

- Abdel Aziz, S. M. *et al.* (2020). Antihyperglycemic Effects and Mode of Actions of *Musa paradisica* Leaf and Fruit Peel Hydroethanolic Extracts in Nicotinamide/Streptozotocin-Induced Diabetic Rats. *Evidence-based Complementary and Alternative Medicine*, 2020. doi: 10.1155/2020/9276343.
- Amaliah, Z. Z. N., Bahri, S. dan Amelia, P. (2018). Isolasi dan Karakterisasi Bakteri Asam Laktat dari Limbah Cair Rendaman Kacang Kedelai. *Jurnal Fitofarmaka Indonesia*, 5(1), pp. 253–257.
- American Diabetes Association. (2014). Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*, 37(1), pp. 81–90. doi: 10.2337/dc14-S081.
- Anas, Y. *et al.* (2015). Aktivitas Antidiabetes Fraksi n-Heksan Ekstrak Etanol Daun Lenglgengan (*Leucas lavandulifolia* JE. Smith) pada Tikus DM Tipe-2 yang Mengalami Resistensi Insulin. *Kartika Jurnal Ilmiah Farmasi*, 3(1), pp. 20–28. doi: 10.26874/kjif.v3i1.33.
- Arifin, W. N. dan Zahiruddin, W. M. (2017). Sample Size Calculation in Animal Studies Using Resource Equation Approach. *Malaysian Journal of Medical Sciences*, 24(5), pp. 101–105. doi: 10.21315/mjms2017.24.5.11.
- Atmodjo, P. K. (2008). Pengaruh Ragi dan Waktu Fermentasi terhadap Produksi Alkohol Secara Fermentasi Berbahan Baku Gaplek Ubi Kayu (*Manihot utilisima*) Pendahuluan Metode Penelitian. *Biota*, 13(1), pp. 47–52.
- Den Besten, G. *et al.* (2015). Short-Chain Fatty Acids Protect Against High-Fat Diet-Induced Obesity Via A PPAR γ -Dependent Switch from Lipogenesis to Fat Oxidation. *Diabetes*, 64(7), pp. 2398–2408. doi: 10.2337/db14-1213.
- Bintari, S. H. *et al.* (2015). Comparative Effect of Tempe and Soymilk on Fasting Blood Glucose, Insulin level and Pancreatic Beta Cell Expression. *Pakistan Journal of Nutrition*, pp. 239–246. doi: 10.3923/pjn.2015.239.246.
- Branitamahisi, B. (2019). Perbaikan Sensitivitas Insulin Diabetes Melitus Tipe 2 oleh Media Terkondisi Sel Punca Mesensimal. *Praxis*, 1(2), p. 180. doi: 10.24167/praxis.v1i2.1629.
- Canfora, E. E., Jocken, J. W. dan Blaak, E. E. (2015). Short-Chain Fatty Acids in Control of Body Weight and Insulin Sensitivity. *Nature Reviews Endocrinology*.

- Chao, P. C. *et al.* (2018). Investigation of Insulin Resistance in The Popularly Used Four Rat Models of Type-2 Diabetes. *Biomedicine and Pharmacotherapy*. Elsevier, 101(2), pp. 155–161. doi: 10.1016/j.biopha.2018.02.084.
- Chen, L. *et al.* (2015). Mechanisms Linking Inflammation to Insulin Resistance. *International Journal of Endocrinology*, 2015. doi: 10.1155/2015/508409.
- Cho, K. W. *et al.* (2010). Daidzein and The Daidzein Metabolite, Equol, Enhance Adipocyte Differentiation and PPAR γ Transcriptional Activity. *Journal of Nutritional Biochemistry*. Elsevier B.V., 21(9), pp. 841–847. doi: 10.1016/j.jnutbio.2009.06.012.
- Cho, N. H. *et al.* (2018). IDF Diabetes Atlas: Global Estimates of Diabetes Prevalence for 2017 and Projections for 2045. *Diabetes Research and Clinical Practice*. Elsevier B.V., 138, pp. 271–281. doi: 10.1016/j.diabres.2018.02.023.
- Cruz, N. G. *et al.* (2013). The Linkage Between Inflammation and Type 2 Diabetes Mellitus. *Diabetes Research and Clinical Practice*, 99(2), pp. 85–92. doi: 10.1016/j.diabres.2012.09.003.
- Dao, M. C. *et al.* (2016). *Akkermansia muciniphila* and Improved Metabolic Health during A Dietary Intervention in Obesity: Relationship with Gut Microbiome Richness and Ecology. *Gut*, 65(3), pp. 426–436. doi: 10.1136/gutjnl-2014-308778.
- Dewi, L. *et al.* (2020). The Alleviation Effect of Combination of Tempeh and Red Ginger Flour towards Insulin Sensitivity in High-Fat Diet Rats. *Journal of Food and Nutrition Research*, 8(1), pp. 21–25. doi: 10.12691/jfnr-8-1-3.
- El-Beih, N. M. *et al.* (2019). Effects of Pomegranate Aril Juice and Its Punicalagin On Some Key Regulators of Insulin Resistance and Oxidative Liver Injury in Streptozotocin-Nicotinamide Type 2 Diabetic Rats. *Molecular Biology Reports*. Springer Netherlands, 46(4), pp. 3701–3711. doi: 10.1007/s11033-019-04813-8.
- Escandón-Rivera, S. M., Andrade-Cetto, A. dan Sánchez-Villaseñor, G. (2019). Phytochemical Composition and Chronic Hypoglycemic Effect of Bromelia karatas on STZ-NA-Induced Diabetic Rats. *Evidence-based Complementary and Alternative Medicine*, 2019. doi: 10.1155/2019/9276953.
- Fatimah, R. N. (2015). Diabetes Melitus Tipe 2. *Jurnal MAJORITY*, 4, pp. 93–101. doi:

- Fauzliyan, Y. *et al.* (2018). Ethanol Extract of *Tithonia diversifolia* (Hemsley) A Gray Standardized Ameliorates Hyperglycemia, Polyphagia, and Weight Loss in Diabetic Rats. *Molekul*, 13(1), p. 72. doi: 10.20884/1.jm.2018.13.1.417.
- Ferguson, J. F. *et al.* (2014). Dietary Isoflavone Intake is Associated with Evoked Responses to Inflammatory Cardiometabolic Stimuli and Improved Glucose Homeostasis in Healthy Volunteers. *Nutrition, Metabolism and Cardiovascular Diseases*. Elsevier Ltd, 24(9), pp. 996–1003. doi: 10.1016/j.numecd.2014.03.010.
- Fu, Z. *et al.* (2010). Genistein Induces Pancreatic β -cell Proliferation through Activation of Multiple Signaling Pathways and Prevents Insulin-Deficient Diabetes in Mice. *Endocrinology*, 151(7), pp. 3026–3037. doi: 10.1210/en.2009-1294.
- Fukushima, M. *et al.* (2004). Insulin Secretion and Insulin Sensitivity at Different Stages of Glucose Tolerance: A Cross-Sectional Study of Japanese Type 2 Diabetes. *Metabolism: Clinical and Experimental*, 53(7), pp. 831–835. doi: 10.1016/j.metabol.2004.02.012.
- Galicia-Garcia, U. *et al.* (2020). Pathophysiology of Type 2 Diabetes Mellitus. *International Journal of Molecular Sciences*, 21(17), pp. 1–34. doi: 10.3390/ijms21176275.
- Gao, R. *et al.* (2019). The Effect of a Low Glycemic Index Pulse-Based Diet on Insulin Sensitivity, Insulin Resistance, Bone Resorption, and Cardiovascular Risk Factors during Bed Rest. *Nutrients*, 11, pp. 1–12.
- Gayoso-Diz, P. *et al.* (2013). Insulin Resistance (HOMA-IR) Cut-off Values and the Metabolic Syndrome in a General Adult Population: Effect of Gender and Age: EPIRCE Cross-sectional Study. *BMC Endocrine Disorders*, 13. doi: 10.1186/1472-6823-13-47.
- Ghasemi, A. *et al.* (2015). Cut-Off Points of Homeostasis Model Assessment of Insulin Resistance, Beta-Cell Function, and Fasting Serum Insulin to Identify Future Type 2 Diabetes: Tehran Lipid and Glucose Study. *Acta Diabetologica*. Springer Milan, 52(5), pp. 905–915. doi: 10.1007/s00592-015-0730-3.
- Ghasemi, A., Khalifi, S. dan Jedi, S. (2014). Streptozotocin-Nicotinamide-Induced Rat Model of Type 2 Diabetes (review). *Acta Physiologica Hungarica*, 101(4), pp. 408–420. doi: 10.1556/APhysiol.101.2014.4.2.

BMJ Open Diabetes Research and Care, 8(1), pp. 1–9. doi: 10.1136/bmjdr-2019-000948.

Handayani, W., Rudijanto, A. dan Indra, M. R. (2009). Soybean Milk Reduces Insulin Resistant in *Rattus norvegicus* of Type 2 Model Diabetes Mellitus. *Jurnal Kedokteran Brawijaya*, XXV(2), pp. 60–66.

Hertzler, S. R. *et al.* (2020). Plant Proteins: Assessing Their Nutritional Quality and Effects on Health and Physical Function. *Nutrients*, 12(12), pp. 1–27. doi: 10.3390/nu12123704.

Hidayat, K., Elfiah, U. dan Sofiana, K. (2015). Jumlah Makrofag pada Luka Insisi Full Thickness yang diberi Ekstrak Umbi Bidara Upas (*Merremia mammosa (Lour)*) pada Tikus Wistar Jantan. *Pustaka Kesehatan*, 3(3), pp. 1–5.

Huang, Y. C. *et al.* (2018). Effects of Tempeh Fermentation with *Lactobacillus plantarum* and *Rhizopus oligosporus* on Streptozotocin-induced Type II Diabetes Mellitus in Rats. *Nutrients*, 10(9). doi: 10.3390/nu10091143.

Husna, F. *et al.* (2019). Model Hewan Coba pada Penelitian Diabetes Animal Model in Diabetes Research. *Pharmaceutical Sciences and Research*, 6(3), pp. 131–141.

Husna, F. *et al.* (2020). Restoration of pro-inflammatory cytokines and histopathological changes in pancreas and liver of hyperglycemic rats by *Murraya koenigii* leaves extract. *Journal of Applied Pharmaceutical Science*, 10(1), pp. 8–15. doi: 10.7324/JAPS.2020.101002.

IDF. (2017). Global Perspective on Diabetes. *Diabetes Voice*, 64(4), pp. 1–32. Available at: www.idf.org.

Irwanto, R., Robiatul Adawiyah, D. dan Rungkat Zakaria, F. (2016). Peran Fisiologis Sari Kedelai Hitam Diperkaya Mikroenkapsulan Minyak Sawit Mentah Pada Penderita Diabetes Melitus Tipe-2. *Jurnal Teknologi dan Industri Pangan*, 27(1), pp. 1–9. doi: 10.6066/jtip.2016.27.1.1.

Istiani, Y., Handajani, S. dan Pangastuti, A. (2015). Karakterisasi Senyawa Bioaktif Isoflavon dan Uji Aktivitas Antioksidan dari Ekstrak Etanol Tempe Berbahan Baku Koro Pedang (*Canavalia ensiformis*). *Biofarmasi*, 13(2), pp. 50–58. doi:

- Jannah, M. *et al.* (2014). Pengembangan Formula Minuman Olahraga Berbasis Tempe untuk Pemulihan Kerusakan Otot. *Jurnal Agritech*, 34(03), p. 285. doi: 10.22146/agritech.9456.
- Jesica, C., Cansa, E. dan Fidelia, J. (2017). Gaplek, Tiwul, and Gatot as Staple Food in Javanese Barren Area. 7(4), pp. 1–6.
- Kim, I. S. (2021). Current Perspectives on The Beneficial Effects of Soybean Isoflavones and Their Metabolites for Humans. *Antioxidants*, 10(7), pp. 1–54. doi: 10.3390/antiox10071064.
- Kim, Y. A., Keogh, J. B. dan Clifton, P. M. (2018). Probiotics, Prebiotics, Synbiotics and Insulin Sensitivity. *Nutrition Research Reviews*, 31(1), pp. 35–51. doi: 10.1017/S095442241700018X.
- Kustyawati, M. E. (2012). Kajian Peran Yeast dalam Pembuatan Tempe. 29(2). doi: 10.22146/agritech.9765.
- Kwon, D. Y. *et al.* (2011). Isoflavonoids and Peptides from Meju, Long-term Fermented Soybeans, Increase Insulin Sensitivity and Exert Insulinotropic Effects In Vitro. *Nutrition*. Elsevier Ltd, 27(2), pp. 244–252. doi: 10.1016/j.nut.2010.02.004.
- Larsen, N. *et al.* (2010). Gut Microbiota in Human Adults with Type 2 Diabetes Differs from Non-Diabetic Adults. *PLoS ONE*, 5(2). doi: 10.1371/journal.pone.0009085.
- Lücke, F. K. *et al.* (2019). Development of Food Products with Addition of Rapeseed Presscake Fermented by *Rhizopus*: Sensory Properties and Consumer Acceptance. *British Food Journal*, 121(10), pp. 2351–2364. doi: 10.1108/BFJ-07-2018-0484.
- Mahjabeen, S. *et al.* (2020). Insulin Sensitivity and Insulin Secretion Estimated by Homeostatic Model Assessment (HOMA) in Gestational Diabetes Mellitus. *Journal of Biosciences and Medicines*, 08(07), pp. 44–54. doi: 10.4236/jbm.2020.87005.
- Masdar, H. *et al.* (2019). Histological Appearance of Diabetes-Rat Pancreas Administrated by Soybean Compared to Tempeh. *AIP Conference Proceedings*, 2108(6). doi: 10.1063/1.5109987.
- Mcnelis, J. C. *et al.* (2015). GPR43 Potentiates B-Cell Function in Obesity. 64(December 2014), pp. 3203–3217. doi: 10.2337/db14-1938.

Noviantoro, D. D. (2019). Isolasi dan Identifikasi Bakteri Asam Laktat Asal Fermentasi Spontan Tepung Gaplek Sebagai Bahan Baku Mi Lethek. *Skripsi*. Universitas Jember, Universita.

Nurhidajah, N. dan Nurrahman, N. (2016). Efek Hipoglikemik Kecambah Beras Merah pada Tikus yang Diinduksi STZ-NA dengan Parameter Kadar Insulin, Indeks HOMA-IR dan HOMA β . 36(4), pp. 433–439.

Padilla-Córdova, C. *et al.* (2020). The Diet-Derived Short Chain Fatty Acid Propionate Improves Beta-Cell Function in Humans and Stimuates Insulin Secretion from Human Islets Invitro. 15(32), pp. 4–6.

Palanisamy, N., Viswanathan, P. and Anuradha, C. V. (2008). Effect of Genistein, a Soy Isoflavone, on Whole Body Insulin Sensitivity and Renal Damage Induced by a High-Fructose Diet. *Renal Failure*, 30(6), pp. 645–654. doi: 10.1080/08860220802134532.

PERKENI (2019) *Pedoman Pengelolaan dan Pencegahan Diabetes Mellitus Tipe 2 Dewasa di Indonesia*. Jakarta: PB PERKENI.

Puspaningtyas, D. E., Sari, P. M. dan Kusuma, R. J. (2018) 'Exploring The Potency Gathotan and Gathot as Diabetes Functional Food: Resistant Starch Analysis. *IOP Conference Series: Earth and Environmental Science*, 207(1). doi: 10.1088/1755-1315/207/1/012042.

Puspitasari, R. I. (2019). *Perubahan Sifat Mikrobiologis dan Kimiawi Tepung Gaplek Selama Fermentasi Spontan Sebagai Bahan Baku Mie Lethek*. *Skripsi*. Universitas Jember.

Putri, N. E. *et al.* (2016). Pengaruh Intervensi Tahu Kedelai Hitam Kaya Serat Terhadap Glukosa Darah dan Inflamasi Responden Diabetes Tipe 2. 27(2), pp. 131–139. doi: 10.6066/jtip.2016.27.2.131.

Radita, R. *et al.* (2017). Metagenome Analysis of Tempeh Production: Where did The Bacterial Community in Tempeh Come From?. *Malaysian Journal of Microbiology*, (12). doi: 10.21161/mjm.101417.

Radita, R. *et al.* (2018). Firmicutes is The Predominant Bacteria in Tempeh.

BioMed Research International, 2014. doi: 10.1155/2014/761264.

Ray, M. K. dan Ray, S. A. (2013). Can Modification of The Gut Microbiome with Diet Affect The Onset and Pathogenesis of Diabetes. *African Journal of Diabetes Medicine*, 21(1), pp. 7–10. Available at: <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=90602554&site=eehost-live>.

Rehman, K. dan Akash, M. S. H. (2016). Mechanisms of Inflammatory Responses and Development of Insulin Resistance: How are They Interlinked?. *Journal of Biomedical Science*, 23(1), pp. 1–18. doi: 10.1186/s12929-016-0303-y.

Sakamoto, Y. *et al.* (2016). The Dietary Isoflavone Daidzein Reduces Expression of Pro-inflammatory Genes through PPAR α / γ and JNK Pathways in Adipocyte and Macrophage Co-cultures. *PLoS ONE*, 11(2), pp. 1–13. doi: 10.1371/journal.pone.0149676.

Saputra, N. T., Suartha, I. N. dan Dharmayudha, A. A. G. O. (2018). Agen Diabetagonik Streptozotocin untuk Membuat Tikus Putih Jantan Diabetes Mellitus. *Buletin Veteriner Udayana*, 10(2), p.116. doi: 10.24843/bulvet.2018.v10.i02.p02.

Sari, P. M., Puspaningtyas, D. E. dan Kusuma, R. J. (2018). Dietary Fiber and Carbohydrate Contents of Gathotan and Gathot as Functional Food for People with Diabetes Mellitus', *Jurnal Gizi dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, 5(2), p. 88. doi: 10.21927/ijnd.2017.5(2).88-92.

Seumahu, C. A. *et al.* (2013). Bacterial and Fungal Communities in Tempeh as Reveal by Amplified Ribosomal Intergenic Sequence Analysis. *HAYATI Journal of Biosciences*. Institut Pertanian Bogor, 20(2), pp. 65–71. doi: 10.4308/hjb.20.2.65.

Simonne, A. H. *et al.* (2000). Retention and Changes of Soy Isoflavones and Carotenoids in Immature Soybean Seeds (edamame) during Processing. *Journal of Agricultural and Food Chemistry*, 48(12), pp. 6061–6069. doi: 10.1021/jf000247f.

Smith, A. dan Hursepuny, A. (2015). Isolasi dan Identifikasi Jenis Jamur pada Ubi Kayu (*Manihot esculenta crants.*) dalam Proses Pembuatan Ubi Kayu Hitam

10.30598/BIOPENDIXVOL1ISSUE2PAGE171-175.

- Stephanie *et al.* (2019). Tempeh Consumption Enhanced Beneficial Bacteria in The Human Gut. *Food Research*, 3(1), pp. 57–63. doi: 10.26656/fr.2017.3(1).230.
- Syafii, H. *et al.* (2019). Ekspresi GLUT4 pada Neuron Hipokampus *Rattus novergicus* Diabetik yang Diinjeksi Streptozotocin dan Nicotinamide Expression of GLUT4 in Hippocampal Neurons of Streptozotocin and Nicotinamide-induced Diabetic *Rattus novergicus*. *Jurnal Kedokteran Brawijaya*, 30(3), pp. 197–201.
- Szkudelski, T. (2012). Streptozotocin-Nicotinamide-Induced Diabetes in The Rat Characteristics of The Experimental Model', *Experimental Biology and Medicine*, 237(5), pp. 481–490. doi: 10.1258/ebm.2012.011372.
- Tamam, B. *et al.* (2019). Proteomic Study of Bioactive Peptides from Tempe. *Journal of Bioscience and Bioengineering*. Elsevier Ltd, 128(2), pp. 241–248. doi: 10.1016/j.jbiosc.2019.01.019.
- Tang, X. dan Pikal, M. J. (2004). Design of Freeze-Drying Processes for Pharmaceuticals: Practical Advice. *Pharmaceutical Research*, 21(2), pp. 191–200. doi: 10.1023/B:PHAM.0000016234.73023.75.
- Tilg, H. dan Moschen, A. R. (2008). Inflammatory Mechanisms in The Regulation of Insulin Resistance. *Molecular Medicine*, 14(3–4), pp. 222–231. doi: 10.2119/2007-00119.Tilg.
- Tripathi, B dan Srivastava, A. (2006). Diabetes Mellitus: Complications and Therapeutics. *Medical Science Monitor*, 12(7), pp. 130–147. Available at: <https://www.medscimonit.com/download/index/idArt/452216>.
- Umeno, A. *et al.* (2016). Antioxidative and Antidiabetic Effects of Natural Polyphenols and Isoflavones. *Molecules*, 21(6). doi: 10.3390/molecules21060708.
- Utari, D. M. *et al.* (2010). Pengaruh Pengolahan Kedelai Menjadi Tempe dan Pemasakan Tempe terhadap Kadar Isoflavon. *Pgm*, 33(2), pp. 148–153.
- Utari, D. M. *et al.* (2011). Potensi Asam Amino pada Tempe untuk Memperbaiki Profil Lipid dan Diabetes Mellitus. *Kesmas: National Public Health Journal*, 5(4), p. 166. doi: 10.21109/kesmas.v5i4.137.
- Vázquez, L. *et al.* (2017). Effect of Soy Isoflavones on Growth of Representative

- Victoria, B. G., Rodica, S. dan Georgeta, N. C. (2015) Improvement of The Antioxidant Activity of Soybean (*Glycine max.*) by Biotechnological Processing. *Romanian Biotechnological Letters*, 20(2), pp. 10212–10220.
- Wagner, J. D. *et al.* (2009). Effects of Soy Protein and Isoflavones on Insulin. *Metabolism*, 57(336), pp. 1–15. doi: 10.1016/j.metabol.2008.04.001.EFFECTS.
- Widoyo, S., Handajani, S. dan Nandariyah. (2015). Pengaruh Lama Fermentasi Terhadap Kadar Serat Kasar dan Aktivitas Antioksidan Tempe Beberapa Varietas Kedelai. *Biofarmasi*, 13(2), pp. 59–65. doi: 10.13057/biofar/f130203.
- Wijanarka, A., Tifauzah, N. dan Wijaningsih, W. (2020). Antidiabetic Potential of Modified Gayam (*Inocarpus Fagifer Forst.*) Starch in Diabetic Rats STZ-NA Induced. *Pakistan Journal of Medical and Health Sciences*, 14(2), pp. 1474–1478.
- Winanti, R. (2014). Higienitas Produk Tempe Berdasarkan Perbedaan Metode Inokulasi. *Unnes Journal of Life Science*, 3(1), pp. 39–46.
- Wu, Y. *et al.* (2014). Risk Factors Contributing to Type 2 Diabetes and Recent Advances in The Treatment and Prevention. *International journal of medical sciences*, 11(11), pp. 1185–1200. doi: 10.7150/ijms.10001.
- Yudianti, N. F. *et al.* (2020). Isolation and Characterization of Lactic Acid Bacteria from Legume Soaking Water of Tempeh Productions. *Digital Press Life Sciences*, 2, p. 00003. doi: 10.29037/digitalpress.22328.
- Yuniastuti, A., Susanti, R. dan Iswari, R. S. (2018). Efek Infusa Umbi Garut (*Marantha arundinaceae L*) terhadap Kadar Glukosa dan Insulin Plasma Tikus yang Diinduksi Streptozotocyn. *Jurnal MIPA*, 41(1), pp. 34–39.