

DAFTAR PUSTAKA

- Abidov, M., Sokolova, K., Danilova, I., Baykenova, M., Gette, I., Mychlynina, E., Ozgur, B. A., Gurol, A. O., & Yilmaz, M. T. (2023). Hepatic insulin synthesis increases in rat models of diabetes mellitus type 1 and 2 differently. *PLoS ONE*, 18(11). <https://doi.org/10.1371/journal.pone.0294432>
- Adalina, Y., Heryati, Y., & Yuniaty, D. (2019). Quality of kapok honey in some areas of Apis mellifera honey cultivation in Central Java and East Java Province. *IOP Conference Series: Earth and Environmental Science*, 394(1), 012049. <https://doi.org/10.1088/1755-1315/394/1/012049>
- Ahrens Kress, A. P., Zhang, Y., Kaiser-Vry, A. R., & Sauer, M. B. (2022). A Comparison of Blood Collection Techniques in Mice and their Effects on Welfare. *Journal of the American Association for Laboratory Animal Science*, 61(3), 287–295. <https://doi.org/10.30802/AALAS-JAALAS-21-000129>
- Alm, L. (1982). Effect of fermentation on lactose, glucose, and galactose content in milk and suitability of fermented milk products for lactose intolerant individuals. *Journal of Dairy Science*, 65(3), 346–352. [https://doi.org/10.3168/jds.S0022-0302\(82\)82198-X](https://doi.org/10.3168/jds.S0022-0302(82)82198-X)
- Al-Sabaawy, H. B., Rahawi, A. M., & Al-Mahmood, S. S. (2021). Standard techniques for formalin-fixed paraffin-embedded tissue: A Pathologist's perspective. *Iraqi Journal of Veterinary Sciences*, 35(Supplement I-III), 127–135. <https://doi.org/10.33899/ijvs.2021.131918.2023>
- American Diabetes Association. (2014). Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*, 37(Supplement_1), S81–S90. <https://doi.org/10.2337/dc14-S081>
- Apriliyanto, U., Ulfa, R., & Harsanti, R. S. (2020). Pengaruh Perbedaan Konsentrasi Gula dan Lama Waktu Proses Fermentasi pada Karakteristik Kefir Susu Kedelai (Glycine max). *Jurnal Teknologi Pangan Dan Ilmu Pertanian*, 2(1), 5.
- Attaie, R., & Richter, R. L. (2000). Size Distribution of Fat Globules in Goat Milk. *Journal of Dairy Science*, 83(5), 940–944. [https://doi.org/10.3168/jds.S0022-0302\(00\)74957-5](https://doi.org/10.3168/jds.S0022-0302(00)74957-5)
- Aulbach, A. D., & Amuzie, C. J. (2017). Biomarkers in Nonclinical Drug Development. In *A Comprehensive Guide to Toxicology in Nonclinical Drug Development* (pp. 447–471). Elsevier. <https://doi.org/10.1016/B978-0-12-803620-4.00017-7>

- Azizi, N. F., Kumar, M. R., Yeap, S. K., Abdullah, J. O., Khalid, M., Omar, A. R., Osman, M. A., Mortadza, S. A. S., & Alitheen, N. B. (2021). Kefir and its biological activities. *Foods*, 10(6). <https://doi.org/10.3390/foods10061210>
- Bagaméry, F., Varga, K., Kecsmár, K., Vincze, I., Szökő, É., & Tábi, T. (2020). Lack of insulin resistance in response to streptozotocin treatment in neuronal SH-SY5Y cell line. *Journal of Neural Transmission*, 127(1), 71–80. <https://doi.org/10.1007/s00702-019-02118-5>
- Balkrishna, A., Yadav, P., Saini, A., Yadav, P., Kumar, B., & Arya, V. (2024). Honey as Supplementary Food. In *Honey* (pp. 17–29). CRC Press. <https://doi.org/10.1201/9781003490180-2>
- Ben Taheur, F., Mansour, C., Mechri, S., Laaouar, H., Safta Skhiri, S., Bouricha, M., Jaouadi, B., Mzoughi, R., & Zouari, N. (2022). Protective effects of dietary Kefir against aflatoxin B1-induced hepatotoxicity in Nile tilapia fish, *Oreochromis niloticus*. *Food Science & Nutrition*, 10(7), 2300–2311. <https://doi.org/10.1002/fsn3.2838>
- Bourrie, B. C. T., Willing, B. P., & Cotter, P. D. (2016). The microbiota and health promoting characteristics of the fermented beverage kefir. In *Frontiers in Microbiology* (Vol. 7, Issue MAY). Frontiers Media S.A. <https://doi.org/10.3389/fmicb.2016.00647>
- Bugianesi, E., McCullough, A. J., & Marchesini, G. (2005a). Insulin resistance: A metabolic pathway to chronic liver disease. *Hepatology*, 42(5), 987–1000. <https://doi.org/10.1002/hep.20920>
- Bugianesi, E., McCullough, A. J., & Marchesini, G. (2005b). INSULIN resistance: A metabolic pathway to chronic liver disease. *Hepatology*, 42(5), 987–1000. <https://doi.org/10.1002/hep.20920>
- Catalá, A., & Díaz, M. (2016). Editorial: Impact of Lipid Peroxidation on the Physiology and Pathophysiology of Cell Membranes. *Frontiers in Physiology*, 7. <https://doi.org/10.3389/fphys.2016.00423>
- Chatterjee, S., Khunti, K., & Davies, M. J. (2017). Type 2 Diabetes. *Lancet*, 389, 2239–2251.
- Chaudhary, N., Dangi, P., Chaudhary, V., Sablania, V., Dewan, A., Joshi, S., Siddqui, S., & Yadav, A. N. (2022). Probiotics and bioactive metabolite production. In *Probiotics for Human Nutrition in Health and Disease* (pp. 171–198). Elsevier. <https://doi.org/10.1016/B978-0-323-89908-6.00006-6>
- Choi, J.-W., Kang, H. W., Lim, W.-C., Kim, M.-K., Lee, I.-Y., & Cho, H.-Y. (2017). Kefir prevented excess fat accumulation in diet-induced obese mice. *Bioscience, Biotechnology, and Biochemistry*, 81(5), 958–965. <https://doi.org/10.1080/09168451.2016.1258984>

- Dewi, R., & Sutejo, I. R. (2011). Pemberian Minyak Goreng Bekas Pakai dalam Menimbulkan Kerusakan Sel-Sel Hati Mencit dan Penurunan Kadar Albumin Serum Mencit. *Jurnal Kedokteran Dan Kesehatan*, 4(1), 61–69.
- Dilworth, L., Facey, A., & Omoruyi, F. (2021). Diabetes Mellitus and Its Metabolic Complications: The Role of Adipose Tissues. *International Journal of Molecular Sciences*, 22(14), 7644. <https://doi.org/10.3390/ijms22147644>
- Edremitlioglu, M., Andic, M. F., & Korkut, O. (2012). Quercetin, a Powerful Antioxidant Bioflavonoid, Prevents Oxidative Damage in Different Tissues of Long-Term Diabetic Rats. *Balkan Medical Journal*, 29(1), 49–55. <https://doi.org/10.5152/balkanmedj.2011.002>
- El-Sayed, M. H., Thabet, R. A., Hamza, M. T., Hussein, M. S., & El Saeed, M. M. (2020). Liver disease in children and adolescents with type 1 diabetes mellitus: A link between glycemic control and hepatopathy. *Diabetes Research and Clinical Practice*, 170, 108458. <https://doi.org/10.1016/j.diabres.2020.108458>
- Farag, M. A., Jomaa, S. A., El-wahed, A. A., & El-seedi, H. R. (2020). The many faces of kefir fermented dairy products: Quality characteristics, flavour chemistry, nutritional value, health benefits, and safety. *Nutrients*, 12(2), 1. <https://doi.org/10.3390/nu12020346>
- Fazriyanti, N. (2015). *Pengaruh Perbedaan Konsentrasi Madu dan Lama Fermentasi terhadap pH, Total Asam, Gula Reduksi, dan Potensi Antibakteri Kefir Air Leri*. UIN Maulana Malik Ibrahim.
- Firdaus, G. M., Rizqiati, H., & Nurwantoro. (2018). Pengaruh Lama Fermentasi Terhadap Rendemen, pH, Total Padatan Terlarut dan Mutu Hedonik Kefir Whey. *Jurnal Teknologi Pangan*, 1.
- Fitriani, R. N., Sitasiwi, A. J., & Isdadiyanto, S. (2020). Struktur Hepar dan Rasio Bobot Hepar Terhadap Bobot Tubuh Mencit (*Mus Musculus L.*) Jantan Setelah Pemberian Ekstrak Etanol Daun Mimba (*Azadirachta Indica A.Juss*). *Buletin Anatomi Dan Fisiologi*, 5(1), 75–83.
- Forlani, G., Di Bonito, P., Mannucci, E., Capaldo, B., Genovese, S., Orrasch, M., Scaldaferri, L., Di Bartolo, P., Melandri, P., Dei Cas, A., Zavaroni, I., & Marchesini, G. (2008). Prevalence of elevated liver enzymes in Type 2 diabetes mellitus and its association with the metabolic syndrome. *Journal of Endocrinological Investigation*, 31(2), 146–152. <https://doi.org/10.1007/BF03345581>
- Gad, S. C. (2007). *Animal Models in Toxicology* (Second). CRC Press.
- Gaidhani, S. N., Reddy S, V., Ala, S., Sudhakar D, & Kumar Y R, S. (2022). High Fat Diet and Low Dose Streptozotocin Induced Diabetic Dyslipidaemia and

- Hepatic Damage in Rats. *International Journal of Research in Pharmaceutical Sciences*, 13(4), 403–410. <https://doi.org/10.26452/ijrps.v13i4.3835>
- Ghasemi, A., & Jedd, S. (2023). Streptozotocin as a Tool for Induction of Rat Models of Diabetes: A Practical Guide. *EXCLI Journal*, 22, 274–294. <https://doi.org/10.17179/excli2022-5720>
- Gheibi, S., Kashfi, K., & Ghasemi, A. (2017). A practical guide for induction of type-2 diabetes in rat: Incorporating a high-fat diet and streptozotocin. *Biomedicine & Pharmacotherapy*, 95, 605–613. <https://doi.org/10.1016/j.bioph.2017.08.098>
- Ginting, S. A. W. (2024). Organoleptik Kefir Susu Kambing dengan Waktu Lama Fermentasi. *JCI (Jurnal Cakrawala Ilmiah)*, 3(9). <http://bajangjournal.com/index.php/JCI>
- Guo, X. xuan, Wang, Y., Wang, K., Ji, B. ping, & Zhou, F. (2018). Stability of a type 2 diabetes rat model induced by high-fat diet feeding with low-dose streptozotocin injection. *Journal of Zhejiang University: Science B*, 19(7), 559–569. <https://doi.org/10.1631/jzus.B1700254>
- Hammam, A. R. A., Salman, S. M., Elfaruk, M. S., & Alsaleem, K. A. (2021). *Goat milk: compositional, technological, nutritional, and therapeautic aspects*. <https://doi.org/10.20944/preprints202108.0097.v1>
- Hardiansyah, A. (2020). Identifikasi Nilai Gizi dan Potensi Manfaat Kefir Susu Kambing Kaligesing. *Journal of Nutrition College*, 9(3), 208–214. <https://doi.org/10.14710/jnc.v9i3.27308>
- Hardiansyah, A., & Hadi Kusuma, H. (2022). Optimalisasi Kualitas Organoleptik dan Aktivitas Antioksidan Kefir Susu Kambing dengan Penambahan Madu Lokal Bunga Randu. *Journal of Nutrition College*, 11(4), 278–284. <http://ejournal3.undip.ac.id/index.php/jnc/>
- Hardiansyah, A., Malkan Bahrul Ilmi, I., Quratul Marjan, A., & Crosita Octaria, Y. (2024). Viskositas, Keasaman, dan Kadar Gula Total pada Kefir Susu Kambing dengan Penambahan Madu Bunga Randu (*Cheiba pentandra L.*). *Jurnal Gizi*, 13(2), 70–81.
- Hardiansyah, A., Malkan Bahrul Ilmi, I., Quratul Marjan, A., Crosita Octaria, Y., Ana Saputri, K., Khodijah, & Darmuin. (2024). Effect of Kapok Flower Honey (*Ceiba pentandra*) Addition on Antioxidant Activity, Total Flavonoid, Total Phenolic, and Lactose Levels in Goat's Milk Kefir. *Malaysian Journal of Medicine and Health Sciences*, 20(SUPP9), 85–90. <https://doi.org/10.47836/mjmhs20.s9.14>
- Hasan, F. E., & Yunus, R. (2023). Fungsi Antioksidan dalam Menghambat Peroksidasi Lipid dan Meningkatkan Ketahanan Membran Eritrosit pada

- Penderita Diabetes Melitus. *Health Information : Jurnal Penelitian*, 15(2). <https://doi.org/10.36990/hijp.v15i2.901>
- IDF. (2019). International Diabetes Federation. *The Lancet*, 266, 134–137.
- Ighodaro, O. M. (2018). Molecular pathways associated with oxidative stress in diabetes mellitus. *Biomedicine & Pharmacotherapy*, 108, 656–662. <https://doi.org/10.1016/j.biopha.2018.09.058>
- Ilmi, I. M. B., Hardiansyah, A., Luailiya, N., Avrilian, P. A., Marjan, A. Q., Sugiyanti, D., & Hayati, N. (2024). Pengaruh Pemberian Kefir Madu terhadap Profil Lipid Tikus Galur Sprague Dawley Sindroma Metabolik. *Amerta Nutrition*, 8(3SP), 218–227.
- Inayah, Marianti, A., & Lisdiana. (2012). Efek Madu Randu dan Kelengkeng dalam Menurunkan Kolesterol pada Tikus Putih Hiperkolesterolemik. *Unnes Journal of Life Science*, 1(1).
- International Diabetes Federation. (2021). *IDF Diabetes Atlas, 10th edn*. <https://www.diabetesatlas.org>
- Isnaini, N., & Ratnasari, R. (2018). Faktor risiko mempengaruhi kejadian Diabetes mellitus tipe dua. *Jurnal Kebidanan Dan Keperawatan Aisyiyah*, 14(1), 59–68. <https://doi.org/10.31101/jkk.550>
- Jambhulkar, A. B., & Ashfaq, K. M. (2021). Functional Properties of Probiotic Kefir: A Review. *International Journal of Advances in Engineering and Management (IJAEM)*, 3(5), 997. <https://doi.org/10.35629/5252-03059971006>
- John, S. M., & Deeseenthum, S. (2015). Properties and benefits of kefir-A review. *Songklanakarin Journal of Science and Technology*, 37(3), 275–282. <http://www.sjst.psu.ac.th>
- Kalas, M. A., Chavez, L., Leon, M., Taweesedt, P. T., & Surani, S. (2021). Abnormal liver enzymes: A review for clinicians. *World Journal of Hepatology*, 13(11), 1688–1698. <https://doi.org/10.4254/wjh.v13.i11.1688>
- Karni, I. (2023). Ulasan Ilmiah: Karakteristik Mutu Nutrisi, Organoleptik dan Mikrobiologis Kefir Susu Kambing. *Jurnal Teknologi Dan Mutu Pangan*, 2(1), 29–44. <https://doi.org/10.30812/jtmp.v2i1.3060>
- Kesenkaş, H., Gürsoy, O., & Özbaş, H. (2017). Kefir. In *Fermented Foods in Health and Disease Prevention* (pp. 339–361). Elsevier. <https://doi.org/10.1016/B978-0-12-802309-9.00014-5>

- Kew, M. C. (2000). Serum aminotransferase concentration as evidence of hepatocellular damage. *Lancet (London, England)*, 355(9204), 591–592. [https://doi.org/10.1016/S0140-6736\(99\)00219-6](https://doi.org/10.1016/S0140-6736(99)00219-6)
- Khairani, D., Ilyas, S., & Yurnadi. (2024). *Prinsip dan Praktik Hewan Percobaan Mencit (Mus musculus)*. USU Press. <https://www.researchgate.net/publication/378012780>
- Kim, D.-H., Kim, H., Jeong, D., Kang, I.-B., Chon, J.-W., Kim, H.-S., Song, K.-Y., & Seo, K.-H. (2017). Kefir alleviates obesity and hepatic steatosis in high-fat diet-fed mice by modulation of gut microbiota and mycobiota: targeted and untargeted community analysis with correlation of biomarkers. *The Journal of Nutritional Biochemistry*, 44, 35–43. <https://doi.org/10.1016/j.jnutbio.2017.02.014>
- Koodathil, J., Venkatachalam, G., & Bhaskaran, K. (2023). In vitro and in vivo antidiabetic activity of bitter honey in streptozotocin-nicotinamide-induced diabetic Wistar rats. *Journal of Medicine and Life*, 2023(1), 91–100. <https://doi.org/10.25122/jml-2022-0099>
- Krisnamurti, D. G. B., Purwaningsih, E. H., Tarigan, T. J. E., Nugroho, C. M. H., Soetikno, V., & Louisa, M. (2022). Alterations of Liver Functions and Morphology in a Rat Model of Prediabetes After a Short-term Treatment of a High-fat High-glucose and Low-dose Streptozotocin. *Open Access Macedonian Journal of Medical Sciences*, 10(A), 668–674. <https://doi.org/10.3889/oamjms.2022.8717>
- Kwo, P. Y., Cohen, S. M., & Lim, J. K. (2017). ACG Clinical Guideline: Evaluation of Abnormal Liver Chemistries. *American Journal of Gastroenterology*, 112(1), 18–35. <https://doi.org/10.1038/ajg.2016.517>
- Kwon, S. S., & Lee, S.-G. (2019). A High Alanine Aminotransferase/Aspartate Aminotransferase Ratio Determines Insulin Resistance and Metabolically Healthy/Unhealthy Obesity in a General Adult Population in Korea: The Korean National Health and Nutritional Examination Survey 2007–2010. *Experimental and Clinical Endocrinology & Diabetes*, 127(10), 677–684. <https://doi.org/10.1055/a-0752-0217>
- Lee, S.-J., Jeon, H.-S., Yoo, J.-Y., & Kim, J.-H. (2021). Some Important Metabolites Produced by Lactic Acid Bacteria Originated from Kimchi. *Foods*, 10(9), 2148. <https://doi.org/10.3390/foods10092148>
- Liu, M., Tan, J., He, Z., He, X., Hou, D.-X., He, J., & Wu, S. (2018). Inhibitory effect of blue honeysuckle extract on high-fat-diet-induced fatty liver in mice. *Animal Nutrition*, 4(3), 288–293. <https://doi.org/10.1016/j.aninu.2018.06.001>
- London, A., Lundsgaard, A.-M., Kiens, B., & Bojsen-Møller, K. N. (2021). The Role of Hepatic Fat Accumulation in Glucose and Insulin Homeostasis—

- Dysregulation by the Liver. *Journal of Clinical Medicine*, 10(3), 390. <https://doi.org/10.3390/jcm10030390>
- Lori, G., Cecchi, L., Mulinacci, N., Melani, F., Caselli, A., Cirri, P., Pazzagli, L., Luti, S., Mazzoli, L., & Paoli, P. (2019). Honey extracts inhibit PTP1B, upregulate insulin receptor expression, and enhance glucose uptake in human HepG2 cells. *Biomedicine & Pharmacotherapy*, 113, 108752. <https://doi.org/10.1016/j.biopha.2019.108752>
- Manna, P., Das, J., Ghosh, J., & Sil, P. C. (2010). Contribution of type 1 diabetes to rat liver dysfunction and cellular damage via activation of NOS, PARP, IκBa/NF-κB, MAPKs, and mitochondria-dependent pathways: Prophylactic role of arjunolic acid. *Free Radical Biology and Medicine*, 48(11), 1465–1484. <https://doi.org/10.1016/j.freeradbiomed.2010.02.025>
- Marco, M. L., Heeney, D., Binda, S., Cifelli, C. J., Cotter, P. D., Foligné, B., Gänzle, M., Kort, R., Pasin, G., Pihlanto, A., Smid, E. J., & Hutzins, R. (2017). Health benefits of fermented foods: microbiota and beyond. *Current Opinion in Biotechnology*, 44, 94–102. <https://doi.org/10.1016/j.copbio.2016.11.010>
- Medhet, M., Mangoud M, Omar, N. N., & Hussin, M. Z. (2021). Protective Effect of Kefir Against Hepatorenal Toxicities of Malathion in Male Rats. *The National Review of Criminal Sciences*, 64(3).
- Mobasher, L., Ahadi, M., Beheshti Namdar, A., Alavi, M. S., Bemidinezhad, A., Moshirian Farahi, S. M., Esmaeilizadeh, M., Nikpasand, N., Einafshar, E., & Ghorbani, A. (2023). Pathophysiology of diabetic hepatopathy and molecular mechanisms underlying the hepatoprotective effects of phytochemicals. *Biomedicine and Pharmacotherapy*, 167. <https://doi.org/10.1016/j.biopha.2023.115502>
- Mohamed, J., Nazratun Nafizah, A. H., Zariyantey, A. H., & Budin, S. B. (2016). Mechanisms of diabetes-induced liver damage: The role of oxidative stress and inflammation. *Sultan Qaboos University Medical Journal*, 16(2), 132–141. <https://doi.org/10.18295/squmj.2016.16.02.002>
- Mohammadi, F., Razmjooei, N., Mohsenpour, M. A., Nejati, M. A., Eftekhari, M. H., & Hejazi, N. (2025). The effects of kefir drink on liver aminotransferases and metabolic indicators in patients with nonalcoholic fatty liver disease: a randomized controlled trial. *BMC Nutrition*, 11(3), 1–11. <https://doi.org/10.1186/s40795-024-00989-w>
- Molyneux, P. (2003). *The use of the stable free radical diphenylpicryl-hydrazyl (DPPH) for estimating antioxidant activity.*
- Mora-Villalobos, J. A., Montero-Zamora, J., Barboza, N., Rojas-Garbanzo, C., Usaga, J., Redondo-Solano, M., Schroedter, L., Olszewska-Widdrat, A., & López-Gómez, J. P. (2020). Multi-Product Lactic Acid Bacteria

- Fermentations: A Review. *Fermentation*, 6(1), 23. <https://doi.org/10.3390/fermentation6010023>
- Nakajima, H., Okada, H., Hamaguchi, M., Kurogi, K., Murata, H., Ito, M., & Fukui, M. (2022). Low aspartate aminotransferase/alanine aminotransferase ratio is a predictor of diabetes incidence in Japanese people: Population-based Panasonic cohort study 5. *Diabetes/Metabolism Research and Reviews*, 38(6). <https://doi.org/10.1002/dmrr.3553>
- Nasir, S. M., Ismail, A. F., Ismail, T. S. T., Rahman, W. F. W. A., Ahmad, W. A. N. W., Din, T. A. D. A. A. T., & Sirajudeen, K. N. S. (2024). Hepatic and renal effects of oral stingless bee honey in a streptozotocin-induced diabetic rat model. *World Journal of Experimental Medicine*, 14(1). <https://doi.org/10.5493/wjem.v14.i1.91271>
- Nurliyani, Harmayani, E., & Sunarti. (2015). Antidiabetic Potential of Kefir Combination from Goat Milk and Soy Milk in Rats Induced with Streptozotocin-Nicotinamide. *Korean Journal for Food Science of Animal Resources*, 35(6), 847–858. <https://doi.org/10.5851/kosfa.2015.35.6.847>
- Octary, N., Sari, I., & Aristoteles. (2022). Liver Tissue Examination of Mice Using 10% BNF Fixation For 6 Hours And 16 Hours. *JURNAL ANALIS LABORATORIUM MEDIK*, 7(2), 104–109. <https://doi.org/10.51544/jalm.v7i2.3457>
- OD, A. (2023). “Liver Function Status of Diabetic Wistar Rats Treated with Ethanol Extract of Cucumis Sativus Fruit.” *Biomedical Journal of Scientific & Technical Research*, 51(2). <https://doi.org/10.26717/bjstr.2023.51.008065>
- Ozsoy, B., Cantekin, Z., Yalcin, S., & Bayraktar, H. S. (2021). Effects of kefir on blood parameters and intestinal microflora in rats: An experimental study. *Kafkas Universitesi Veteriner Fakultesi Dergisi*, 27(1), 111–115. <https://doi.org/10.9775/kvfd.2020.24855>
- Özsoy, S. Y. (2016). The Protective Effect of Kefir on Carbon Tetrachloride-induced Histopathological Changes in the Liver of Rats. *Kafkas Universitesi Veteriner Fakultesi Dergisi*, 22(3), 403–408. <https://doi.org/10.9775/kvfd.2015.14825>
- Palsamy, P., Sivakumar, S., & Subramanian, S. (2010). Resveratrol attenuates hyperglycemia-mediated oxidative stress, proinflammatory cytokines and protects hepatocytes ultrastructure in streptozotocin–nicotinamide-induced experimental diabetic rats. *Chemico-Biological Interactions*, 186(2), 200–210. <https://doi.org/10.1016/j.cbi.2010.03.028>
- Parmar, K., Singh, G., Gupta, G., Pathak, T., & Nayak, S. (2016). Evaluation of De Ritis ratio in liver-associated diseases. *International Journal of Medical*

- Science and Public Health*, 5(9), 1783.
<https://doi.org/10.5455/ijmsph.2016.24122015322>
- Parwata, I. M. (2015). *Teaching book of bioactivity test of antioxidant* (pp. 1–51).
- Petersen, M. C., & Shulman, G. I. (2018). Mechanisms of Insulin Action and Insulin Resistance. *Physiological Reviews*, 98(4), 2133–2223.
<https://doi.org/10.1152/physrev.00063.2017>
- Pradnyawati, N., Lestari, A. A. W., Subawa, A., & Oka, T. (2018). Analisis Kadar Albumin Serum terhadap Aspartate Transaminase (AST), Alanine Transaminase (ALT) dan Rasio De Ritis pada Pasien Hepatitis B di RSUP Sanglah, Denpasar. *E-Jurnal Medika*, 7(6).
- Prado, M. R., Blandón, L. M., Vandenberghe, L. P. S., Rodrigues, C., Castro, G. R., Thomaz-Soccol, V., & Soccol, C. R. (2015). Milk kefir: composition, microbial cultures, biological activities, and related products. *Frontiers in Microbiology*, 6. <https://doi.org/10.3389/fmicb.2015.01177>
- Rachmani, N. H., Taufik, E., Apriantini, A., & Yuni Cahya Endrawati. (2022). Kualitas Kefir Susu Sapi dengan Tambahan Madu Hutan Selama Penyimpanan Suhu Rendah. *Jurnal Ilmu Pertanian Indonesia*, 28(1), 78–82.
<https://doi.org/10.18343/jipi.28.1.78>
- Rahmawati, F. C., Djamiyatun, K., & Suci, N. (2017). Pengaruh yogurt sinbiotik pisang terhadap kadar glukosa dan insulin tikus sindrom metabolik. *Jurnal Gizi Klinik Indonesia*, 14(1), 10. <https://doi.org/10.22146/ijcn.19379>
- Rao, P. V., Krishnan, K. T., Salleh, N., & Gan, S. H. (2016). Biological and therapeutic effects of honey produced by honey bees and stingless bees: a comparative review. *Revista Brasileira de Farmacognosia*, 26(5), 657–664.
<https://doi.org/https://doi.org/10.1016/j.bjp.2016.01.012>
- Richard Hendarto, D., Putri Handayani, A., Esterelita, E., & Aji Handoko, Y. (2021). Mekanisme Biokimiawi dan Optimalisasi *Lactobacillus bulgaricus* dan *Streptococcus thermophilus* dalam Pengolahan Yoghurt yang Berkualitas. *Jurnal Sains Dasar*, 8(1), 13–19. <https://doi.org/10.21831/jsd.v8i1.24261>
- Rief, P., Pichler, M., Raggam, R., Hafner, F., Gerger, A., Eller, P., Brodmann, M., & Gary, T. (2016). The AST/ALT (De-Ritis) ratio. *Medicine*, 95(24), e3843.
<https://doi.org/10.1097/MD.0000000000003843>
- Rosa, D. D., Dias, M. M. S., Grześkowiak, Ł. M., Reis, S. A., Conceição, L. L., & Peluzio, M. D. C. G. (2017). Milk kefir: Nutritional, microbiological and health benefits. *Nutrition Research Reviews*, 30(1), 82–96.
<https://doi.org/10.1017/S0954422416000275>

- Rukmi, D. L., Fitri, Z. E., & Sahenda, L. N. (2023). Characteristics of kefir based on goat's milk with different starter combinations. *IOP Conference Series: Earth and Environmental Science*, 1168(1). <https://doi.org/10.1088/1755-1315/1168/1/012031>
- Sadewi, S. M., Nurhasanah, N., Sudibyo, S., Windayani, N., Kiswandono, A. A., & Satria, H. (2023). Antioxidant and Antibacterial Activities of Curd and Whey Kefir Produced from Etawa Goat Milk. *Journal of Multidisciplinary Applied Natural Science*, 4(1), 139–145. <https://doi.org/10.47352/jmans.2774-3047.200>
- Saeedi, P., Salpea, P., Karuranga, S., Petersohn, I., Malanda, B., Gregg, E. W., Unwin, N., Wild, S. H., & Williams, R. (2020). Mortality attributable to diabetes in 20–79 years old adults, 2019 estimates: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Research and Clinical Practice*, 162, 108086. <https://doi.org/10.1016/j.diabres.2020.108086>
- Sah, H., Gürmez, N., Söyler, G., Sayiner, S., Sehirli, A. Ö., & Küknar, A. (2022). Effect of Kefir on Increased Apoptosis in Liver and Kidney in Cisplatin Toxicity. *International Journal of Morphology*, 40(2), 480.
- Salah, N., Eissa, S., Mansour, A., El Magd, N. M. A., Hasanin, A. H., El Mahdy, M. M., Hassan, M. K., & Matboli, M. (2023). Evaluation of the role of kefir in management of non-alcoholic steatohepatitis rat model via modulation of NASH linked mRNA-miRNA panel. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-022-27353-x>
- Samarghandian, S., Azimi-Nezhad, M., Samini, F., & Farkhondeh, T. (2016). Chrysin treatment improves diabetes and its complications in liver, brain, and pancreas in streptozotocin-induced diabetic rats. *Canadian Journal of Physiology and Pharmacology*, 94(4), 388–393. <https://doi.org/10.1139/cjpp-2014-0412>
- Sanders, M. E., Merenstein, D., Merrifield, C. A., & Hutchins, R. (2018). Probiotics for human use. In *Nutrition Bulletin* (Vol. 43, Issue 3, pp. 212–225). Blackwell Publishing Ltd. <https://doi.org/10.1111/nbu.12334>
- Saputra, M. M. (2023). *Analisis Bakteri Asam Laktat (BAL), Organoleptik, dan Daya Simpan Kefir Susu Kambing dengan Penambahan Madu Bunga Randu (Ceiba pentandra I.)*. Universitas Islam Negeri Walisongo.
- Schwartz, S. S., Epstein, S., Corkey, B. E., Grant, S. F. A., Gavin, J. R., & Aguilar, R. B. (2016). The Time Is Right for a New Classification System for Diabetes: Rationale and Implications of the β -Cell-Centric Classification Schema. *Diabetes Care*, 39(2), 179–186. <https://doi.org/10.2337/dc15-1585>

- Setiawati, L., Rizqiati, H., & Susanti, S. (2019). Analisis Rendemen, Kadar Alkohol, Nilai pH dan Total BAL pada Kefir Whey Susu Kambing dengan Lama Fermentasi yang Berbeda. *Jurnal Teknologi Pangan*, 3(1), 142–146. <https://doi.org/10.14710/jtp.2019.23771>
- Seto Wicaksono, H., Narayani, I., Setyawati, I., Fisiologi Hewan, L., & Struktur dan Perkembangan Hewan Jurusan Biologi, L. (2015). Struktur Hati Mencit (Mus Musculus L.) Setelah Pemberian Ekstrak Daun Kaliandra Merah (Calliandra Calothrysus Meissn.) Structure of Mice Liver After Giving Red Calliandra Leaf Extract. *Jurusan Biologi FMIPA Universitas Udayan a Maret*.
- Setyawardani, T., Rahardjo, A. H., Sulistyowati, M., & Wasito, S. (2014). Physiochemical and Organoleptic Features of Goat Milk Kefir Made of Different Kefir Grain Concentration on Controlled Fermentation. *Animal Production*, 16(1), 48–54.
- Sevanti, F. P., Lyrawati, D., & Puspita, O. E. (2021). *Uji Efektivitas Sistem Penghantaran Polymeric- Lipid Nanoparticle Ekstrak Kayu Manis (Cinnamomum Burmannii) Terhadap Kadar Kolesterol Pada Tikus Wistar Jantan Model Diabetes*. Universitas Brawijaya.
- Shaikh, S. M., Varma, A., Kumar, S., Acharya, S., & Patil, R. (2024). Navigating Disease Management: A Comprehensive Review of the De Ritis Ratio in Clinical Medicine. *Cureus*. <https://doi.org/10.7759/cureus.64447>
- Shareef, S., Mishra, S., & Y, V. (2013). Evaluation of hypoglycemic effect of Lagerstroemia speciosa (Banaba) Leaf extract in Alloxan induced diabetic rabbits. *International Journal of Medical Research & Health Sciences*, 2, 217.
- Sharifi, M., Moridnia, A., Mortazavi, D., Salehi, M., Bagheri, M., & Sheikhi, A. (2017). Kefir: a powerful probiotics with anticancer properties. *Medical Oncology*, 34(11), 183. <https://doi.org/10.1007/s12032-017-1044-9>
- Sharifi-Rad, M., Zucca, P., Varoni, E. M., Dini, L., Panzarini, E., Rajkovic, J., Tsouh Fokou, P. V., Azzini, E., Peluso, I., Prakash Mishra, A., Nigam, M., El Rayess, Y., Beyrouthy, M. El, Polito, L., Iriti, M., Martins, N., Martorell, M., Docea, A. O., Setzer, W. N., ... Sharifi-Rad, J. (2020). Lifestyle, Oxidative Stress, and Antioxidants: Back and Forth in the Pathophysiology of Chronic Diseases. *Frontiers in Physiology*, 11. <https://doi.org/10.3389/fphys.2020.00694>
- Singh, R., Devi, S., & Gollen, R. (2015). Role of free radical in atherosclerosis, diabetes and dyslipidaemia: larger-than-life. *Diabetes/Metabolism Research and Reviews*, 31(2), 113–126. <https://doi.org/10.1002/dmrr.2558>
- Skinner, J. R. (2024). Fermented Foods: Kefir. *EDIS*, 2024(4). <https://doi.org/10.32473/edis-fs457-2024>

- Soelistijo, S. A. (2019). *Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia 2019*.
- Srisayam, M., & Chantawannakul, P. (2010). Antimicrobial and antioxidant properties of honeys produced by *Apis mellifera* in Thailand. *Journal of ApiProduct & ApiMedical Science*, 2(2), 77–83. <https://doi.org/10.3896/IBRA.4.02.2.03>
- Sulmiyati, S., Said, N. S., Fahrodi, D. U., Malaka, R., & Maruddin, F. (2019). The Physicochemical, Microbiology, and Sensory Characteristics of Kefir Goat Milk with Different Levels of Kefir Grain. *Tropical Animal Science Journal*, 42(2), 152–158. <https://doi.org/10.5398/tasj.2019.42.2.152>
- Tarihoran, W. C., Hintono, A., & Rizqiati, H. (2022). Total BAL, viskositas, ph, dan padatan terlarut kefir susu kerbau dengan pemberian buah naga merah (*Hylocereus polyrhizus*). *Jurnal Pangan Dan Agroindustri*, 10(4), 191.
- Triwanto, J., Herlinda, K., & Muttaqin, T. (2022). Kualitas Fisikokimia pada Madu dari Nektar Bunga Randu (*Ceiba pentandra*) dan Kaliandra (*Calliandra callothyrsus*). *Journal of Forest Science Avicennia*, 4(1), 102–113. <https://doi.org/10.22219/avicennia.v4i2.19750>
- Ustadi, Radiati, L., & Thohari, I. (2017). Bioactive Components of Rubber Tree Honey (*Hevea Brasiliensis*) and Calliandra (*Calliandra Callothyrsus*) and Kapok Honey (*Ceiba Pentandra*). *Jurnal Ilmu Dan Teknologi Hasil Ternak*, 12(2), 97–102. <https://doi.org/10.21776/ub.jitek.2017.012.02.6>
- Wahdini, S. I., Seswandhana, M. R., Vityadewi, N., Ramli, R. N., Gabriela, G. C., & Dachlan, I. (2022). THE use of Indonesian randu honey for chronic wounds in a patient with uncontrolled type 2 diabetes mellitus: A case report. *International Journal of Surgery Case Reports*, 95, 107–140. <https://doi.org/10.1016/j.ijscr.2022.107140>
- Wan Mohammad, W. M. Z. (2017). Sample Size Calculation in Animal Studies Using Resource Equation Approach. *Malaysian Journal of Medical Sciences*, 24(5), 101–105. <https://doi.org/10.21315/mjms2017.24.5.11>
- Wang, H., Zhou, X., Sun, Y., Sun, X., & Guo, M. (2022). Differences in Protein Profiles of Kefir Grains from Different Origins When Subcultured in Goat Milk. *Journal of Agricultural and Food Chemistry*, 70(24), 7515–7524. <https://doi.org/10.1021/acs.jafc.2c01391>
- Wang, L., Xu, Y., Zhang, S., Bibi, A., Xu, Y., & Li, T. (2022). The AST/ALT Ratio (De Ritis Ratio) Represents an Unfavorable Prognosis in Patients in Early-Stage SFTS: An Observational Cohort Study. *Frontiers in Cellular and Infection Microbiology*, 12. <https://doi.org/10.3389/fcimb.2022.725642>

WHO. (2000). *General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine.*

Widodo, H. S., Murti, T. W., Agus, A., & Widodo, W. (2019). Mengidentifikasi Peptida Bioaktif Angiotensin Converting Enzyme-inhibitor (ACEi) dari Kasein β Susu Kambing dengan Polimorfismenya Melalui Teknik In Silico. *Jurnal Aplikasi Teknologi Pangan*, 7(4). <https://doi.org/10.17728/jatp.3008>

Wijayanti, S. P. M., Nurbaiti, T. T., & Maqfiroch, A. F. A. (2020). Analisis Faktor Risiko Kejadian Diabetes Mellitus Tipe II di Wilayah Pedesaan. *Jurnal Promosi Kesehatan Indonesia*, 15(1), 16. <https://doi.org/10.14710/jPKI.15.1.16-21>

Xie, W., Yu, W., Chen, S., Ma, Z., Yang, T., & Song, Z. (2022). Low aspartate aminotransferase/alanine aminotransferase (DeRitis) ratio assists in predicting diabetes in Chinese population. *Front Public Health*. <https://doi.org/10.5061/dryad.ft8750v>

Yuneldi, R. F., Saraswati, T. R., & Yuniwarti, E. Y. W. (2018). Profile of SGPT and SGOT on Male Rats (*Rattus norvegicus*) Hyperglycemic After Giving Insulin Leaf Extract (*Tithonia diversifolia*). *Biosaintifika: Journal of Biology & Biology Education*, 10(3), 519–525. <https://doi.org/10.15294/biosaintifika.v10i3.5516>

Yuniartha, R., Arfian, N., Setyaningsih, W. A. W., Kencana, S. M. S., & Sari, D. C. R. (2022). Accelerated Senescence and Apoptosis in the Rat Liver during the Progression of Diabetic Complications. *Malaysian Journal of Medical Sciences*, 29(6), 46–59. <https://doi.org/10.21315/mjms2022.29.6.5>

Zafar, M., Naeem-ul-Hassan Naqvi, S., Ahmed, M., & Ali Kaimkhani, Z. (2009). Altered Liver Morphology and Enzymes in Streptozotocin Induced Diabetic Rats. *Int. J. Morphol*, 27(3), 719–725.