3389/fphys.2011.00112)

Jia, Z.S.; Zhou, B.; Yang, L.; Wu, L.M.; Liu, Z.L. (2000). Synergistic antioxidant effect of green tea polyphenols with a-tocopherol on free radical initiated peroxidation of linoleic acid in micelles. Journal of the Chemical Society, Perkin Transactions 2: 785–791.

Kähkönen, M.P., Heinonen, M. (2003). Antioxidant activity of anthocyanins and their aglycons. *Journal of Agricultural Food Chemistry* **51**: 628-633.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Kalt, W., Blumberg, J.B., McDonald, J.E., Vinqvist-Tymchuk, M.R., Fillmore, S.A.E., Graf, B.A. (2008). Identification of anthocyanins in the liver, eye, and brain of blueberry-fed pigs. *Journal of Agricultural and Food Chemistry*, 56, 705–712.

Kaneto, H., Katakami, N., Matsuhisa. M., dan Matsuoka, T. (2010). Role of reactive oxygen species in the progression of type 2 diabetes and atherosclerosis. *Mediators of Inflammation* **Article ID 453892**: 1-11.

Kay, C.C., Mazza, G., Holub, B.J., Wang, J. (2004). Anthocyanin metabolites in human urine and serum. *Britain Journal of Nutrition* **91**: 933-942.

Keppler, K., Humpf, H. U. (2005). Metabolism of anthocyanins and their phenolic degradation products by the intestinal microflora. *Bioorganic and Medicinal Chemistry* **13**: 5195–5205.

Kim, J. A., Jung, W. S., Chun, S. C., Yu, C. Y., Ma, K. H., Gwag, J. G. (2006). A correlation between the level of phenolic compounds and the antioxidant capacity in cooked-with-rice and vegetable soybean (*Glycine max* L.) varieties. *European Food Research and Technology* **224**: 259–270.

Kim, M.K., Kim, H.A., Koh, K.O., Kim, H.S., Lee, Y.S., Kim, Y.H. (2008). Identification and quantification of anthocyanin pigments in colored rice. *Nutrition Research and Practice* **2**(1): 46-49.

Kordali, S., Kotan, R., Mavi, A., Cakir, A., Ala, A., Yildirim A. (2005). Determination of the chemical composition and antioxidant activity of the essential oil of *Artemisia dracunculus* and of the antifungal and antibacterial activities of Turkish *Artemisia absinthium*, *Artemisia dracunculus*, *Artemisia santonicum*, and *Artemisia spicigera* essential oils. *Journal of Agricultural and Food Chemistry* **53**: 9452–9458.

Kowalczyk, E., Krzesinski, P., Kura, M., Szmigiel, B., Blaszczyk, J., (2003). Anthocyanins in medicine. *Poland Journal of Pharmacology* **55**: 699-702.

Krssak, M., Brehm, A., Bernroider, E., Anderwald, C., Nowotny, P., Man, C.D., Cobelli, C., Cline, G. W., Shulman, G.I., Waldhausl, W., Roden, M. (2004). Alterations in postprandial hepatic glycogen metabolism in Type 2 Diabetes. *Diabetes* **53**: 3048-3056.

Kumar, S. dan Rahilly. (2005). *Insulin Resistance*. John Wiley and Sons Ltd, United Kingdom.

Kumar, V., Rani, A., Dixit, A.K., Pratap, D., Bhatnagar, D. (2010). A comparative assessment of total phenolic content, ferric reducing-anti-oxidative power, free radical-scavenging activity, vitamin C and isoflavones content in soybean with varying seed coat colour. *Food Research International* **43**: 323–328.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Latifah Putri Aulia. (2015). Efektivitas Ekstrak Antosianin Beras Hitam (*Oryza Sativa* L) dan Ubi Jalar Ungu (*Ipomea Batatas* Poiret) terhadap Penghambatan Stres Oksidatif dan Peningkatan Kapasitas Antioksidan pada Tikus Diabetes Melitus Tipe Dua. Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta.

L'Abbate A, Neglia D, Vecoli C, Novelli M, Ottaviano V, Baldi S, Barsacchi R, Paolicchi A, Masiello P, Drummond GS, McClung JA, Abraham NG. (2007). Beneficial effect of heme oxygenase-1 expression on myocardial ischemia-reperfusion involves an increase in adiponectin in mildly diabetic rats. *American Journal of Heart and Circular Physiology* **293**:3532–3541.

Lambeth, J.D. (2004). NOX enzymes and the biology of reactive oxygen. *Natural Review of Immunology* **4**: 181-189.

Lee, J., Finn, C.E., Wrolstad, R.E. (2004). Comparison of anthocyanin pigment and other phenolic compounds of *Vaccinium membranaceum* and *Vaccinium ovatum* native to the Pacific Northwest of North America. *Journal of Agricultural and Food Chemistry* **52**: 7039-7044.

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

Li, HT., W, X.D., Davey, A.K., Wang, J. (2011). Antihyperglycemic effects of baicalin on streptozotocin–nicotinamide induced diabetic rats. *Phytotherminology Research* **25**:189–194.

Lou, T., Zhang, Z., Xi, Z., Liu, K., Li, L., Liu, B. (2011). Berberine inhibits inflammatory response and ameliorates insulin resistance in hepatocytes. *Inflammation* **34**: 659-667.

Ma, X.H., Zheng, C.J., Han, L.Y., Xie, B., Jia, J., Cao, Z.W., Li, Y.X., Chen, Y.Z. (2009). Synergistic therapeutic actions of herbal ingredients and their mechanisms from molecular interaction and network perspectives. *Drug Discovery Today* **14** (11–12): 579–588.

Magnusson I., Rothman D. L., Katz L. D., Shulman R. G., Shulman G. I. (1992). Increased rate of gluconeogenesis in type II diabetes mellitus. A ^{13}C nuclear magnetic resonance study. J. Clin. Invest. 90, 1323–1327.

Mallery, S. R., Budendorf, D. E., Larsen, M. P., Pei, P., Tong, M., Holpuch, A. S., et al. (2011). Effects of human oral mucosal tissue, saliva and oral microflora on intraoral metabolism and bioactivation of black raspberry anthocyanins. *Cancer Prevention Research*: 54-66.

Manohar, S.M., Vaikasuvu, S.R., Deepthi K., Sachan, A., Narashimha, S.R.P.V.L., (2013). An association of hyperglycemia with plasma malondialdehyde and

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

atherogenic lipid risk factors in newly diagnosed Type 2 diabetic patients. *Journal of Research Medical Science* **18**(2): 89–93.

Marchetti, P., Del-Prato, S., Lupi, R., Del-Guerra, S. (2006). Pancreatic β-cell in human type-2 diabetes. *Nutritional Metabolism and Cardiovascular Disease* **16**: 3-6.

Markham, K.R., Gould, K.S., Winefield, C.S., Mitchell, K.A., Bloor., S.J., Boase, M.R. (2000). Anthocyanin vacuolar inclusions, their nature, and significance in flower coloration. *Phytochemistry* **55**: 327-336.

Martineau, L.C., Couture, A., Spoor, D., Benhaddou-Andaloussi, A., Harris, C., Meddah, B. (2006). Anti-diabetic properties of the Canadian lowbush blueberry *Vaccinium angustifolium* Ait. *Phytomedicine: international journal of phytotherapy and phytopharmacology* **13**: 612-623.

Markley, K.S. (1950). *Soybean and Soybean Product*, vol I. Interscience Publisher Inc., New York, USA.

Masiello, P. (1998). Animal models of type 2 diabetes with reduced pancreatic beta-cell mass. *International Journal of Biochemistry and Cellular Biology* **38**:873–893.

Matsumoto, H., Inaba, H., Kishi, M., Tominaga, S., Hirayama, M., Tsuda, T. (2001). Orally administered delphinidin 3-rutinoside and cyanidin 3-rutinoside are directly absorbed in rats and humans and appear in the blood as the intact forms. *Journal of Agriculture and Food Chemistry* **49**(3):1546–1551.

Mazza, G., Miniati, E. (1993). Anthocyanins in fruits, vegetables, and grains. *Dalam*: *Anthocyanins in fruits, vegetables, and grains*. CRC Press, Boca Raton.

McDougall, G.J., Dobson, P., Smith, P., Blake, A., Stewart, D. (2005). Assessing potential bioavailability of raspberry anthocyanins using an in vitro digestion system. *Journal of Agricultural and Food Chemistry* **53**: 5896-5904.

McGhie, T. K., Ainge, G. D., Barnett, L. E., Cooney, J. M., Jensen, D.J. (2003). Anthocyanin glycosides from berry fruit are absorbed and excreted unmetabolized by both humans and rats. *Journal of Agricultural and Food Chemistry* **51**, 4539–4548.

McGhie, T.K., Walton, M.C. (2007). The bioavailability and absorption of anthocyanins: towards a better understanding. *Molecular Nutrition and Food Research* **51**:702-713.

Meier, J.J., Bonadonna, R.C. (2013). Role of Reduced b-Cell Mass Versus Impaired b-Cell Function in the Pathogenesis of Type 2 Diabetes. *Diabetes Care* **36**(2): S113-119.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Meléndez R., Meléndez-Hevia E., Canela E. I. (1999). The fractal structure of glycogen: a clever solution to optimize cell metabolism. *Biophysical Journal* **77**: 1327 – 1332.

Miguel, M.G. (2011). Anthocyanins: Antioxidant and/or anti-inflammatory activities. *Journal of Applied Pharmaceutical Science* **01** (06): 07-15.

Min, B.R., Gu, L.W., McClung, A.M., Bergman, C.J., Chen, M.H. (2012). Free and bound total phenolic concentrations, antioxidant capacities, and profiles of proanthocyanidins and anthocyanins in whole grain rice (*Oryza sativa* L.) of different bran colours. *Food Chemistry* **133**: 715–722.

Mislachah Nuril Chilmiyah Fitriyati.(2015). Perbandingan Efek Anti Inflamasi Antara Ekstrak Antosianin Beras Hitam (*Oryza Sativa* L) dan Ubi Jalar Ungu (*Ipomea Batatas* Poiret) pada Tikus Diabetes Mellitus Tipe Dua. Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta.

Moussa, S.A. (2006). *Oxidative Stress in Diabetes Mellitus*. Biophysics Group, Department of Biochemistry, National Research Centre, Cairo, Egypt.

Mulleder, U., Murkovic, M., Pfannhauser, W. (2002). Urinary excretion of cyanidin glycosides. *Journal of Biochemistry and Biophysic Methods* **53**: 61–66.

Muselík, J., García-Alonso, M., Martín-López, M.P., Žemlicka, M., Rivas-Gonzalo, J.C. (2007). Measurement of antioxidant activity of wine catechins, procyanidins, anthocyanins and pyranoanthocyanins. *International Journal of Molecular Science* **8**: 797-809.

Nakhaee, A., Bokaeian, M., Saravani, M., Farhangi, A., Akbarzadeh, A. (2009). Attenuation of oxidative stress in streptozotocin-induced diabetic rats by *Eucalyptus globulus*. Indian Journal of Clinical Biochemistry **24**(4): 419-425

Nandi, A., Chatterjee, I.B. (1988). Assay of superoxide dismutase activity in animal tissues. Journal of Bioscience, **13**(3): 305–315.

Narwidina, P. (2009). Pengembangan minuman isotonik antosianin beras hitam (*Oryza Sativa* L. Indica) dan efeknya terhadap kebugaran dan aktivitas antioksidan pada manusia pasca stres fisik: a case control study. Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta

Nielsen, I.L.F., Dragsted, L.O., Ravn-Haren, G., Freese, R., Rasmussen, S.E. (2003). Absorption and excretion of black currant anthocyanins in humans and Watanabe heritable hyperlipidemic rabbits. *Journal of Agriculture and Food Chemistry* **51**(9):2813–20.

Nishikawa, T., Edelstein, D., Du, X.L., Yamagishi, S., Matsumura, T., Kaneda, K., Yorek, M.A., Beebek, D., Oatesk, P.J., Hammes, H.P., Giardino, I., Brownlee,

UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

M. (2000). Normalizing mitochondrial superoxide production blocks three pathways of hyperglycaemic damage. *Nature* **404**: 787-790.

Nizamutdinova, I.T., Jin, Y.C., Chung, J.I., Shin, S.C., Lee, S.J., Seo, H.G., Lee, J.H., Chang, K.C., Kim, H.J. (2009). The anti-diabetic effect of anthocyanins in streptozotocin-induced diabetic rats through glucose transporter 4 regulation and prevention of insulin resistance and pancreatic apoptosis. *Molecular Nutrition and Food Research* **53**:1419–1429.

Noori, S. (2012). An overview of oxidative stress and antioxidant defensive system. **1:413**. doi:10.4172/scientificreports.413.

Novelli M, Fabregat ME, Fernandez-Alvarez J, Gomis R, Masiello P. (2001). Metabolic and functional studies on isolated islets in a new rat model of type 2 diabetes. *Molecular Cell and Endocrinology* **175**: 57–66.

Oki, T., Masuda, M., Kobayashi, M., Nishiba, Y., Furuta, S., Suda,I., Sato, T. (2002). Polymeric procyanidins as radical-scavenging components in red-hulled rice. *Journal of Agriculture and Food Chemistry* **50**: 7524 – 7529.

Ortiz-Andrade, R.R., Sanchez-Salgado, J.C., Navarrete-Vazquez G., Webster, S.P., Binnie, M., Garcıa-Jimenez, S., Leon-Rivera, I., Cigarroa-Vazquez, P., Villalobos-Molina, R., Estrada-Soto, S. (2008). Antidiabetic and toxicological evaluations of naringenin in normoglycaemic and NIDDM rat models and its implications on extra-pancreatic glucose regulation. *Diabetes and Obesity Metabolism* **10**: 1097–1104.

Oteiza, P.I., Erlejman, A.G., Verstraeten, S.V., Keen, C.L., Fraga C.G. (2005). Flavonoid-membrane interactions: A protective role of flavonoids at the membrane surface. *Clinical Development Immunology* **12**: 19-25.

Ozyazgan, S., Kutluata, N., Afsar, S., Ozdas, S.B., Akkan, A.G. (2005). Effect of glucagon-like peptide-1(7–36) and exendin-4 on the vascular reactivity in streptozotocin/nicotinamide-induced diabetic rats. *Pharmacology* **74**:119–126.

Palsamy, P., Subramanian, S. (2009). Modulatory effects of resveratrol on attenuating the key enzymes activities of carbohydrate metabolism in streptozotocin-nicotinamide-induced diabetic rats. *Chemical and Biology Interaction* **179**: 356–362.

Pandya, K.G., Patel, M.R., Lau-Cam, C.A. (2010). Comparative study of the binding characteristics to and inhibitory potencies towards PARP and in vivo antidiabetogenic potencies of taurine, 3-aminobenzamide and nicotinamide. *Journal of Biomedical Science* **17**:16-23.

Pari, L., Srinivasan, S. (2010). Antihyperglycemic effect of diosmin on hepatic key enzymes of carbohydrate metabolism in streptozotocin-nicotinamide-induced diabetic rats. *Biomedical Pharmacotherapy* **64**: 477–481.

UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Passamonti, S., Vrhovsek, U., Vanzo, A., Mattivi, F. (2003). The stomach as a site for anthocyanins absorption from food. *FEBS Letters,* **544**: 210–213.

Passamonti, S., Terdoslavich, M., Franca, R., Vanzo, A., Tramer, F., Braidot, E., Petrussa, E., Vianello, A. (2009). Bioavailability of flavonoids: a review of their membrane transport and the function of bilitranslocase in animal and plant organisms. *Current Drug Metabolism* **10**(4):369–394.

Perera, A.S., and Jansz, E.R. (2000).Preliminary investigation on the red pigment in rice and its effect on glucose release from rice starch. Journal of National Science Foundation Sri Lanka **28** (3): 185 – 192.

Pietta, P.G. (2000). Flavonoids as antioxidants. *Journal of Natural Products* **63**: 1035–1042.

Poitout, V., Robertson, R.P. (2008). Glucolipotoxicity: fuel excess and-cell dysfunction. *Endocrine Review* **29**(3): 351–366.

Pojer, E., Mattivi, F., Johnson, D., Stockley, C.S. (2013). The case for anthocyanin consumption to promote human health: a review. *Comprehensive Reviews in Food Science and Food Safety* **12**: 483–508.

Prentki, M., Nolan, C.J. (2006). Islet beta cell failure in type 2 diabetes. *Journal of Clinical Investigation* **116**: 1802–1812.

Prihati-Sih Nugraheni. (2007). *Absorbsi ekstrak antosianin dan minuman berbasis ekstrak antosianin kulit kedelai hitam pada Gastrointestinal tract tikus secara in situ.* Tesis. Program Studi Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta

Prior, R.L., Wu, X. (2006). Anthocyanins: structural characteristics that result in unique metabolic patterns and biological activities. *Free Radical Research* **40**(10): 1014–1028.

Prior, R. L., Wilkes, S. E., Rogers, T. R., Khanal, R. C., Wu, X., Howard, L. R. (2010). Purified blueberry anthocyanins and blueberry juice alter development of obesity in mice fed an obesogenic high-fat diet. *Journal of Agricultural and Food Chemistry* **58**: 3970–3976.

Rajarajeswari, N., Pari, L. (2011). Antioxidant role of coumarin on streptozotocin-nicotinamide-induced type 2 diabetic rats. *Journal of Biochemistry and Molecular Toxicology* **25**:355–361.

Reeves, P.G., Nielsen, F.H. dan Fahey, G.C. Jr. (1993). AIN-93 Purified Diets for Laboratory Rodents: Final Report of the American Institute of Nutrition Ad Hoc Writing Committee on the Reformulation of the AIN-76A Rodent Diet. *The Journal of Nutrition* **123**: 1939-1951.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Ren, H. (2010). Antioxidant and free radical-scavenging activities of black soybean peptides (BSP). *International Journal of Agriculture and Biology Engineering* **3**(2): 64–69.

Ren, S.C., Liu, Z.L., Wang, P. (2012). Proximate composition and flavonoids content and in vitro antioxidant activity of 10 varieties of legume seeds grown in China. *Journal of Medicinal Plants Research* **6**(2): 301-308.

Ridha, M.F. (2009). Pengaruh konsumsi kacang merah (*Phaseolus vulgaris* L.) pratanak terhadap status antioksidan dan profil lipida darah tikus *Sprague Dawley*. Tesis. Fakultas Teknologi Pertanian, Universitas Gadjah Mada, Yogyakarta.

Robertson, R. P., Harmon, J., Tran, P.O., Tanaka, Y., dan Takahashi H. (2003). Glucose toxicity in β-cells: Type 2 Diabetes, good radicals gone bad and the glutathione connection. *Diabetes* **52** (3): 581 – 587.

Robertson, R. P., Harmon, J. (2006). Diabetes, glucose toxicity, and oxidative stress: A case of double jeopardy for the pancreatic islet β cell. *Free Radical Biology and Medicine* **41**: 177 – 184.

Rojo, L.E., Ribnicky, D., Logendra, S., Poulev, A., Rojas-Silva, P., Kuhn, P., Dorn, R., Grace, M.H., Lila, M.A., Raskin, I. (2012). In vitro and in vivo anti-diabetic effects of anthocyanins from Maqui Berry (*Aristotelia chilensis*). *Food Chemistry* **131**: 387–396.

Rossetto, M., Vanzani, P., Lunelli, M., Scarpa, M., Mattivi, F., Rigo, A. (2007). Peroxyl radical trapping activity of anthocyanins and generation of free radical intermediates. *Free Radical Research* **41**(7): 854–859.

Roy, M., Sen, S. Chakraborti, A.S. (2008). Action of pelargonidin on hyperglycemia and oxidative damage in diabetic rats: implication for glycation-induced hemoglobin modification. *Life Science* **82**: 1102-1110.

Sancho, R.A.S., Pastore, G.M. (2012) Evaluation of the effects of anthocyanins in type 2 diabetes. *Food Research International* **46**: 378–386.

Salway, J.G. (2004). *Metabolism at A Glance,* 3rd ed. Blackwell Publishing, Oxford, United Kingdom.

Sarma, A.D., Sreelakshmi, Y., Sharma, R. (1997). Antioxidant ability of anthocyanins against ascorbic acid oxydation. *Phytochemistry* **45**: 671–674.

Sasaki, R., Nishimura, N., Hoshino, H., Isa, Y., Kadowaki, M., Ichi, T. (2007). Cyanidin 3-glucoside ameliorates hyperglycemia and insulin sensitivity due to downregulation of retinol binding protein 4 expression in diabetic mice. *Biochemical Pharmacology* **74**: 1619-1627.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Scazzocchio, B., Vari, R., Filesi, C., D'Archivio, M., Santangelo, C., Giovannini, C. (2011). Cyanidin-3-O-beta-glucoside and protocatechuic acid exert insulin-like effects by upregulating PPARγ activity in human omental adipocytes. *Diabetes* **60**: 2234-2244.

Schönfeld, P., Wieckowski, M.R., Lebiedzińska, M., Wojtczak, L. (2010). Mitochondrial fatty acid oxidation and oxidative stress: lack of reverse electron transfer-associated production of reactive oxygen species. *Biochemistry and Biophysics Acta.* **1797** (6–7): 929–938.

Shanmuganayagam, D., BeahM, M.R., Osman, H.E., Krueger, C.G., Reed, J.D., Folts, J.D. (2002). Grape seed and grape skin extracts elicit a greater antiplatelet effect when used in combination than when used individually in dogs and humans. The Journal of Nutrition **132** (12): 3592-3598.

Shao, Y.F., Xu, F.F., Sun, X., Bao, J.S., Beta, T. (2014). Identification and quantification of phenolic acids and anthocyanins as antioxidants in bran, embryo and endosperm of white, red and black rice kernels (*Oryza sativa* L.). *Journal of Cereal Science* **59**: 211-218.

Shih, P.H., Yeh, C.T., Yen, G.C. (2005). Effects of anthocyanidin on the inhibition of proliferation and induction of apoptosis in human gastric adenocarcinoma cells. Food Chemistry and Toxicology **43**(10):1557–1566.

Shirwaikar, A., Rajendran, K., Kumar C.D., Bodla, R., (2004). Antidiabetic activity of aqueous leaf extract of Annona squamosa in streptozotocin–nicotinamide type 2 diabetic rats. *Journal of Ethnopharmacology* **91**: 171–175

Shu, Y.Z. (1998). Recent natural products based drug development: a pharmaceutical industry perspective. *Journal of Nature Production* **61**: 1053-1071.

Steffen, Y., Gruber, C., Schewe, T., Sies, H. (2008). Mono-O-methylated flavanols and other flavonoids as inhibitors of endothelial NADPH oxidase. *Archives of Biochemistry and Biophysics* **469**: 209–219.

Sun, Y., Oberley, L.W., Li, Y. (1988): A simple method for clinical assay of superoxide dismutase. Clinical Chemistry **34**: 497-500.

Suzuki, Y., Lanner, C., Kim, J.H., Vilardo, P.G., Zhang, H. (2001). Insulin control of glycogen metabolism in knockout mice lacking the muscle-specific protein phosphatase PP1G/RGL. *Molecular Cell and Biology* **21**: 2683-2694.

Szkudelski, T. (2008). Streptozotocin–nicotinamide–induced diabetes in rats: Characteristic of the experimental model. *Experimental Biology and Medicine* **237**: 481-490.

Takeda, J. (1988). Light-induced synthesis of in carrot cell in suspension: the factors affecting anthocyanin production. *Journal of Experimental Botany* **39**: 1065-1077.

UNIVERSITAS GADJAH MADA
EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L) Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Takikawa, M., Inoue, S., Horio, F., Tsuda, T. (2010). Dietary anthocyanin-rich bilberry extract ameliorates hyperglycemia and insulin sensitivity via activation of AMP-activated protein kinase in diabetic mice. *The Journal of Nutrition* **140**: 527-533.

Taylor R., Magnusson I., Rothman D. L., Cline G. W., Caumo A., Cobelli C., Shulman G. I. (1996). Direct assessment of liver glycogen storage by ^{13}C nuclear magnetic resonance spectroscopy and regulation of glucose homeostasis after a mixed meal in normal subjects. Journal of Clinical Investigation **97**(1): 126–132.

Thilakarathna, S.H., Rupasinghe, H. P. V., (2013). Flavonoid Bioavailability and Attempts for Bioavailability Enhancement. *Nutrients* **5**: 3367-3387.

Tiwari, B.K., Pandey, K.B., Abidi, A. B., Rizvi, S.I. (2013). Markers of Oxidative Stress during Diabetes Mellitus. *Journal of Biomarkers* **Article ID 378790**: 1-8.

Torskangerpoll, K., Andersen, O.M. (2005). Colour stability of anthocyanins in aqueous solutions at various pH values. Food Chemistry **89**: 427-440.

Toufektsian, M., Lorgeril, M.D., Nagy, N. (2008). Chronic dietary intake of plant-derived anthocyanins protects the rat heart against ischemia-reperfusion injury. Journal of Nutrition **138**:747–752.

Tsuda, T., Horio, F., Osawa, T. (1999). Absorption and metabolism of cyanidin 3-O-b-D-glucoside in rats. *FEBS Letters* **449**: 179–182.

Tsuda, T., Horio, F., Uchida, K., Aoki, H., Osawa, T. (2003). Dietary cyanidin 3-O-B-D-glucoside-rich purple corn color prevents obesity and ameliorates hyperglycemia in mice. *Journal of Nutrition* **133**: 2125–2130.

Vossen, E., Ntawubizi, M., Raes, K., Smet, K. Huyghebaert, G., Arnouts, S., DeSmet, S. (2011). Effect of dietary antioxidant supplementation on the oxidative status of plasma in broilers. *Journal of Animal Physiology and Animal Nutrition* **95** (2): 198–205.

Vitaglione, P., Donnarumma, G., Napolitano, A., Galvano, F., Gallo A., Scalfi L., Fogliano, V. (2007). Protocatechuic acid is the major human metabolite of cyanidin-glucosides. Journal of Nutrition **137**: 2043-2048.

Wang, H., Cao, G., Prior, R.L. (1997). Oxygen radical absorbing capacity of anthocyanins. *Journal of Agriculture and Food Chemistry* **45**: 304-309.

Wang, S. Y., Lin, H. S. (2000). Antioxidant activity in fruits and leaves of blackberry, raspberry, and strawberry varies with cultivar and developmental stage. *Journal of Agricultural and Food Chemistry* **48**(2): 140–146.

UNIVERSITAS GADJAH MADA
**EFEKTIVITAS EKSTRAK ANTOSIANIN BERAS MERAH (Oryza sativa L.) DAN KEDELAI HITAM (Glycine max (L)
Merr.) DALAM PENANGGULANGAN HIPERGLIKEMIA TIKUS INDUKSI STZ-NA**
WAHIDAH MAHANANI, Prof. Dr. Ir. Mary Astuti, M.S.; Prof. Dr. Ir. Y. Marsono, M.S.
Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Winter, J., Moore, L.H., Dowell, J.R., Bokkenheuser, V.D., (1989). C-ring cleavage of flavonoids by human intestinal bacteria. *Applied Environmental Microbiology* **55**: 1203 – 1208.

Xu, B.J., Chang, S.K.C. (2008). antioxidant capacity of seed coat, dehulled bean, and whole black soybeans in relation to their distributions of total phenolics, phenolic acids, anthocyanins, and isoflavone. *Journal of Agriculture and Food Chemistry* **56**: 8365–8373.

Yeum, K.J., Russell, R.M., Krinsky, N.I., Aldini, G. (2004). Biomarkers of antioxidant capacity in the hydrophilic and lipophilic compartments of human plasma. *Archive of Biochemistry and Biophysic* **430**: 97–103.

Walton MC, McGhie TK, Reynolds GW, Hendriks WH. 2006. The flavonol quercetin-3-glucoside inhibits cyanidin-3-glucoside absorption invitro. *Journal of Agriculture and Food Chemistry* **54**(13): 4913–4920.

Zaky, E.A. (2009). Physiological response to diets fortified with Jerusalem Artichoke tubers (*Helianthus tuberosus* L.) powder by diabetic rats. *American-Eurasian Journal of Agriculture and Environmental* Science **5** (5): 682–688.

Zelko, I.N., Mariani, T.J, Folz, R.J. (2002). Superoxide dismutase multigene family: a comparison of the CuZn-SOD (SOD1), Mn-SOD (SOD2), and EC- SO (SOD3) gene structures, evolution, and expression. *Free Radical Biology & Medicine,* **33(3)**: 337–349.

Zhang, R., Kim, J.S., Kang, K.A., Piao, M.J., Kim, K.C., Hyun, J.W. (2011). Protective mechanism of KIOM-4 in streptozotocin-induced pancreatic β-cells damage is involved in the inhibition of endoplasmic reticulum stress. *Evidence Based Complement Alternative Medicine* pii: 231938.

Zhang, Z.F., Fan, S.H., Zheng, Y.L., Lu, J., Wu, D.M., Shan, Q. (2009). Purple sweet potato color attenuates oxidative stress and inflammatory response induced by D-galactose in mouse liver. *Food and Chemical Toxicology* **47**: 496–501.

Zhang, Z.F., Lu, J., Zheng, Y.L., Hu, B., Fan, S.H., Wu, D.M. (2010). Purple sweet potato color protects mouse liver against d-galactose-induced apoptosis via inhibiting caspase-3 activation and enhancing PI3K/Akt pathway. *Food and Chemical Toxicology* **48**: 2500-2507.

Zhang, Z.F., Lu, J., Zheng, Y.L., Wu, D.M., Hu, B., Shan, Q. (2013). Purple sweet potato color attenuates hepatic insulin resistance via blocking oxidative stress and endoplasmic reticulum stress in high-fat-diet-treated mice. *The Journal of Nutritional Biochemistry* **24**: 1008-1018.