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DAFTAR PUSTAKA

Adam, C. L., Williams, P. A., Dalby, M. J., Garden, K., Thomson, L. M., Richardson, A. J., Gratz, S. W., & Ross, A. W. (2014). Different types of soluble fermentable dietary fibre decrease food intake, body weight gain and adiposity in young adult male rats. *Nutrition & metabolism*, *11*(1), 36.

Aggarwal, B. B., Sundaram, C., Prasad, S., & Kannappan, R. (2010). Tocotrienols, the vitamin E of the 21st century: its potential against cancer and other chronic diseases. *Biochemical pharmacology*, *80*(11), 1613-1631.

Ahsan, H., Ahad, A., Iqbal, J., & Siddiqui, W. A. (2014). Pharmacological potential of tocotrienols: a review. *Nutrition & metabolism*, *11*(1), 52.

Alauddin, M., Shirakawa, H., Koseki, T., Kijima, N., Budijanto, S., Islam, J., Goto T., & Komai, M. (2016). Fermented rice bran supplementation mitigates metabolic syndrome in stroke-prone spontaneously hypertensive rats. *BMC complementary and alternative medicine*, *16*(1), 442.

Alberti, K. G. M. M., Zimmet, P., & Shaw, J. (2007). International Diabetes Federation: a consensus on Type 2 diabetes prevention. *Diabetic Medicine*, *24*(5), 451-463.

Altomare, D. A., & Testa, J. R. (2008). AKT2 (v-akt murine thymoma viral oncogene homolog 2). Retrieved from http://documents.irevues.inist.fr/bitstream/handle/2042/38467/07-2007-AKT2ID517ch19q13.pdf

American Diabetes Association. (2014). Diagnosis and classification of diabetes mellitus. *Diabetes care*, *37*(Supplement 1), S81-S90.

Anderson, J. W., Deakins, D. A., Floore, T. L., Smith, B. M., & Whitis, S. E. (1990). Dietary fiber and coronary heart disease. Critical Reviews in Food Science & Nutrition, 29(2), 95-147.

Beg, M., Abdullah, N., Thowfeik, F. S., Altorki, N. K., & McGraw, T. E. (2017). Distinct Akt phosphorylation states are required for insulin regulated Glut4 and Glut1-mediated glucose uptake. *eLife*, *6*.

Bergeron, Y., Bureau, G., Laurier-Laurin, M. É., Asselin, E., Massicotte, G., & Cyr, M. (2017). Genetic Deletion of Akt3 Induces an Endophenotype Reminiscent of Psychiatric Manifestations in Mice. *Frontiers in molecular neuroscience*, *10*.

Besten, G. D., Lange, K., Havinga, R., van Dijk, T. H., Gerding, A., van Eunen, K., Müller, M., Groen, A. K., Hooiveld, G. J., Bakker, B. M., & Reijngoud, D. J. (2013). Gut-derived short-chain fatty acids are vividly assimilated into host carbohydrates and lipids. *American Journal of Physiology-Gastrointestinal and Liver Physiology*, *305*(12), G900-G910.

Beurel, E., Grieco, S. F., & Jope, R. S. (2015). Glycogen synthase kinase-3 (GSK3): regulation, actions, and diseases. *Pharmacology & therapeutics*, *148*, 114-131.

Boucher, J., Kleinridders, A., & Kahn, C. R. (2014). Insulin receptor signaling in normal and insulin-resistant states. *Cold Spring Harbor perspectives in biology*, *6*(1), a009191.

Boue, S. M., Daigle, K. W., Chen, M. H., Cao, H., & Heiman, M. L. (2016). Antidiabetic potential of purple and red rice (Oryza sativa L.) bran extracts. *Journal of agricultural and food chemistry*, *64*(26), 5345-5353

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Brand-Miller, J., Hayne, S., Petocz, P., & Colagiuri, S. (2003). Low–glycemic index diets in the management of diabetes. *Diabetes care*, *26*(8), 2261-2267.Brownlee, M. (2005). The pathobiology of diabetic complications. *Diabetes*, *54*(6), 1615-1625.

Brozinick, J. T., Roberts, B. R., & Dohm, G. L. (2003). Defective signaling through Akt-2 and-3 but not Akt-1 in insulin-resistant human skeletal muscle: potential role in insulin resistance. *Diabetes*, *52*(4), 935-941.

Butsat, S., & Siriamornpun, S. (2010). Antioxidant capacities and phenolic compounds of the husk, bran and endosperm of Thai rice. *Food Chemistry*, *119*(2), 606-613.

Canfora, E. E., Jocken, J. W., & Blaak, E. E. (2015). Short-chain fatty acids in control of body weight and insulin sensitivity. *Nature Reviews Endocrinology*, *11*(10), 577-591.

Carnagarin, R., Dharmarajan, A. M., & Dass, C. R. (2015). Molecular aspects of glucose homeostasis in skeletal muscle–A focus on the molecular mechanisms of insulin resistance. *Molecular and cellular endocrinology*, *417*, 52-62.

Casaubon, L., Sajan, M. P., Rivas, J., Powe, J. L., Standaert, M. L., & Farese, R. V. (2006). Contrasting insulin dose-dependent defects in activation of atypical protein kinase C and protein kinase B/Akt in muscles of obese diabetic humans. *Diabetologia*, *49*(12), 3000-3008.

Chang, Y. C., & Chuang, L. M. (2010). The role of oxidative stress in the pathogenesis of type 2 diabetes: from molecular mechanism to clinical implication. *American journal of translational research*, *2*(3), 316.

Chao, P. C., Li, Y., Chang, C. H., Shieh, J. P., Cheng, J. T., & Cheng, K. C. (2018). Investigation of insulin resistance in the popularly used four rat models of type-2 diabetes. *Biomedicine & Pharmacotherapy*, *101*, 155-161.s

Chaturvedi, N., Sharma, P., Shukla, K., Singh, R., & Yadav, S. (2011). Cereals Nutraceuticals, Health Ennoblement and Diseases Obviation: A Comprehensive Review. Journal of Applied Pharmaceutical Science 01 (07); 2011:06-12

Chavez, J. A., Knotts, T. A., Wang, L. P., Li, G., Dobrowsky, R. T., Florant, G. L., & Summers, S. A. (2003). A role for ceramide, but not diacylglycerol, in the antagonism of insulin signal transduction by saturated fatty acids. *Journal of Biological Chemistry*, *278*(12), 10297-10303.

Chen, C. W., & Cheng, H. H. (2006). A rice bran oil diet increases LDL-receptor and HMG-CoA reductase mRNA expressions and insulin sensitivity in rats with streptozotocin/nicotinamide-induced type 2 diabetes. *The Journal of nutrition*, *136*(6), 1472-1476.

Cheng, H. H., Huang, H. Y., Chen, Y. Y., Huang, C. L., Chang, C. J., Chen, H. L., & Lai, M. H. (2010). Ameliorative effects of stabilized rice bran on type 2 diabetes patients. *Annals of Nutrition and Metabolism*, *56*(1), 45-51.

Cho, H., Mu, J., Kim, J. K., Thorvaldsen, J. L., Chu, Q., Crenshaw, E. B., Kaestner, K. H., Bartolomei, M. S., Shulman, G. I., & Birnbaum, M. J. (2001). Insulin resistance and a diabetes mellitus-like syndrome in mice lacking the protein kinase Akt2 (PKBβ). *Science*, *292*(5522), 1728-1731.

Chopra, I., Li, H.F., Wang, H. and Webster, K.A. (2012). Phosphorylation of the insulin receptor by AMP-activated protein kinase (AMPK) promotes ligand-independent activation of the insulin signalling pathway in rodent muscle. *Diabetologia*, *55*(3), pp.783-794.

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GADJAH MADA
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Chotimarkorn, C., & Ushio, H. (2008). The effect of trans-ferulic acid and gamma-oryzanol on ethanol-induced liver injury in C57BL mouse. *Phytomedicine*, *15*(11), 951-958.

Chriett, S., Zerzaihi, O., Vidal, H., & Pirola, L. (2017). The histone deacetylase inhibitor sodium butyrate improves insulin signalling in palmitate-induced insulin resistance in L6 rat muscle cells through epigenetically-mediated up-regulation of Irs1. *Molecular and cellular endocrinology*, *439*, 224-232.

Chung, S. I., Rico, C. W., & Kang, M. Y. (2014). Comparative study on the hypoglycemic and antioxidative effects of fermented paste (doenjang) prepared from soybean and brown rice mixed with rice bran or red ginseng marc in mice fed with high fat diet. *Nutrients*, *6*(10), 4610-4624.

Costa, R. M., Neves, K. B., Mestriner, F. L., Louzada-Junior, P., Bruder-Nascimento, T., & Tostes, R. C. (2016). TNF-α induces vascular insulin resistance via positive modulation of PTEN and decreased Akt/eNOS/NO signaling in high fat diet-fed mice. *Cardiovascular diabetology*, *15*(1), 119.

Damayanthi, E., Tjing, L.T. & Arbianto, L. (2007). Rice Bran. Depok: *Panebar Swadaya*. Hal. 28.

DeFronzo, R. A., & Tripathy, D. (2009). Skeletal muscle insulin resistance is the primary defect in type 2 diabetes. *Diabetes care*, *32*(suppl 2), S157-S163.

DeFronzo, R. A., Ferrannini, E., Groop, L., Henry, R. R., Herman, W. H., Holst, J. J., Hu, F. B., Kahn, C. R., Raz, I, Shulman, G. I. & Simonson, D. C. (2015). Type 2 diabetes mellitus. *Nature reviews. Disease primers*, *1*, 15019-15019.

Egawa, T., Tsuda, S., Oshima, R., Goto, A., Ma, X., Goto, K., & Hayashi, T. (2017). Regulatory Mechanism of Skeletal Muscle Glucose Transport by Phenolic Acids. In *Phenolic Compounds-Biological Activity*. InTech.

Esa, N. M., Ling, T. B., & Peng, L. S. (2013). By-products of rice processing: An overview of health benefits and applications. *Rice Research: Open Access*.

Fang, F., Kang, Z., & Wong, C. (2010). Vitamin E tocotrienols improve insulin sensitivity through activating peroxisome proliferator-activated receptors. *Molecular nutrition & food research*, *54*(3), 345-352.

Fauzziyah, A. (2011). *Analisis Potensi Dan Gizi Pemanfaatan Bekatul dalam Pembuatan Cookies* (Skripsi). Institut Pertanian Bogor, Yogyakarta, Indonesia. Diakses dari http://repository.ipb.ac.id

Federer, W. T. (1977). *Experimental Design Theory and Application, 3rd Ed*. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd

Foster-Powell, K., Holt, S.H. and Brand-Miller, J.C. (2002). International table of glycemic index and glycemic load values: 2002. *The American journal of clinical nutrition*, *76*(1), pp.5-56.

Furman, B. L. (2015). Streptozotocin-induced diabetic models in mice and rats. *Current Protocols in Pharmacology*, 5-47.

Gao, Z., Yin, J., Zhang, J., Ward, R.E., Martin, R.J., Lefevre, M., Cefalu, W.T. and Ye, J. (2009). Butyrate improves insulin sensitivity and increases energy expenditure in mice. *Diabetes*, *58*(7), pp.1509-1517.

Garofalo, R. S., Orena, S. J., Rafidi, K., Torchia, A. J., Stock, J. L., Hildebrandt, A. L., Coskran, T., Black, S. J., Brees, D. J., Wicks, J. R., & McNeish, J. D. (2003). Severe diabetes, age-dependent loss of adipose tissue, and mild growth deficiency in mice lacking Akt2/PKBβ. *The Journal of clinical investigation*, *112*(2), 197-208.

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Geddis, A. V., Abdalla, M. N., Leandry, L. A., McClung, H. L., Pasiakos, S. M., & Matheny, R. W. (2017). AKT2 is the Predominant Akt Isoform Expressed in Human Skeletal Muscle. *The FASEB Journal*, *31*(1 Supplement), lb144-lb144.

George, S., Rochford, J.J., Wolfrum, C., Gray, S.L., Schinner, S., Wilson, J.C., Soos, M.A., Murgatroyd, P.R., Williams, R.M., Acerini, C.L. and Dunger, D.B. (2004). A family with severe insulin resistance and diabetes due to a mutation in AKT2. *Science*, *304*(5675), pp.1325-1328.

Ghasemi, A., Khalifi, S., & Jedi, S. (2014). Streptozotocin-nicotinamide-induced rat model of type 2 diabetes. *Acta Physiologica Hungarica*, *101*(4), 408-420.

Ghatak, S. B., & Panchal, S. S. (2012). Anti-diabetic activity of oryzanol and its relationship with the anti-oxidant property. *International Journal of Diabetes in Developing Countries*, *32*(4), 185-192.

Gogoi, B., Chatterjee, P., Mukherjee, S., Buragohain, A. K., Bhattacharya, S., & Dasgupta, S. (2014). A polyphenol rescues lipid induced insulin resistance in skeletal muscle cells and adipocytes. *Biochemical and biophysical research communications*, *452*(3), 382-388.

Goldenberg, R. and Punthakee, Z. (2013). Definition, classification and diagnosis of diabetes, prediabetes and metabolic syndrome. *Canadian journal of diabetes*, *37*, pp.S8-S11.

Gonzalez, E., & McGraw, T. E. (2009). The Akt kinases: isoform specificity in metabolism and cancer. *Cell cycle*, *8*(16), 2502-2508.

Gul, K., Yousuf, B., Singh, A. K., Singh, P., & Wani, A. A. (2015). Rice bran: Nutritional values and its emerging potential for development of functional food—A review. *Bioactive Carbohydrates and Dietary Fibre*, *6*(1), 24-30.

Han, S.W., Chee, K.M. and Cho, S.J. (2015). Nutritional quality of rice bran protein in comparison to animal and vegetable protein. *Food chemistry*, *172*, pp.766-769.

Hao, J., Chen, C., Huang, K., Huang, J., Li, J., Liu, P. and Huang, H. (2014). Polydatin improves glucose and lipid metabolism in experimental diabetes through activating the Akt signaling pathway. *European journal of pharmacology*, *745*, pp.152-165.

Hemmings, B. A., & Restuccia, D. F. (2012). Pi3k-pkb/akt pathway. *Cold Spring Harbor perspectives in biology*, *4*(9), a011189.

Henderson, A. J., Ollila, C. A., Kumar, A., Borresen, E. C., Raina, K., Agarwal, R., & Ryan, E. P. (2012). Chemopreventive properties of dietary rice bran: current status and future prospects. *Advances in Nutrition: An International Review Journal*, *3*(5), 643-653.

Henriksen, E. J., Diamond-Stanic, M. K., & Marchionne, E. M. (2011). Oxidative stress and the etiology of insulin resistance and type 2 diabetes. *Free Radical Biology and Medicine*, *51*(5), 993-999.

Herman, W. H. (2017). The Global Burden of Diabetes: An Overview. In *Diabetes Mellitus in Developing Countries and Underserved Communities* (pp. 1-5). Springer International Publishing.

Hers, I., Vincent, E. E., & Tavaré, J. M. (2011). Akt signalling in health and disease. *Cellular signalling*, *23*(10), 1515-1527.

Hlaing, E. I. E. I., Piamrojanaphat, P., Lailerd, N., Phaonakrop, N., & Roytrakul, S. (2017). Anti-Diabetic Activity and Metabolic Changes in Purple Rice Bran Supplement Type 2 Diabetic Rats by Proteomics. *International Journal of Pharmacognosy and Phytochemical Research*, 9(3), 428-436

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Universitas Gadjah Mada, 2018 | Diunduh dari http://etd.repository.ugm.ac.id/

Hong, J., Jia, Y., Pan, S., Jia, L., Li, H., Han, Z, Chai, D., & Zhao, R. (2016). Butyrate alleviates high fat diet-induced obesity through activation of adiponectin-mediated pathway and stimulation of mitochondrial function in the skeletal muscle of mice. *Oncotarget*, *7*(35), 56071.

Hongu, N., Kitts, D. D., Zawistowski, J., Dossett, C. M., Kopeć, A., Pope, B. T., & Buchowski, M. S. (2014). Pigmented rice bran and plant sterol combination reduces serum lipids in overweight and obese adults. *Journal of the American College of Nutrition*, *33*(3), 231-238.

Huang, S. H., & Ng, L. T. (2011). An improved high-performance liquid chromatographic method for simultaneous determination of tocopherols, tocotrienols and γ-oryzanol in rice. *Journal of Chromatography A*, *1218*(29), 4709-4713.

Huang, Y. P., & Lai, H. M. (2016). Bioactive compounds and antioxidative activity of colored rice bran. *journal of food and drug analysis*, *24*(3), 564-574.

Huynh, N. T., Van Camp, J., Smagghe, G., & Raes, K. (2014). Improved release and metabolism of flavonoids by steered fermentation processes: a review. *International journal of molecular sciences*, *15*(11), 19369-19388.

IDF. (2015). IDF Diabetes Atlas. www.idf.org/diabetesatlas.

Inzucchi, S.E. (2012). Diagnosis of diabetes. *New England Journal of Medicine*, *367*(6), pp.542-550.

Jain, S. S., Luiken, J. J., Snook, L. A., Han, X. X., Holloway, G. P., Glatz, J. F., & Bonen, A. (2015). Fatty acid transport and transporters in muscle are critically regulated by Akt2. *FEBS letters*, *589*(19PartB), 2769-2775.

Jun, H. I., Song, G. S., Yang, E. I., Youn, Y., & Kim, Y. S. (2012). Antioxidant activities and phenolic compounds of pigmented rice bran extracts. *Journal of food science*, *77*(7).

Jung, E.H., Ran Kim, S., Hwang, I.K. and Youl Ha, T. (2007). Hypoglycemic effects of a phenolic acid fraction of rice bran and ferulic acid in C57BL/KsJ-db/db mice. *Journal of agricultural and food chemistry*, *55*(24), pp.9800-9804.

Jung, C. H., Lee, D. H., Ahn, J., Lee, H., Choi, W. H., Jang, Y. J., & Ha, T. Y. (2015). γ-Oryzanol enhances adipocyte differentiation and glucose uptake. *Nutrients*, *7*(6), 4851-4861.

Justo, M. L., Claro, C., Zeyda, M., Stulnig, T. M., Herrera, M. D., & Rodríguez-Rodríguez, R. (2016). Rice bran prevents high-fat diet-induced inflammation and macrophage content in adipose tissue. *European journal of nutrition*, *55*(6), 2011-2019.

Kahn, S. E., Cooper, M. E., & Del Prato, S. (2014). Pathophysiology and treatment of type 2 diabetes: perspectives on the past, present, and future. *The Lancet*, *383*(9922), 1068-1083.

Kang, H. W., Lim, W. C., Lee, J. K., Ho, J. N., Lim, E. J., & Cho, H. Y. (2017). Germinated Waxy Black Rice Ameliorates Hyperglycemia and Dyslipidemia in Streptozotocin-Induced Diabetic Rats. *Biological and Pharmaceutical Bulletin*, *40*(11), 1846-1855.

Karlsson, H. K., Zierath, J. R., Kane, S., Krook, A., Lienhard, G. E., & Wallberg-Henriksson, H. (2005). Insulin-stimulated phosphorylation of the Akt substrate AS160 is impaired in skeletal muscle of type 2 diabetic subjects. *Diabetes*, *54*(6), 1692-1697.

Kasubuchi, M., Hasegawa, S., Hiramatsu, T., Ichimura, A., & Kimura, I. (2015). Dietary gut microbial metabolites, short-chain fatty acids, and host metabolic regulation. *Nutrients*, *7*(4), 2839-2849.

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GADJAH MADA
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Katsarou, A., Gudbjörnsdottir, S., Rawshani, A., Dabelea, D., Bonifacio, E., Anderson, B. J., Jacobsen, L.M., Schatz, D.A. .& Lernmark, Å. (2017). Type 1 diabetes mellitus. *Nature reviews. Disease primers*, *3*, 17016.

Kaup, R. M., Khayyal, M. T., & Verspohl, E. J. (2013). Antidiabetic effects of a standardized Egyptian rice bran extract. *Phytotherapy research*, *27*(2), 264-271.

Khunti, K., Nikolajsen, A., Thorsted, B. L., Andersen, M., Davies, M. J., & Paul, S. K. (2016). Clinical inertia with regard to intensifying therapy in people with type 2 diabetes treated with basal insulin. *Diabetes, Obesity and Metabolism*, *18*(4), 401-409.

Kim, Y. B., Peroni, O. D., Franke, T. F., & Kahn, B. B. (2000). Divergent regulation of Akt1 and Akt2 isoforms in insulin target tissues of obese Zucker rats. *Diabetes*, *49*(5), 847-856.

Kim, S. M., Rico, C. W., Lee, S. C., & Kang, M. Y. (2010). Modulatory effect of rice bran and phytic acid on glucose metabolism in high fat-fed C57BL/6N mice. *Journal of Clinical Biochemistry and Nutrition*, *47*(1), 12-17.

Kozuka, C., Yabiku, K., Takayama, C., Matsushita, M., Shimabukuro, M., & Masuzaki, H. (2013). Natural food science based novel approach toward prevention and treatment of obesity and type 2 diabetes: recent studies on brown rice and γ-oryzanol. *Obesity research & clinical practice*, *7*(3), e165-e172.

Krook, A., Kawano, Y., Song, X. M., Efendić, S., Roth, R. A., Wallberg-Henriksson, H., & Zierath, J. R. (1997). Improved glucose tolerance restores insulin-stimulated Akt kinase activity and glucose transport in skeletal muscle from diabetic Goto-Kakizaki rats. *Diabetes*, *46*(12), 2110-2114.

Krook, A., Roth, R. A., Jiang, X. J., Zierath, J. R., & Wallberg-Henriksson, H. (1998). Insulin-stimulated Akt kinase activity is reduced in skeletal muscle from NIDDM subjects. *Diabetes*, *47*(8), 1281-1286.

Kupski, L., Cipolatti, E., Rocha, M. D., Oliveira, M. D. S., Souza-Soares, L. D. A., & Badiale-Furlong, E. (2012). Solid-state fermentation for the enrichment and extraction of proteins and antioxidant compounds in rice bran by Rhizopus oryzae. *Brazilian Archives of Biology and Technology*, *55*(6), 937-942.

Lavie, N., Shukia, P., & Panchal, A. (2016). Role of flavonoids and saponins in the treatment of diabetes mellitus. *Journal of Pharmaceutical Science and Bioscientific Reseaerch. 6 (4) 535*, *541*.

Leto, D., & Saltiel, A. R. (2012). Regulation of glucose transport by insulin: traffic control of GLUT4. *Nature reviews. Molecular cell biology*, *13*(6), 383.

Li, L., Hua, Y. and Ren, J. (2011). Short-chain fatty acid propionate alleviates Akt2 knockout-induced myocardial contractile dysfunction. *Experimental diabetes research*, *2012*.

Livak, K. J., & Schmittgen, T. D. (2001). Analysis of relative gene expression data using real-time quantitative PCR and the 2− ΔΔCT method. *methods*, *25*(4), 402-408.

Luh, B. S., Barber, S., & de Barber, C. B. (1991). Rice bran: chemistry and technology. In *Rice* (pp. 732-781). Springer US.

Mackenzie, R. and Elliot, B. (2014). Akt/PKB activation and insulin signaling: a novel insulin signaling pathway in the treatment of type 2 diabetes. *Diabetes, metabolic syndrome and obesity: targets and therapy*, *2014*(7), pp.55-64.

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Universitas Gadjah Mada, 2018 | Diunduh dari http://etd.repository.ugm.ac.id/

Mäkinen, S., Nguyen, Y. H., Skrobuk, P., & Koistinen, H. A. (2017). Palmitate and oleate exert differential effects on insulin signalling and glucose uptake in human skeletal muscle cells. *Endocrine connections*, *6*(5), 331-339.

Mancuso, C., & Santangelo, R. (2014). Ferulic acid: pharmacological and toxicological aspects. *Food and Chemical Toxicology*, *65*, 185-195.

Manning, B. D., & Cantley, L. C. (2007). AKT/PKB signaling: navigating downstream. *Cell*, *129*(7), 1261-1274.

Manning, B. D., & Toker, A. (2017). AKT/PKB Signaling: Navigating the Network. *Cell*, *169*(3), 381-405.

Manning, A., Highland, H. M., Gasser, J., Sim, X., Tukiainen, T., Fontanillas, P., & Cingolani, P. (2017). A low-frequency inactivating AKT2 variant enriched in the Finnish population is associated with fasting insulin levels and type 2 diabetes risk. *Diabetes*, db161329.

Martins, S., Mussatto, S. I., Martínez-Avila, G., Montañez-Saenz, J., Aguilar, C. N., & Teixeira, J. A. (2011). Bioactive phenolic compounds: Production and extraction by solid-state fermentation. A review. *Biotechnology advances*, *29*(3), 365-373.

Masiello, P., Broca, C., Gross, R., Roye, M., Manteghetti, M., Hillaire-Buys, D., Novelli, M., & Ribes, G. (1998). Experimental NIDDM: development of a new model in adult rats administered streptozotocin and nicotinamide. *Diabetes*, *47*(2), 224-229.

Massarolo, K. C., de Souza, T. D., Collazzo, C. C., Furlong, E. B., & de Souza Soares, L. A. (2017). The impact of Rhizopus oryzae cultivation on rice bran: Gamma-oryzanol recovery and its antioxidant properties. *Food Chemistry*, *228*, 43-49.

Matough, F. A., Budin, S. B., Hamid, Z. A., Alwahaibi, N., & Mohamed, J. (2012). The role of oxidative stress and antioxidants in diabetic complications. *Sultan Qaboos University Medical Journal*, *12*(1), 5.

Matsunaga, T., Shoji, A., Gu, N., Joo, E., Li, S., Adachi, T., Yamazaki, H., Yasuda, K., Kondoh, T., & Tsuda, K. (2012). γ-Tocotrienol attenuates TNF-α-induced changes in secretion and gene expression of MCP-1, IL-6 and adiponectin in 3T3-L1 adipocytes. *Molecular medicine reports*, *5*(4), 905-909.

McCaskill, D. R., & Zhang, F. (1999). Use of rice bran oil in foods: Developing nutraceuticals for the new millenium. *Food Technology*, *53*(2), 50-53.

Miller, J. B., Pang, E., & Bramall, L. (1992). Rice: a high or low glycemic index food?. *The American journal of clinical nutrition*, *56*(6), 1034-1036.

Mohamed, S. (2014). Functional foods against metabolic syndrome (obesity, diabetes, hypertension and dyslipidemia) and cardiovasular disease. *Trends in Food Science & Technology*, *35*(2), pp.114-128.

Muthayya, S., Sugimoto, J.D., Montgomery, S. and Maberly, G.F., 2014. An overview of global rice production, supply, trade, and consumption. *Annals of the New York Academy of Sciences*, *1324*(1), pp.7-14.

Nagasaka, R., Yamsaki, T., Uchida, A., Ohara, K., & Ushio, H. (2011). γ-Oryzanol recovers mouse hypoadiponectinemia induced by animal fat ingestion. *Phytomedicine*, *18*(8), 669-671.

Narasimhan, A., Chinnaiyan, M., & Karundevi, B. (2015). Ferulic acid exerts its antidiabetic effect by modulating insulin-signalling molecules in the liver of high-fat diet and fructose-induced type-2 diabetic adult male rat. *Applied Physiology, Nutrition, and Metabolism*, *40*(8), 769-781.

UNIVERSITAS
GADJAH MADA
**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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Natali, A., Toschi, E., Baldeweg, S., Ciociaro, D., Favilla, S., Saccà, L., & Ferrannini, E. (2006). Clustering of insulin resistance with vascular dysfunction and low-grade inflammation in type 2 diabetes. *Diabetes*, *55*(4), 1133-1140.

NCD Risk Factor Collaboration. (2016). Worldwide trends in diabetes since 1980: a pooled analysis of 751 population-based studies with 4· 4 million participants. *The Lancet*, *387*(10027), 1513-1530.

Nieto-Vazquez, I., Fernández-Veledo, S., Krämer, D. K., Vila-Bedmar, R., Garcia-Guerra, L., & Lorenzo, M. (2008). Insulin resistance associated to obesity: the link TNF-alpha. *Archives of physiology and biochemistry*, *114*(3), 183-194.

Ogurtsova, K., da Rocha Fernandes, J. D., Huang, Y., Linnenkamp, U., Guariguata, L., Cho, N. H., Cavan, D., Shaw, D. E., & Makaroff, L. E. (2017). IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Research and Clinical Practice*, *128*, 40-50.

Ohara, K., Uchida, A., Nagasaka, R., Ushio, H., & Ohshima, T. (2009). The effects of hydroxycinnamic acid derivatives on adiponectin secretion. *Phytomedicine*, *16*(2), 130-137.

Oliveira, M. D. S., Feddern, V., Kupski, L., Cipolatti, E. P., Badiale-Furlong, E., & de Souza-Soares, L. A. (2011). Changes in lipid, fatty acids and phospholipids composition of whole rice bran after solid-state fungal fermentation. *Bioresource technology*, *102*(17), 8335-8338.

Oliveira, M.D.S., Cipolatti, E.P., Furlong, E.B. and Soares, L.D.S. (2012). Phenolic compounds and antioxidant activity in fermented rice (Oryza sativa) bran. *Food Science and Technology (Campinas)*, *32*(3), pp.531-537.

Ooi, D. J., Adamu, H. A., Imam, M. U., Ithnin, H., & Ismail, M. (2018). Polyphenol-rich ethyl acetate fraction isolated from Molineria latifolia ameliorates insulin resistance in experimental diabetic rats via IRS1/AKT activation. *Biomedicine & Pharmacotherapy*, *98*, 125-133.

Özdestan, Ö., Erol, T., & Acar, B. (2014). Phytosterols in rice bran and usage of rice bran in food industry. In *9th Baltic Conference on Food Science and Technology "Food for Consumer Well-Being"* (p. 24).

Palsamy, P., & Subramanian, S. (2010). Ameliorative potential of resveratrol on proinflammatory cytokines, hyperglycemia mediated oxidative stress, and pancreatic β-cell dysfunction in streptozotocin-nicotinamide-induced diabetic rats. *Journal of cellular physiology*, *224*(2), 423-432.

Panchal, S. S., Patidar, R. K., Jha, A. B., Allam, A. A., Ajarem, J., & Butani, S. B. (2017). Anti-Inflammatory and Antioxidative Stress Effects of Oryzanol in Glaucomatous Rabbits. *Journal of ophthalmology*, *2017*.

Peng, Z., Aggarwal, R., Zeng, N., & Stiles, B. (2016). AKT1 but Not AKT2 Mediates Cell Proliferation and Survival of Pancreatic Î² Cells. In *Late-Breaking Diabetes & Glucose Metabolism I (posters)* (pp. LBFri-48). Endocrine Society.

Perez-Ternero, C., de Sotomayor, M. A., & Herrera, M. D. (2017). Contribution of ferulic acid, γ-oryzanol and tocotrienols to the cardiometabolic protective effects of rice bran. *Journal of Functional Foods*, *32*, 58-71.

Posuwan, J., Prangthip, P., Leardkamolkarn, V., Yamborisut, U., Surasiang, R., Charoensiri, R., & Kongkachuichai, R. (2013). Long-term supplementation of high pigmented rice bran oil (Oryza sativa L.) on amelioration of oxidative

UNIVERSITAS
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**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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stress and histological changes in streptozotocin-induced diabetic rats fed a high fat diet; Riceberry bran oil. *Food chemistry*, *138*(1), 501-508.

Prasetyastuti, Sunarti, Sadewa, A. H., & Mustofa (2016). Effect of 7-Hydroxy-2-(4-Hydroxy-3-Methoxy-Phenyl)-Chroman-4-One (Swietenia Macrophylla King Seed) on Retinol Binding Protein-4 and Phosphoenolpyruvate Carboxykinase Gene Expression in Type 2 Diabetic Rats. *Romanian Journal of Diabetes Nutrition and Metabolic Diseases*, *23*(3), 255-265.

Qaseem, A., Humphrey, L. L., Sweet, D. E., Starkey, M., & Shekelle, P. (2012). Oral pharmacologic treatment of type 2 diabetes mellitus: a clinical practice guideline from the American College of Physicians. *Annals of internal medicine*, *156*(3), 218-231

Qi, J., Yokoyama, W., Masamba, K. G., Majeed, H., Zhong, F., & Li, Y. (2015). Structural and physico-chemical properties of insoluble rice bran fiber: effect of acid–base induced modifications. *RSC Advances*, *5*(97), 79915-79923.

Qureshi, A. A., Sami, S. A., & Khan, F. A. (2002). Effects of stabilized rice bran, its soluble and fiber fractions on blood glucose levels and serum lipid parameters in humans with diabetes mellitus Types I and II. *The Journal of nutritional biochemistry*, *13*(3), 175-187.

Rains, J. L., & Jain, S. K. (2011). Oxidative stress, insulin signaling, and diabetes. Free Radical Biology and Medicine, 50(5), 567-575.

Ramachandran, V., & Saravanan, R. (2015). Glucose uptake through translocation and activation of GLUT4 in PI3K/Akt signaling pathway by asiatic acid in diabetic rats. *Human & experimental toxicology*, *34*(9), 884-893.

Rao, Y. P. C., Sugasini, D., & Lokesh, B. R. (2016). Dietary gamma oryzanol plays a significant role in the anti-inflammatory activity of rice bran oil by decreasing pro-inflammatory mediators secreted by peritoneal macrophages of rats. *Biochemical and biophysical research communications*, *479*(4), 747-752.

Rask-Madsen, C. and King, G.L. (2013). Vascular complications of diabetes: mechanisms of injury and protective factors. *Cell metabolism*, *17*(1), pp.20-33.

Razak, D. L. A., Rashid, N. Y. A., Jamaluddin, A., Sharifudin, S. A., & Long, K. (2015). Enhancement of phenolic acid content and antioxidant activity of rice bran fermented with Rhizopus oligosporus and Monascus purpureus. *Biocatalysis and Agricultural Biotechnology*, *4*(1), 33-38.

Roberts, A. C., & Porter, K. E. (2013). Cellular and molecular mechanisms of endothelial dysfunction in diabetes. *Diabetes and Vascular Disease Research*, *10*(6), 472-482.

Ruan, H., & Dong, L. Q. (2016). Adiponectin signaling and function in insulin target tissues. *Journal of molecular cell biology*, *8*(2), 101-109.

Rutter, G. A., Pullen, T. J., Hodson, D. J., Martinez-Sanchez, A. (2015). Pancreatic β-cell identity, glucose sensing and the control of insulin secretion. *Biochem J*, *466*(2), 203-218.

Sacks, D. B. (2011). A1C versus glucose testing: a comparison. *Diabetes care*, *34*(2), 518-523.

Saini, V. (2010). Molecular mechanisms of insulin resistance in type 2 diabetes mellitus. *World journal of diabetes*, *1*(3), 68.

Salar, A., Faghih, S., Pishdad, G., & Rezaie, P. (2015). Comparison of the effects of canola oil and rice bran oil consumption on oxidative stress and blood

UNIVERSITAS
GADJAH MADA
**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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pressure in postmenopausal type 2 diabetic women. *Journal of Nutritional Sciences and Dietetics*, *1*(4).

Sah, S. P., Singh, B., Choudhary, S., & Kumar, A. (2016). Animal models of insulin resistance: A review. *Pharmacological Reports*, *68*(6), 1165-1177.

Sakamoto, K., & Holman, G. D. (2008). Emerging role for AS160/TBC1D4 and TBC1D1 in the regulation of GLUT4 traffic. *American journal of physiology-endocrinology and metabolism*, *295*(1), E29-E37.

Sanchez, A. M., Candau, R. B., & Bernardi, H. (2014). FoxO transcription factors: their roles in the maintenance of skeletal muscle homeostasis. *Cellular and molecular life sciences*, *71*(9), 1657-1671.

Saudek, C. D., & Brick, J. C. (2009). The clinical use of hemoglobin A1c. J Diabetes Sci Technol. 2009 Jul; 3(4): 629–634.

Saunders, R. M. (1990). The properties of rice bran as a foodstuff. *Cereal Foods World*, *35*(7), 632-636.

Schalkwijk, C. G., & Stehouwer, C. D. (2005). Vascular complications in diabetes mellitus: the role of endothelial dysfunction. *Clinical science*, *109*(2), 143-159.

Schmidt, C. G., Gonçalves, L. M., Prietto, L., Hackbart, H. S., & Furlong, E. B. (2014). Antioxidant activity and enzyme inhibition of phenolic acids from fermented rice bran with fungus Rizhopus oryzae. *Food chemistry*, *146*, 371-377.

Schultze, S. M., Hemmings, B. A., Niessen, M., & Tschopp, O. (2012). PI3K/AKT, MAPK and AMPK signalling: protein kinases in glucose homeostasis. *Expert reviews in molecular medicine*, *14*.

Selvi, N. M. K., Sridhar, M. G., Swaminathan, R. P., & Sripradha, R. (2015). Efficacy of turmeric as adjuvant therapy in type 2 diabetic patients. *Indian Journal of Clinical Biochemistry*, *30*(2), 180-186.

Sena, C. M., Pereira, A. M., & Seiça, R. (2013). Endothelial dysfunction—a major mediator of diabetic vascular disease. *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease*, *1832*(12), 2216-2231.

Sesti, G. (2006). Pathophysiology of insulin resistance. *Best practice & research Clinical endocrinology & metabolism*, *20*(4), 665-679.

Sharif, M. K., Butt, M. S., Anjum, F. M., & Khan, S. H. (2014). Rice bran: a novel functional ingredient. *Critical reviews in food science and nutrition*, *54*(6), 807-816.

Shen, L., Keenan, M.J., Raggio, A., Williams, C. and Martin, R.J. (2011). Dietary-resistant starch improves maternal glycemic control in Goto–Kakizaki rat. *Molecular nutrition & food research*, 55(10), pp.1499-1508.

Shirakawa, H., Koseki, T., Hashizume, K. and Komai, M.(2007). The Driselase-treated fraction of rice bran is a more effective dietary factor to improve hypertension, glucose and lipid metabolism in stroke-prone spontaneously hypertensive rats compared to ferulic acid. *British journal of nutrition*, *97*(01), pp.67-76.

Siddiqui, S., Khan, M. R., & Siddiqui, W. A. (2010). Comparative hypoglycemic and nephroprotective effects of tocotrienol rich fraction (TRF) from palm oil and rice bran oil against hyperglycemia induced nephropathy in type 1 diabetic rats. *Chemico-biological interactions*, *188*(3), 651-658.

Silva, F.M., Kramer, C.K., de Almeida, J.C., Steemburgo, T., Gross, J.L. and Azevedo, M.J. (2013). Fiber intake and glycemic control in patients with

UNIVERSITAS
GADJAH MADA
**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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type 2 diabetes mellitus: a systematic review with meta-analysis of randomized controlled trials. *Nutrition reviews*, *71*(12), pp.790-801.

Singh, I., Carey, A. L., Watson, N., Febbraio, M. A., & Hawley, J. A. (2008). Oxidative stress-induced insulin resistance in skeletal muscle cells is ameliorated by gamma-tocopherol treatment. *European journal of nutrition*, *47*(7), 387-392.

Son, M. J., Rico, C. W., Nam, S. H., & Kang, M. Y. (2011). Effect of Oryzanol and Ferulic Acid on the Glucose Metabolism of Mice Fed with a High-Fat Diet. *Journal of food science*, *76*(1).

Srinivasan, K., & Ramarao, P. (2007). Animal models in type 2 diabetes research: an overview. *Indian Journal of Medical Research*, *125*(3), 451.

Stefan, N., Vozarova, B., Funahashi, T., Matsuzawa, Y., Weyer, C., Lindsay, R. S., & Tataranni, P. A. (2002). Plasma adiponectin concentration is associated with skeletal muscle insulin receptor tyrosine phosphorylation, and low plasma concentration precedes a decrease in whole-body insulin sensitivity in humans. *Diabetes*, *51*(6), 1884-1888.

Stratton, I. M., Adler, A. I., Neil, H. A. W., Matthews, D. R., Manley, S. E., Cull, C. A., Hadden, D., Turner, R. C., & Holman, R. R. (2000). Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *Bmj*, *321*(7258), 405-412.

Suprihatin. (2010). *Teknologi Fermentasi*. Surabaya: UNESA Press.

Suryajayanti, M. F. (2017). *Pengaruh Pemberian Bekatul Terfermentasi Terhadap Kadar Glukosa Tikus Wistar Jantan Model Diabetes Mellitus* (Skripsi). Universitas Gadjah Mada, Yogyakarta, Indonesia. Diakses dari http://libmed.ugm.ac.id

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

Szkudelski, T. (2012). Streptozotocin–nicotinamide-induced diabetes in the rat. Characteristics of the experimental model. *Experimental Biology and Medicine*, *237*(5), 481-490.

Szkudelski, T., Zywert, A., & Szkudelska, K. (2013). Metabolic disturbances and defects in insulin secretion in rats with streptozotocin-nicotinamide-induced diabetes. *Physiological research*, *62*(6), 663.

Tangvarasittichai, S. (2015). Oxidative stress, insulin resistance, dyslipidemia and type 2 diabetes mellitus. *World journal of diabetes*, *6*(3), 456.

Taylor, R. (2013). Type 2 Diabetes. *Diabetes care*, *36*(4), 1047-1055.

Taylor, R., & Holman, R. R. (2015). Normal weight individuals who develop type 2 diabetes: the personal fat threshold. *Clinical Science*, *128*(7), 405-410.

Tazakori, Z., Dehghan, M. H., Iranparvar, M., Zare, M., Foladi, N., & Mohmmadi, R. (2007). Effect of rice bran powder on blood glucose levels and serum lipid parameters in diabetes patient II. *Res. J. Biol. Sci*, *2*, 252-255.

Thomas, D.E. and Elliott, E.J. (2010). The use of low-glycaemic index diets in diabetes control. British journal of nutrition, 104(06), pp.797-802.

Tremblay, F., Lavigne, C., Jacques, H., & Marette, A. (2001). Defective insulin-induced GLUT4 translocation in skeletal muscle of high fat–fed rats is associated with alterations in both Akt/protein kinase B and atypical protein kinase C (ζ/λ) activities. *Diabetes*, *50*(8), 1901-1910.

Tsuchida, A., Yamauchi, T., Takekawa, S., Hada, Y., Ito, Y., Maki, T., & Kadowaki, T. (2005). Peroxisome proliferator–activated receptor (PPAR) α activation

UNIVERSITAS
GADJAH MADA
**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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increases adiponectin receptors and reduces obesity-related inflammation in adipose tissue. *Diabetes*, *54*(12), 3358-3370.

Tuncel, N. B., Yılmaz, N., Kocabıyık, H., & Uygur, A. (2014). The effect of infrared stabilized rice bran substitution on B vitamins, minerals and phytic acid content of pan breads: Part II. *Journal of Cereal Science*, *59*(2), 162-166.

Vinayagam, R., Jayachandran, M., & Xu, B. (2016). Antidiabetic effects of simple phenolic acids: A comprehensive review. *Phytotherapy research*, *30*(2), 184-199.

Vincent, H. K., Bourguignon, C. M., Weltman, A. L., Vincent, K. R., Barrett, E., Innes, K. E., & Taylor, A. G. (2009). Effects of antioxidant supplementation on insulin sensitivity, endothelial adhesion molecules, and oxidative stress in normal-weight and overweight young adults. *Metabolism-Clinical and Experimental*, *58*(2), 254-262.

Vlavcheski, F., Naimi, M., Murphy, B., Hudlicky, T., & Tsiani, E. (2017). Rosmarinic Acid, a Rosemary Extract Polyphenol, Increases Skeletal Muscle Cell Glucose Uptake and Activates AMPK. *Molecules*, *22*(10), 1669.

Wang, X. L., Zhang, L., Youker, K., Zhang, M. X., Wang, J., LeMaire, S. A., Coselli, J. S., & Shen, Y. H. (2006). Free fatty acids inhibit insulin signaling–stimulated endothelial nitric oxide synthase activation through upregulating PTEN or inhibiting Akt kinase. *Diabetes*, *55*(8), 2301-2310.

Wang, C., Mao, X., Wang, L., Liu, M., Wetzel, M. D., Guan, K. L., Dong, L. Q. & Liu, F. (2007). Adiponectin sensitizes insulin signaling by reducing p70 S6 kinase-mediated serine phosphorylation of IRS-1. *Journal of Biological Chemistry*, *282*(11), 7991-7996.

Wang, W., Guo, J., Zhang, J., Peng, J., Liu, T., & Xin, Z. (2015). Isolation, identification and antioxidant activity of bound phenolic compounds present in rice bran. *Food chemistry*, *171*, 40-49.

Weyer, C., Bogardus, C., Mott, D.M. and Pratley, R.E., 1999. The natural history of insulin secretory dysfunction and insulin resistance in the pathogenesis of type 2 diabetes mellitus. *Journal of Clinical Investigation*, *104*(6), p.787.

Wink, Michael. (2006). *An Introduction to Molecular Biotechnology*. Weinheim: Wiley-VCH.

White, M. G., Shaw, J. A., & Taylor, R. (2016). Type 2 diabetes: the pathologic basis of reversible β-cell dysfunction. *Diabetes care*, *39*(11), 2080-2088.

Xu, Z., Hua, N., & Godber, J. S. (2001). Antioxidant activity of tocopherols, tocotrienols, and γ-Oryzanol components from rice bran against cholesterol oxidation accelerated by 2, 2 '-Azobis (2-methylpropionamidine) dihydrochloride. *Journal of Agricultural and Food Chemistry*, *49*(4), 2077-2081.

Yan, L. J. (2014). Pathogenesis of chronic hyperglycemia: from reductive stress to oxidative stress. *Journal of diabetes research*, *2014*.

Yogalakshmi, B., Bhuvaneswari, S., Sreeja, S., & Anuradha, C. V. (2014). Grape seed proanthocyanidins and metformin act by different mechanisms to promote insulin signaling in rats fed high calorie diet. *Journal of cell communication and signaling*, *8*(1), 13-22.

You, J. S., Anderson, G. B., Dooley, M. S., & Hornberger, T. A. (2015). The role of mTOR signaling in the regulation of protein synthesis and muscle mass during immobilization in mice. *Disease models & mechanisms*, *8*(9), 1059-1069

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GADJAH MADA
**Pengaruh Pemberian Bekatul Terfermentasi terhadap Ekspresi Gen Akt2 Otot Skelet Tikus Wistar Jantan
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Universitas Gadjah Mada, 2018 | Diunduh dari http://etd.repository.ugm.ac.id/

Yu, S., Nehus, Z. T., Badger, T. M., & Fang, N. (2007). Quantification of vitamin E and γ-oryzanol components in rice germ and bran. *Journal of agricultural and food chemistry*, *55*(18), 7308-7313.

Yu, N., Fang, X., Zhao, D., Mu, Q., Zuo, J., Ma, Y., Zhang, Y., Mo, F., Zhang, D., Jiang, G., Gao, S., & Wu, R. (2017). Anti-diabetic effects of Jiang Tang Xiao Ke granule via PI3K/Akt signalling pathway in type 2 diabetes KKAy mice. *PloS one*, *12*(1), e0168980.

Yuan, J. S., Reed, A., Chen, F., & Stewart, C. N. (2006). Statistical analysis of real-time PCR data. BMC bioinformatics, 7(1), 85.

Zavoshy, R., Noroozi, M., & Jahanihashemi, H. (2012). Effect of low calorie diet with rice bran oil on cardiovascular risk factors in hyperlipidemic patients. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences*, *17*(7), 626.

Zhang, L., Li, M., Yi, W., Xu, N. G., & Sun, J. (2010). Effect on the Akt2 in skeletal muscle of rats with insulin resistance treated by acupuncture. *Journal of Acupuncture and Tuina Science*, *8*(5), 277-281.

Zhao, L., Kang, I., Fang, X., Wang, W., Lee, M. A., Hollins, R. R., Marshall, M. R., & Chung, S. (2015). Gamma-tocotrienol attenuates high-fat diet-induced obesity and insulin resistance by inhibiting adipose inflammation and M1 macrophage recruitment. *International Journal of Obesity*, *39*(3), 438.

Zheng, X., & Cartee, G. D. (2016). Insulin-induced effects on the subcellular localization of Akt1, Akt2 and AS160 in rat skeletal muscle. *Scientific reports*, *6*, 39230.

Zhou, S. S., Da Li, W. P. S., Guo, M., Lun, Y. Z., Zhou, Y. M., Xiao, F. C., Jing, L. X., Sun, S. X., Zhang, L. B., Luo, N., & Bian, F. N. (2009). Nicotinamide overload may play a role in the development of type 2 diabetes. *World Journal of Gastroenterology: WJG*, *15*(45), 5674.

Zubair, M., Anwar, F., Ashraf, M., & Uddin, M. K. (2012). Characterization of high-value bioactives in some selected varieties of Pakistani rice (Oryza sativa L.). *International journal of molecular sciences*, *13*(4), 4608-4622.