

DAFTAR PUSTAKA

- Adeghate, E., dan Ponery, A. S. 2002. GABA in the endocrine pancreas: Cellular localization and function in normal and diabetic rats. *Tissue and Cell*, 34(1), 1–6. <https://doi.org/10.1054/tice.2002.0217>
- Agarwal, S. G., Powar, R. M., Tankhiwale, S., dan Rukadikar, A. 2015. Study of opportunistic infections in HIV-AIDS patients and their correlation with CD4+ cell count. *International Journal of Current Microbiology and Applied Sciences*, 4(6), 373–382.
- Ahmed, Z., Mehmood, T., Ferheen, I., Noori, A. W., Almansouri, M., dan Waseem, M. 2023. Optimization of exopolysaccharide produced by *L. kefiranofaciens* ZW3 using response surface methodology. *International Journal of Food Properties*, 26(1), 2285–2293. <https://doi.org/10.1080/10942912.2023.2245577>
- Ahmed, Z., Wang, Y., Ahmad, A., Khan, S. T., Nisa, M., Ahmad, H., dan Afreen, A. 2013. Kefir and health: a contemporary perspective. *Critical reviews in food science and nutrition*, 53(5), 422–434. <https://doi.org/10.1080/10408398.2010.540360>
- Aires, R., Gobbi Amorim, F., Côco, L. Z., da Conceição, A. P., Zanardo, T. É. C., Taufner, G. H., Nogueira, B. V., Vasquez, E. C., Pereira, T. M. C., Campagnaro, B. P., dan dos Santos Meyrelles, S. 2022. Use of kefir peptide (Kef-1) as an emerging approach for the treatment of oxidative stress and inflammation in 2K1C mice. *Food & Function*, 13(4), 1965–1974. <https://doi.org/10.1039/D1FO01798E>
- Ajam, B. A., Yousef, F. M. A., dan Abduljawad, E. A. 2025. Kefir fermented milk ameliorates serum indicators of hyperglycemia, dyslipidemia, pro-inflammatory cytokines and hepatic histology in streptozotocin-diabetic rats. *Journal of Pioneering Medical Sciences*, 14(1), 15–22. <https://doi.org/10.47310/jpms2025140103>
- Akar, F., Sumlu, E., Alçığır, M. E., Bostancı, A., dan Sadi, G. 2021. Potential mechanistic pathways underlying intestinal and hepatic effects of kefir in high-fructose-fed rats. *Food Research International*, 143, 110287. <https://doi.org/10.1016/j.foodres.2021.110287>
- Akieda-Asai, S., Ma, H., Han, W., Nagata, J., Yamaguchi, F., dan Date, Y. 2024. Mechanism of muscle atrophy in a normal-weight rat model of type 2 diabetes established by using a soft-pellet diet. *Scientific reports*, 14(1), 7670. <https://doi.org/10.1038/s41598-024-57727-2>
- Alraddadi, F. A. J., Ross, T., dan Powell, S. M. 2023. Evaluation of the microbial communities in kefir grains and kefir over time. *International Dairy*

Journal, 136, Article 105490.
<https://doi.org/10.1016/j.idairyj.2022.105490>

- Alves, E., Ntungwe, E. N., Gregório, J., Rodrigues, L. M., Pereira-Leite, C., Caleja, C., Pereira, E., Barros, L., Aguilar-Vilas, M. V., Rosado, C., dan Rijo, P. 2021. Characterization of kefir produced in household conditions: Physicochemical and nutritional profile, and storage stability. *Foods*, 10(5), 1057. <https://doi.org/10.3390/foods10051057>
- Ampe, F., Omar, N. dan Guyot, J.P. 1999, Culture-independent quantification of physiologically-active microbial groups in fermented foods using rRNA-targeted oligonucleotide probes: application to pozol, a Mexican lactic acid fermented maize dough. *Journal of Applied Microbiology*, 87: 131-140. <https://doi.org/10.1046/j.1365-2672.1999.00803.x>
- Anon, 2003. CODEX STAN 243-2003 Standard for Fermented Milks. FAO/WHO, Rome, Italy, pp. 1–11.
- AOAC. 2005. Official Methods of Analysis of the Association of Official Analytical Chemist. AOAC Inc., Washington.
- Apalowo, O. E., Adegoye, G. A., Mbogori, T., Kandiah, J., dan Obuotor, T. M. 2024. Nutritional characteristics, health impact and applications of kefir. *Foods*, 13(7), 1026. <https://doi.org/10.3390/foods13071026>
- Arapović, M., Puljić, L., Kajić, N., Banožić, M., Kartalović, B., Habschied, K., dan Mastanjević, K. 2024. The impact of production techniques on the physicochemical properties, microbiological, and consumer's acceptance of milk and water kefir grain-based beverages. *Fermentation*, 10(1), 2. <https://doi.org/10.3390/fermentation10010002>
- Arslan, S. 2015. A review: Chemical, microbiological and nutritional characteristics of kefir. *CyTA - Journal of Food*, 13(3), 340–345. <https://doi.org/10.1080/19476337.2014.981588>
- Athira, M. K., Singh, B. P., Sarkar, P., Hassan, M. Z., Abidi, K. H., Kovaleva, E., Adil, S., & Hati, S. 2026. A comprehensive review on kefir: Composition, microbial diversities, meta-analysis and biological significances on human health. *Food Production, Processing and Nutrition*, 8(1), Article 6. <https://doi.org/10.1186/s43014-025-00351-y>
- Baars, T., van Esch, B., van Ooijen, L., Zhang, Z., Dekker, P., Boeren, S., Diks, M., Garssen, J., Hettinga, K., dan Kort, R. 2023. Raw milk kefir: Microbiota, bioactive peptides, and immune modulation. *Food & Function*, 14, 1648–1661. <https://doi.org/10.1039/D2FO03248A>
- Bahram M, Anslan S, Hildebrand F, Bork P, Tedersoo L. 2018. Newly designed 16S rRNA metabarcoding primers amplify divers and novel arhaeal taxa from the environment. *Environ. Microbiol. Rep.* 11(4): 487-494. <https://doi.org/10.1111/1758-2229.12684>

- Bao, S., Zheng, H., Chen, C., Zhang, Y., Bao, L., Yang, B., Hou, Y., Chen, Y., Zhang, Q., Pi, J., dan Fu, J. 2021. Nfe211 deficiency mitigates streptozotocin-induced pancreatic β -cell destruction and development of diabetes in male mice. *Food and Chemical Toxicology*, 158, 112633. <https://doi.org/10.1016/j.fct.2021.112633>
- Bauer, B. M., Bhattacharya, S., Bloom-Saldana, E., Irimia, J. M., & Fueger, P. T. 2023. Dose-dependent progression of multiple low dose streptozotocin-induced diabetes in mice. *bioRxiv : the preprint server for biology*, 2023.04.08.536122. <https://doi.org/10.1101/2023.04.08.536122>
- Beger, R. D., Goodacre, R., Jones, C. M., Lippa, K. A., Mayboroda, O. A., O'Neill, D., Najdekr, L., Ntai, I., Wilson, I. D., dan Dunn, W. B. 2024. Analysis types and quantification methods applied in UHPLC-MS metabolomics research: A tutorial. *Metabolomics*, 20(5), Article 95. <https://doi.org/10.1007/s11306-024-02155-6>
- Bengoa, A. A., Iraporda, C., Garrote, G. L., & Abraham, A. G. 2019. Kefir microorganisms: their role in grain assembly and health properties of fermented milk. *Journal of applied microbiology*, 126(3), 686–700. <https://doi.org/10.1111/jam.14107>
- Bertazzo, A., Ragazzi, E., dan Visioli, F. 2016. Evolution of tryptophan and its foremost metabolites' concentrations in milk and fermented dairy products. *Pharma Nutrition*, 4(2), 62–67. <https://doi.org/10.1016/j.phanu.2016.02.002>
- Beshkova, D. M., Simova, E. D., Frengova, G. I., Simov, Z. I., dan Dimitrov, Z. P. 2003. Production of volatile aroma compounds by kefir starter cultures. *International Dairy Journal*, 13(7), 529–535. [https://doi.org/10.1016/S0958-6946\(03\)00058-X](https://doi.org/10.1016/S0958-6946(03)00058-X)
- BGI Genomics. 2024. Targeted Metabolomics—HM700 Panel: Service Description. BGI Genomics.
- Blasche, S., Kim, Y., Mars, R. A. T., Machado, D., Maansson, M., Kafkia, E., Milanese, A., Zeller, G., Teusink, B., Nielsen, J., Benes, V., Neves, R., Sauer, U., dan Patil, K. R. 2021. Metabolic cooperation and spatiotemporal niche partitioning in a kefir microbial community. *Nature Microbiology*, 6, 196–208. <https://doi.org/10.1038/s41564-020-00816-5>
- Bloomfield, S. J., Palau, R., Holden, E. R., Webber, M. A., dan Mather, A. E. 2024. Genomic characterization of *Pseudomonas* spp. on food: implications for spoilage, antimicrobial resistance and human infection. *BMC microbiology*, 24(1), 20. <https://doi.org/10.1186/s12866-023-03153-9>
- Bokulich, N., dan Mills, D. A. 2012. Next-generation approaches to the microbial ecology of food fermentations. *BMB reports*, 45(7), 377–389.

- Bourrie, B. C., Willing, B. P., dan Cotter, P. D. 2016. The microbiota and health promoting characteristics of the fermented beverage kefir. *Frontiers in microbiology*, 7, 647. <https://doi.org/10.3389/fmicb.2016.00647>
- Brandsma, J. B., Brinkman, J., Wolkers-Rooijackers, J. C. M., van Swam, I., van Uiter, K., Zwietering, M. H., dan Smid, E. J. 2024. Pyruvate stimulates transamination of leucine into α -ketoisocaproic acid and supports 3-methylbutanal production by *Lactococcus lactis*. *Journal of Applied Microbiology*, 135(10), lxae257. <https://doi.org/10.1093/jambio/lxae257>
- Breselge, S., Skibińska, I., Yin, X., Brennan, L., Kilcawley, K., dan Cotter, P. D. 2025. The core microbiomes and associated metabolic potential of water kefir as revealed by pan multi-omics. *Communications Biology*, 8(1), 415. <https://doi.org/10.1038/s42003-025-07808-3>
- Brustad, M., Parr, C. L., Melhus, M., dan Lund, E. 2008. Dietary patterns in the population living in the Sámi core areas of Norway the SAMINOR study. *International journal of circumpolar health*, 67(1), 82–96.
- Casado-Hidalgo, G., González-Gómez, L., López-Revenge, P., Morante-Zarcelero, S., Montilla, A., Sierra, I., dan Moreno, F. J. 2025. Microbial dynamics, alkaloid stability, and lactose degradation of poppy seed kefir during fermentation and cold storage. *Food Bioscience*, 71, Article 107266. <https://doi.org/10.1016/j.fbio.2025.107266>
- Cassol, I., Ibañez, M., dan Bustamante, J. P. 2025. Key features and guidelines for the application of microbial alpha diversity metrics. *Scientific Reports*, 15, Article 622. <https://doi.org/10.1038/s41598-024-77864-y>
- Chakravarthy, S. K., Ramaprasad, E. V. V., Shobha, E., Sasikala, C., dan Ramana, C. V. 2012. *Rhodoplanes piscinae* sp. nov., a phototrophic bacterium isolated from a freshwater fish pond and industrial effluent. *International Journal of Systematic and Evolutionary Microbiology*, 62(Pt 11), 2771–2777. <https://doi.org/10.1099/ijs.0.037912-0>
- Chang, G.-R., Cheng, W.-Y., Fan, H.-C., Chen, H.-L., Lan, Y.-W., Chen, M.-S., Yen, C.-C., dan Chen, C.-M. 2023. Kefir peptides attenuate atherosclerotic vascular calcification and osteoporosis in atherogenic diet-fed ApoE^{-/-} knockout mice. *Frontiers in Cell and Developmental Biology*, 11, Article 1158812. <https://doi.org/10.3389/fcell.2023.1158812>
- Chen, K., dan Pachter, L. 2005. Bioinformatics for whole-genome shotgun sequencing of microbial communities. *PLoS computational biology*, 1(2), 106–112. <https://doi.org/10.1371/journal.pcbi.0010024>
- Chen, K., Yang, J., Guo, X., Han, W., Wang, H., Zeng, X., Wang, Z., Yuan, Y., dan Yue, T. 2024. Microflora structure and functional capacity in Tibetan kefir grains and selenium-enriched Tibetan kefir grains: A metagenomic

- analysis. *Food Microbiology*, 119, 104454.
<https://doi.org/10.1016/j.fm.2023.104454>
- Chen, P., Zhang, Q., Dang, H., Liu, X., Tian, F., Zhao, J., Chen, Y., Zhang, H., dan Chen, W. 2014. Screening for potential new probiotic based on probiotic properties and α -glucosidase inhibitory activity. *Food Control*, 35, 65-72.
- Chen, Z., Ni, D., Zhang, W., Stressler, T., dan Mu, W. 2021. Lactic acid bacteria-derived α -glucans: From enzymatic synthesis to miscellaneous applications. *Biotechnology Advances*, 47, 107708.
<https://doi.org/10.1016/j.biotechadv.2021.107708>
- Choi, Y., Keum, G. B., Kang, J., Doo, H., Kwak, J., Kim, H., Chae, Y., Lee, S., Yang, H., Kim, S., Sun, X., Kim, H. B., dan Yoo, S. J. 2025. Evaluation of kefir consumption on gut microbial diversity in a healthy young population using full-length 16S rRNA sequencing. *Frontiers in Microbiology*, 16, 1587831. <https://doi.org/10.3389/fmicb.2025.1587831>
- Constantin, E. A., Popa-Tudor, I., Matei, F., Constantinescu, A. D., dan Oancea, F. 2023. Evaluation of polyphenol content and antioxidant activity of standard water kefir. *Chemistry Proceedings*, 13, 7.
<https://doi.org/10.3390/chemproc2023013007>
- Craig, K., Johnson, B. R., dan Grunden, A. 2021. Leveraging *Pseudomonas* stress response mechanisms for industrial applications. *Frontiers in Microbiology*, 12, 660134. <https://doi.org/10.3389/fmicb.2021.660134>
- Cufaoglu, G., dan Erdinc, A. N. 2023. Comparative analyses of milk and water kefir: Fermentation temperature, physicochemical properties, sensory qualities, and metagenomic composition. *Food Bioscience*, 55, 103079.
<https://doi.org/10.1016/j.fbio.2023.103079>
- Cui, Y., Wang, X., Yue, Y., Du, G., Chen, H., Ning, M., Yuan, Y., dan Yue, T. 2023. Metagenomic features of Tibetan kefir grains and its metabolomics analysis during fermentation. *LWT*, 175, 114502.
<https://doi.org/10.1016/j.lwt.2023.114502>
- Czyżak-Runowska, G., Wójtowski, J. A., Łęska, B., Bielińska-Nowak, S., Pytlewski, J., Antkowiak, I., dan Stanisławski, D. 2022. Lactose Content and Selected Quality Parameters of Sheep Milk Fermented Beverages during Storage. *Animals*, 12(22), 3105.
<https://doi.org/10.3390/ani12223105>
- Dallas, D. C., Citerne, F., Tian, T., Silva, V. L., Kalanetra, K. M., Frese, S. A., Robinson, R. C., Mills, D. A., dan Barile, D. 2016. Peptidomic analysis reveals proteolytic activity of kefir microorganisms on bovine milk proteins. *Food chemistry*, 197(Pt A), 273–284.
<https://doi.org/10.1016/j.foodchem.2015.10.116>

- De Coster, W., D'Hert, S., Schultz, D. T., Cruts, M., dan Van Broeckhoven, C. 2018. NanoPack: visualizing and processing long-read sequencing data. *Bioinformatics* (Oxford, England), 34(15), 2666–2669. <https://doi.org/10.1093/bioinformatics/bty149>
- de Oliveira Leite, A. M., Miguel, M. A., Peixoto, R. S., Rosado, A. S., Silva, J. T., dan Paschoalin, V. M. 2013. Microbiological, technological and therapeutic properties of kefir: a natural probiotic beverage. *Brazilian journal of microbiology* : [publication of the Brazilian Society for Microbiology], 44(2), 341–349. <https://doi.org/10.1590/S1517-83822013000200001>
- DeLong, E. F., Preston, C. M., Mincer, T., Rich, V., Hallam, S. J., Frigaard, N. U., Martinez, A., Sullivan, M. B., Edwards, R., Brito, B. R., Chisholm, S. W., dan Karl, D. M. 2006. Community genomics among stratified microbial assemblages in the ocean's interior. *Science* (New York, N.Y.), 311(5760), 496–503. <https://doi.org/10.1126/science.1120250>
- Díaz-Montes, E. 2021. Dextran: Sources, structures, and properties. *Polysaccharides*, 2(3), 554–565. <https://doi.org/10.3390/polysaccharides2030033>
- Dilna, S. V., Surya, H., Aswathy, R. G., Varsha, K. K., Sakthikumar, D. N., Pandey, A., dan Nampoothiri, K. M. 2015. Characterization of an exopolysaccharide with potential health-benefit properties from a probiotic *Lactobacillus plantarum* RJF4. *LWT – Food Science and Technology*, 64(2), 1179–1186. <https://doi.org/10.1016/j.lwt.2015.07.040>
- Ding, F., Stoyanova, L. G., dan Netrusov, A. I. 2022. Microbiome and metabiotic properties of kefir grains and kefirs based on them. *Microbiology*, 91(4), 339–355. <https://doi.org/10.1134/S0026261722100885>
- Dinić, S., Arambašić Jovanović, J., Uskoković, A., Mihailović, M., Grdović, N., Tolić, A., Rajić, J., Đorđević, M., dan Vidaković, M. 2022. Oxidative stress-mediated beta cell death and dysfunction as a target for diabetes management. *Frontiers in Endocrinology*, 13, 1006376. <https://doi.org/10.3389/fendo.2022.1006376>
- Du, G., Qing, Y., Wang, H., Wang, N., Yue, T., dan Yuan, Y. 2023. Effects of Tibetan kefir grain fermentation on the physicochemical properties, phenolics, enzyme activity, and antioxidant activity of *Lycium barbarum* (Goji berry) juice. *Food Bioscience*, 53, 102555. <https://doi.org/10.1016/j.fbio.2023.102555>
- Du, X., dan Miracle, A. D. 2018. Fermentation alters the bioaccessible phenolic compounds and increases the alpha-glucosidase inhibitory effects of aronia juice in a dairy matrix following in vitro digestion. *Food & Function*, 9(5), 2998–3007. <https://doi.org/10.1039/c8fo00250a>

- Edgar R. C. 2004. MUSCLE: multiple sequence alignment with high accuracy and high throughput. *Nucleic acids research*, 32(5), 1792–1797. <https://doi.org/10.1093/nar/gkh340>
- El-Esawy, B.H, Alghamdy, A.N, El Askary A, Elsayed E.M. 2016. Histopathological evaluation of the pancreas following administration of paricalcitol in alloxan-induced diabetic wistar rats. *World Journal Of Pharmacy And Pharmaceutical Sciences*. Vol. 5(3). ISSN 2278 – 4357.
- Eminoğlu, G., Senel, E., Özcan, S., Atar, H. H., dan Koç, Ş. 2025. Innovative kefir fortified with paraprobiotics and postbiotics: Enhanced bioaccessibility and antimicrobial properties following in vitro gastrointestinal digestion. *Journal of Food Science and Technology*, (Advance online publication). <https://doi.org/10.1007/s13197-025-06403-y>
- Fan, D., Stoyanova, L. G., dan Netrusov, A. I. 2022. Microbiome and metabiotic properties of kefir grains and kefirs based on them. *Microbiology*, 91(4), 339–355. <https://doi.org/10.1134/S0026261722100885>
- Farnworth R. E. 2005. Kefir: A Complex Probiotic. *Food Science and Technology Bulletin: Functional Foods* Vol. 2 (1):1–17.
- Ferawati, Melia, S dan Juliyarsi, I. 2023. *Manfaat Kefir Bagi Kesehatan*. Penerbit Adab. Indramayu.
- Ferawati, Purwati, E., Melia, S., Juliyarsi, I., Kurnia, Y. F., Putri, S. 2022a. *Teknologi Kefir*. Andalas University Press. Padang.
- Ferawati, S. Melia., I. Juliyarsi., E.L.S. Suharto., E. Vebriyanti., E. Purwati., A.R. Maulina. 2022b. The physicochemical, microbial, and sensorial quality of cow's milk kefir fortified with mango pulp (*Mangifera Indica* L.). *Advanced Engineering Science*. 54(7):2277-2287
- Gao, W., dan Zhang, L. 2019. Comparative analysis of the microbial community composition between Tibetan kefir grains and milks. *Food research international* (Ottawa, Ont.), 116, 137–144. <https://doi.org/10.1016/j.foodres.2018.11.056>
- Gao, X., dan Li, B. 2016. Chemical and microbiological characteristics of kefir grains and their fermented dairy products: A review. *Cogent Food & Agriculture*, 2(1). <https://doi.org/10.1080/23311932.2016.1272152>
- Gao, Y., Liu, Y., Ma, T., Liang, Q., Sun, J., Wu, X., Song, Y., Nie, H., Huang, J., dan Mu, G. 2025. Fermented dairy products as precision modulators of gut microbiota and host health: mechanistic insights, clinical evidence, and future directions. *Foods*, 14(11), 1946. <https://doi.org/10.3390/foods14111946>

- Garmendia, G., Gyenes, F., Alvarez, A., Arbildi, E., Giménez, S., Gonda, M., dan Vero, S. 2025. Dynamic microbiota in water kefir: Microbial shift and ecological selection during fermentation. *BMC Microbiology*, 26(1), 271. <https://doi.org/10.1186/s12866-025-04461-y>
- Garofalo, C., Osimani, A., Milanović, V., Aquilanti, L., De Filippis, F., Stellato, G., Di Mauro, S., Turchetti, B., Buzzini, P., Ercolini, D., dan Clementi, F. 2015. Bacteria and yeast microbiota in milk kefir grains from different Italian regions. *Food Microbiology*, 49, 123–133. <https://doi.org/10.1016/j.fm.2015.01.017>
- Gaware, V., Kiran, K., Ramdas, D dan Kiran, D. 2011. The Magic of Kefir: A Review. *Pharmacologyonline* 1: 376-386.
- Gentry, B., Cazón, P., dan O'Brien, K. 2023. A comprehensive review of the production, beneficial properties, and applications of kefir, the kefir grain exopolysaccharide. *International Dairy Journal*, 144, 105691. <https://doi.org/10.1016/j.idairyj.2023.105691>
- Georgalaki, M., Zoumpopoulou, G., Anastasiou, R., Kazou, M., dan Tsakalidou, E. 2021. *Lactobacillus kefirianofaciens*: From Isolation and Taxonomy to Probiotic Properties and Applications. *Microorganisms*, 9(10), 2158. <https://doi.org/10.3390/microorganisms9102158>
- Giraffa G. 2004. Studying the dynamics of microbial populations during food fermentation. *FEMS microbiology reviews*, 28(2), 251–260. <https://doi.org/10.1016/j.femsre.2003.10.005>
- Golowczyc, M. A., Mobili, P., Garrote, G. L., de Los Angeles Serradell, M., Abraham, A. G., dan De Antoni, G. L. 2009. Interaction between *Lactobacillus kefir* and *Saccharomyces lipolytica* isolated from kefir grains: evidence for lectin-like activity of bacterial surface proteins. *The Journal of dairy research*, 76(1), 111–116. <https://doi.org/10.1017/S0022029908003749>
- González-Orozco, B. D., García-Cano, I., Jiménez-Flores, R., dan Álvarez, V. B. 2022. Invited review: Milk kefir microbiota, Direct and indirect antimicrobial effects. *Journal of Dairy Science*, 105(5), 3703–3715. <https://doi.org/10.3168/jds.2021-21382>
- González-Orozco, B. D., García-Cano, I., Escobar-Zepeda, A., Jiménez-Flores, R., dan Álvarez, V. B. 2023. Metagenomic analysis and antibacterial activity of kefir microorganisms. *Journal of food science*, 88(7), 2933–2949. <https://doi.org/10.1111/1750-3841.16614>
- Goyal, S. N., Reddy, N. M., Patil, K. R., Nakhate, K. T., Ojha, S., Patil, C. R., dan Agrawal, Y. O. 2016. Challenges and issues with streptozotocin-induced diabetes – A clinically relevant animal model to understand the diabetes

- pathogenesis and evaluate therapeutics. *Chemico-Biological Interactions*, 244, 49-63. <https://doi.org/10.1016/j.cbi.2015.11.032>
- Guzel-Seydim, Z., Tas, T. K., Greene, A. K., 2010. Kefir and koumiss: microbiology and technology. In: Yildiz, F. (Ed.), *Development and Manufacture of Yoghurt and Other Functional Dairy Products*. CRC Press Taylor & Francis Group, LLC, Boca Raton, FL, pp. 143–163.
- Guzel-Seydim, Z. B., Seydim, A. C., Greene, A. K., dan Taş, T. 2006. Determination of antimutagenic properties of acetone-extracted fermented milks and changes in their total fatty acid profiles including conjugated linoleic acids. *International Journal of Dairy Technology*, 59(3), 209–215. <https://doi.org/10.1111/j.1471-0307.2006.00265.x>
- Hajnajafi, H., dan Iqbal, J. 2025. Mass-spectrometry based metabolomics: An overview of workflows, strategies, data analysis and applications. *Proteome Science*, 23(5). <https://doi.org/10.1186/s12953-025-00241-8>
- Han, B., Zhang, C., Zhang, L., dan Zhou, P. 2026. The novel DPP-IV inhibitory peptides derived from goat milk: Purification, identification, bioactivities verification in-vitro and in-vivo. *Food research international* (Ottawa, Ont.), 227, 118274. <https://doi.org/10.1016/j.foodres.2025.118274>
- Han, D., Yang, Y., Guo, Z., Dai, S., Jiang, M., Zhu, Y., Wang, Y., Yu, Z., Wang, K., Rong, C., dan Yu, Y. 2024. A Review on the Interaction of Acetic Acid Bacteria and Microbes in Food Fermentation: *A Microbial Ecology Perspective*. *Foods*, 13(16), 2534. <https://doi.org/10.3390/foods13162534>
- Harley, J. P dan K. M. Prescott. 1993. *Laboratory Exercises in Microbiology*. Second Edition. C Brown Publisher, New York.
- He, Y., Mok, K., Chumnanpuen, P., Nakphaichit, M., dan Vongsangnak, W. 2025. Dissecting Metabolic Functions and Sugar Transporters Using Genome and Transportome of Probiotic *Limosilactobacillus fermentum* KUB-D18. *Genes*, 16(3), 348. <https://doi.org/10.3390/genes16030348>
- Heimann, E., Nyman, M., Pålbrink, A. K., Lindkvist-Petersson, K., dan Degerman, E. 2016. Branched short-chain fatty acids modulate glucose and lipid metabolism in primary adipocytes. *Adipocyte*, 5(4), 359–368. <https://doi.org/10.1080/21623945.2016.1252011>
- Hidalgo-Silva, D. G., Olvera-Rosales, L. B., Cruz-Guerrero, A. E., González-Olivares, L. G., dan Castañeda-Ovando, A. 2025. Probiotic fermented milk and type 2 diabetes mellitus: Mechanisms, benefits, and future directions. *Journal of Functional Foods*, 134, 107068. <https://doi.org/10.1016/j.jff.2025.107068>
- Hsieh, P. S., Ho, H. H., Tsao, S. P., Hsieh, S. H., Lin, W. Y., Chen, J. F., Kuo, Y. W., Tsai, S. Y., dan Huang, H. Y. 2021. Multi-strain probiotic supplement attenuates streptozotocin-induced type-2 diabetes by reducing

- inflammation and β -cell death in rats. *PloS one*, 16(6), e0251646. <https://doi.org/10.1371/journal.pone.0251646>
- Hua, S., Wang, Y., Wang, L., Zhou, Q., Li, Z., Liu, P., Wang, K., Zhu, Y., Han, D., dan Yu, Y. 2024. Regulatory mechanisms of acetic acid, ethanol and high temperature tolerances of acetic acid bacteria during vinegar production. *Microbial Cell Factories*, 23, Article 324. <https://doi.org/10.1186/s12934-024-02602-y>
- Huang, C.-Y. 2025. The loop-in binding mode of dihydroorotase: Implications for ligand binding and therapeutic targeting. *International Journal of Molecular Sciences*, 26(3), 1359. <https://doi.org/10.3390/ijms26031359>
- Huang, C.-Y., Kuo, W.-W., Wang, H.-F., Lin, C.-J., Lin, Y.-M., Chen, J.-L., Kuo, C. H., Chen, P.-K., dan Lin, J.-Y. 2014. GABA tea ameliorates cerebral cortex apoptosis and autophagy in streptozotocin-induced diabetic rats. *Journal of Functional Foods*, 6, 534–544. <https://doi.org/10.1016/j.jff.2013.11.020>
- Hugenholtz, P., Goebel, B. M., dan Pace, N. R. 1998. Impact of culture-independent studies on the emerging phylogenetic view of bacterial diversity. *Journal of bacteriology*, 180(18), 4765–4774. <https://doi.org/10.1128/JB.180.18.4765-4774.1998>
- Hurtado-Romero, A., Del Toro-Barbosa, M., Gradilla-Hernández, M. S., Garcia-Amezquita, L. E., dan García-Cayuela, T. 2021. Probiotic properties, prebiotic fermentability, and GABA-producing capacity of microorganisms isolated from Mexican milk kefir grains: A clustering evaluation for functional dairy food applications. *Foods*, 10(10), 2275. <https://doi.org/10.3390/foods10102275>
- Irigoyen, A., Arana, I., Castiella, M., Torre, P., dan Ibáñez, F. C. 2005. Microbiological, physicochemical, and sensory characteristics of kefir during storage. *Food Chemistry*, 90(4), 613–620. <https://doi.org/10.1016/j.foodchem.2004.04.021>
- Ismail, A. A., Ghaly, M. F., dan El-Naggar, A. K. 2011. Milk kefir: Ultrastructure, antimicrobial activity and efficacy on aflatoxin B1 production by *Aspergillus flavus*. *Current microbiology*, 62(5), 1602–1609. <https://doi.org/10.1007/s00284-011-9901-9>
- Jaya, F. 2019. Ilmu, Teknologi dan Manfaat Kefir. UB Press. Malang
- Jia-ping, L dan Wang, L. M. 2019. Bioactive Components in Kefir and Koumiss. Capter Book 10. Wiley-Blackwell. Hal. 251-262. ISBN: 978-0-813-81982-2.
- Jung, J. Y., Lee, S. H., Kim, J. M., Park, M. S., Bae, J. W., Hahn, Y., Madsen, E. L., dan Jeon, C. O. 2011. Metagenomic analysis of kimchi, a traditional

- Korean fermented food. *Applied and environmental microbiology*, 77(7), 2264–2274. <https://doi.org/10.1128/AEM.02157-10>
- Justel, M. A., Outeiriño, E. B., dan Guerra, N. P. 2026. Production of kefir and kefir-like beverages: Fundamental aspects, advances, and future challenges. *Processes*, 14(1), 73. <https://doi.org/10.3390/pr14010073>
- Kakirde, K. S., Parsley, L. C., dan Liles, M. R. 2010. Size Does Matter: Application-driven approaches for soil metagenomics. *Soil biology & biochemistry*, 42(11), 1911–1923. <https://doi.org/10.1016/j.soilbio.2010.07.021>
- Kaminskas, A., Abaravičius, J. A., Liutkevičius, A., Jablonskienė, V., Valiūnienė, J., Bagdonaitė, L., Andrikonytė, J., Hendrixson, V., dan Sekmokienė, D. 2013. Quality of yoghurt enriched by inulin and its influence on human metabolic syndrome. *Veterinarija ir Zootechnika*, 64(86), 23–28.
- Kazou, M., Grafakou, A., Tsakalidou, E., dan Georgalaki, M. 2021. Zooming into the microbiota of home-made and industrial kefir produced in greece using classical microbiological and amplicon-based metagenomics analyses. *Frontiers in microbiology*, 12, 621069. <https://doi.org/10.3389/fmicb.2021.621069>
- Kesenkas, H., Dinkci, N., Seckin, K., Kinik, O., Gönc, S., Ergönül, P. G., dan Kavas, G. 2011. Physicochemical, microbiological and sensory characteristics of soymilk kefir. *African Journal of Microbiology Research*, 5, 3737–3746.
- Kesenkas, H., Gürsoy, O., Özbaş, H., 2017. Kefir. In: Frías, J., Martínez-Villaluenga, C., Peñas, E. (Eds.), *Fermented Foods in Health and Disease Prevention*. Elsevier Science Ltd. (Academic Press), Amsterdam, pp. 339–361.
- Kesenkas, H., Yerlikaya, O., dan Ozer, E. A. 2013. Functional Milk Beverage: Kefir. *Agro Food Industry Hi Tech*, 24, 53–55.
- Khalil, N. A., Eltahan, N. R., Elaktash, H. M., Aly, S., and Sarbini, S. R. 2021. Prospective evaluation of probiotic and prebiotic supplementation on diabetic health associated with gut microbiota. *Food Bioscience*, 42, 101149. <https://doi.org/10.1016/j.fbio.2021.101149>
- Kim, M., Song, Y. M., Yoon, K. J., Hong, Y., Park, J. H., Kim, Y. K., Kim, J., dan Sohn, C. I. 2025. Effects of DA-9701 (motilitone®) on gastric emptying, glycemic control, and oxidative stress in diabetic rats. *PloS one*, 20(6), e0316686. <https://doi.org/10.1371/journal.pone.0316686>
- Kim, D., Song, L., Breitwieser, F. P., dan Salzberg, S. L. 2016. Centrifuge: rapid and sensitive classification of metagenomic sequences. *Genome research*, 26(12), 1721–1729. <https://doi.org/10.1101/gr.210641.116>

- Kim, D. H., Jeong, D., Kim, H., Kang, I. B., Chon, J. W., Song, K. Y., dan Seo, K. H. 2016. Antimicrobial activity of kefir against various food pathogens and spoilage bacteria. *Korean journal for food science of animal resources*, 36(6), 787–790. <https://doi.org/10.5851/kosfa.2016.36.6.787>
- Kim, J., Chun, Y.-S., Yoon, N., Kim, B., Choi, K., Ku, S.-K., dan Lee, N. 2025. Effects of black cumin seed extract on pancreatic islet β -cell proliferation and hypoglycemic activity in streptozotocin-induced diabetic rats. *Antioxidants*, 14(2), Article 174. <https://doi.org/10.3390/antiox14020174>
- Kim, S., Kang, M.-G., Oh, S., Jang, K. B., dan Kim, Y. 2026. Genome-based characterization of flavor development via metabolic interactions between *Lentilactobacillus kefiri* and *Kluyveromyces marxianus* during milk kefir fermentation. *Journal of Dairy Science*. <https://doi.org/10.3168/jds.2026-28435>
- Koh, W. Y., Utra, U., Ahmad, R., Rather, I. A., dan Park, Y. H. 2018. Evaluation of probiotic potential and anti-hyperglycemic properties of a novel *Lactobacillus* strain isolated from water kefir grains. *Food science and biotechnology*, 27(5), 1369–1376. <https://doi.org/10.1007/s10068-018-0360-y>
- Kotova, I. B., Cherdyntseva, T. A., dan Netrusov, A. I. 2016. Russian kefir grains microbial composition and its changes during production process. *Advances in experimental medicine and biology*, 932, 93–121. https://doi.org/10.1007/5584_2016_2
- Kurniawan, K. U., Milanda, T., dan Kusuma, S. A. F. 2026. Kefir as a functional probiotic: Microbial composition and health effects. *Frontiers in Food Science and Technology*, 5, Article 1725280. <https://doi.org/10.3389/frfst.2025.1725280>
- La Torre, C., Caputo, P., Cione, E., dan Fazio, A. 2024. Comparing nutritional values and bioactivity of kefir from different types of animal milk. *Molecules*, 29(11), 2710. <https://doi.org/10.3390/molecules29112710>
- Laureys, D., Leroy, F., Hauffman, T., Raes, M., Aerts, M., Vandamme, P., dan De Vuyst, L. 2021. The type and concentration of inoculum and substrate as well as the presence of oxygen impact the water kefir fermentation process. *Frontiers in Microbiology*, 12, Article 628599. <https://doi.org/10.3389/fmicb.2021.628599>
- Lee, J. Y., Kim, H., Yang, T. H., Oh, S., Kim, G. J., Park, S., Lee, S., Mok, I. K., Kang, D. H., dan Kim, D. 2025. Enhancing the biochemical and functional properties of water kefir: Comparative effects of different water sources with emphasis on deep ocean water. *Journal of Functional Foods*, 132, 106965. <https://doi.org/10.1016/j.jff.2025.106965>

- de Oliveira Leite, A. M., Miguel, M. A., Peixoto, R. S., Rosado, A. S., Silva, J. T., dan Paschoalin, V. M. 2013. Microbiological, technological and therapeutic properties of kefir: a natural probiotic beverage. *Brazilian journal of microbiology : [publication of the Brazilian Society for Microbiology]*, 44(2), 341–349. <https://doi.org/10.1590/S1517-83822013000200001>
- Lemos Junior, W. J. F., Sant'Ana, A. S., Di Cagno, R., Campanaro, S., dan Gobbetti, M. 2025. Five years after the *Lactobacillus* reclassification: Genomic and functional insights into *Levilactobacillus*, *Lacticaseibacillus*, *Limosilactobacillus*, *Lactiplantibacillus*, and *Ligilactobacillus* in fermented foods. *Trends in Food Science & Technology*, 163, Article 105118. <https://doi.org/10.1016/j.tifs.2025.105118>
- Lennikov, A., ElZaridi, F., dan Yang, M. 2024. Modified streptozotocin-induced diabetic model in rodents. *Animal Models and Experimental Medicine*, 7(5), 777–780. <https://doi.org/10.1002/ame2.12497>
- Lenzen, S. 2008. The mechanisms of alloxan and streptozotocin induced diabetes. *Diabetologia*, 51, 216–226. <https://doi.org/10.1007/s00125-007-0886-7>
- Letizia, M., Diggle, S. P., dan Whiteley, M. 2025. *Pseudomonas aeruginosa*: ecology, evolution, pathogenesis and antimicrobial susceptibility. *Nature reviews. Microbiology*, 23(11), 701–717. <https://doi.org/10.1038/s41579-025-01193-8>
- Li, M., Wang, B., Zhang, M., Rantalainen, M., Wang, S., Zhou, H., ... Zhao, L. 2008. Symbiotic gut microbes modulate human metabolic phenotypes. *Proceedings of the National Academy of Sciences*, 105(6), 2117–2122. <https://doi.org/10.1073/pnas.0712038105>
- Li, X.T., dan Yun, M.Z. 2025. The impact of sulfonyleureas on diverse ion channels: An alternative explanation for the antidiabetic actions. *Frontiers in Cell and Developmental Biology*, 13, 1528369. <https://doi.org/10.3389/fcell.2025.1528369>
- Li, Y., Wei, Y., Zhang, F., dan Wu, X. 2012. Changes in the pharmacokinetics of glibenclamide in rats with streptozotocin-induced diabetes mellitus. *Acta Pharmaceutica Sinica B*, 2(2), 198–204. <https://doi.org/10.1016/j.apsb.2012.01.005>
- Liao, C.H., Yen, C.C., Chen, H.L., Liu, Y.H., Chen, Y.H., Lan, Y.W., Chen, K.R., Chen, W., dan Chen, C.M. 2023. Novel Kefir Exopolysaccharides (KEPS) Mitigate Lipopolysaccharide (LPS) Induced Systemic Inflammation in Luciferase Transgenic Mice through Inhibition of the NF- κ B Pathway. *Antioxidants*, 12(9), 1724. <https://doi.org/10.3390/antiox12091724>

- Lima, M. D. S. F., Souza, K. M. S., Albuquerque, W. W. C., Teixeira, J. A. C., Cavalcanti, M. T. H., dan Porto, A. L. F. 2017. *Saccharomyces cerevisiae* from Brazilian kefir-fermented milk: An in vitro evaluation of probiotic properties. *Microbial pathogenesis*, 110, 670–677. <https://doi.org/10.1016/j.micpath.2017.05.010>
- Lin, C., H. Chen dan J. Liu. 1999. Identification and characterization of lactic acid bacteria and yeast isolated from kefir grains in Taiwan. *Australian Journal of Dairy Technology*, 54: 14-18.
- Lin, X., Waring, K., Ghezzi, H., Tropini, C., Tyson, J., dan Ziels, R. M. 2024. High accuracy meets high throughput for near full-length 16S ribosomal RNA amplicon sequencing on the Nanopore platform. *PNAS Nexus*, 3(10), pgae411. <https://doi.org/10.1093/pnasnexus/page411>
- Lisjak, M., Špoljarević, M., Ravlić, J., Lončarić, Z., dan Galić, L. 2026. Phenolic compounds and antioxidant activity: Analytical methods and current knowledge—a review. *Methods and Protocols*, 9(2), Article 60. <https://doi.org/10.3390/mps9020060>
- Liu, J.R., Wang, S.Y., Chen, M.J., Yueh, P.Y. dan Lin, C.W. 2006, The anti-allergenic properties of milk kefir and soymilk kefir and their beneficial effects on the intestinal microflora. *J. Sci. Food Agric.*, 86: 2527-2533. <https://doi.org/10.1002/jsfa.2649>
- Liu, S., Zhai, M., Qu, J.H., Zhao, L.Z., Zhang, J.X., Ma, W.W., Zhao, S., Zhou, J., Huang, F., dan Zhang, B.Y. 2026. Isolation and characterization of a novel strain, *Paenibacillus lacisediminis* sp. nov., exhibiting both biomacromolecule degradation and plant growth-beneficial activities. *BMC Microbiology*, 26, 440. <https://doi.org/10.1186/s12866-026-04945-5>
- Liu, T., Sun, Z., Yang, Z., dan Qiao, X. 2023. Microbiota-derived short-chain fatty acids and modulation of host-derived peptides formation: Focused on host defense peptides. *Biomedicine & Pharmacotherapy*, 162, 114586. <https://doi.org/10.1016/j.biopha.2023.114586>
- Liu, W., Son, D. O., Lau, H. K., Zhou, Y., Prud'homme, G. J., Jin, T., dan Wang, Q. 2017. Combined oral administration of GABA and DPP-4 inhibitor prevents beta cell damage and promotes beta cell regeneration in mice. *Frontiers in Pharmacology*, 8, Article 362. <https://doi.org/10.3389/fphar.2017.00362>
- Liu, Y., Yu, L., Tian, F., Chen, W., dan Zhai, Q. 2023. Meta-analysis of microbiomes reveals metagenomic features of fermented vegetables. *Food research international* (Ottawa, Ont.), 173(Pt 1), 113248. <https://doi.org/10.1016/j.foodres.2023.113248>

- Liutkevicius, A., dan Sarkinas, A. 2004. Studies on the growth conditions and composition of kefir grains – as a food and forage biomass. *Veterinarija ir Zootechnika*, 25, 64–70.
- Londero, A., Hamet, M. F., De Antoni, G. L., Garrote, G. L., dan Abraham, A. G. 2012. Kefir grains as a starter for whey fermentation at different temperatures: chemical and microbiological characterisation. *The Journal of dairy research*, 79(3), 262–271. <https://doi.org/10.1017/S0022029912000179>
- Lopitz-Otsoa, F., Rementeria, A., Elguezabal, N., dan Garaizar, J. 2006. Kefir: a symbiotic yeasts-bacteria community with alleged healthy capabilities. *Revista iberoamericana de micologia*, 23(2), 67–74. [https://doi.org/10.1016/s1130-1406\(06\)70016-x](https://doi.org/10.1016/s1130-1406(06)70016-x)
- Luo, Q., Ding, N., Liu, Y., Zhang, H., Fang, Y., dan Yin, L. 2023. Metabolic engineering of microorganisms to produce pyruvate and derived compounds. *Molecules*, 28(3), 1418. <https://doi.org/10.3390/molecules28031418>
- Macori, G., dan Cotter, P. D. 2018. Novel insights into the microbiology of fermented dairy foods. *Current opinion in biotechnology*, 49, 172–178. <https://doi.org/10.1016/j.copbio.2017.09.002>
- Magalhães, K. T., de Melo Pereira, G. V., Campos, C. R., Dragone, G., dan Schwan, R. F. 2011. Brazilian kefir: structure, microbial communities and chemical composition. *Brazilian journal of microbiology : [publication of the Brazilian Society for Microbiology]*, 42(2), 693–702. <https://doi.org/10.1590/S1517-838220110002000034>
- Mani-López, E., Mejía-Garibay, B., Hernández-Figueroa, R. H., dan López-Malo, A. 2026. Phenyllactic acid from lactic acid bacteria: A natural antimicrobial for food biopreservation. *Fermentation*, 12(4), Article 184. <https://doi.org/10.3390/fermentation12040184>
- Mao, D. B., Shi, C. W., Wu, J. Y., dan Xu, C. P. 2014. Optimization of exopolysaccharide production in submerged culture of *Daedalea dickinsii* and its antioxidant activity. *Bioprocess and biosystems engineering*, 37(7), 1401–1409. <https://doi.org/10.1007/s00449-013-1111-3>
- Marquina, D., Santos, A., Corpas, I., Muñoz, J., Zazo, J., dan Peinado, J. M. 2002. Dietary influence of kefir on microbial activities in the mouse bowel. *Letters in applied microbiology*, 35(2), 136–140. <https://doi.org/10.1046/j.1472-765x.2002.01155.x>
- Marsh, A. J., O'Sullivan, O., Hill, C., Ross, R. P., dan Cotter, P. D. 2013. Sequencing-based analysis of the bacterial and fungal composition of kefir grains and milks from multiple sources. *PloS one*, 8(7), e69371. <https://doi.org/10.1371/journal.pone.0069371>

- McGovern, C. J., González-Orozco, B. D., dan Jiménez-Flores, R. 2024. Evaluation of kefir grain microbiota, grain viability, and bioactivity from fermenting dairy processing by-products. *Journal of dairy science*, 107(7), 4259–4276. <https://doi.org/10.3168/jds.2023-24364>
- Meadows, J. A., dan Wargo, M. J. 2015. Carnitine in bacterial physiology and metabolism. *Microbiology* (Reading, England), 161(6), 1161–1174. <https://doi.org/10.1099/mic.0.000080>
- Medrano, M., Pérez, P. F., dan Abraham, A. G. 2008. Kefiran antagonizes cytopathic effects of *Bacillus cereus* extracellular factors. *International journal of food microbiology*, 122(1-2), 1–7. <https://doi.org/10.1016/j.ijfoodmicro.2007.11.046>
- Medrano, M., Gangoiti, M. V., Simonelli, N., dan Abraham, A. G. 2020. Kefiran fermentation by human faecal microbiota: Organic acids production and in vitro biological activity. *Bioactive Carbohydrates and Dietary Fibre*, 24, 100229. <https://doi.org/10.1016/j.bcdf.2020.100229>
- Menezes, A. G. T., Melo, D. S., Ramos, C. L., Moreira, S. I., Alves, E., dan Schwan, R. F. 2020. Yeasts isolated from Brazilian fermented foods in the protection against infection by pathogenic food bacteria. *Microbial pathogenesis*, 140, 103969. <https://doi.org/10.1016/j.micpath.2020.103969>
- Milon, R. B., Hu, P., Zhang, X., Hu, X., dan Ren, L. 2024. Recent advances in the biosynthesis and industrial biotechnology of Gamma-amino butyric acid. *Bioresources and bioprocessing*, 11(1), 32. <https://doi.org/10.1186/s40643-024-00747-7>
- Mkadem, W., Indio, V., Belguith, K., Oussaief, O., Savini, F., Giacometti, F., El Hatmi, H., Serraino, A., De Cesare, A., dan Boudhrioua, N. 2023. Influence of fermentation container type on chemical and microbiological parameters of spontaneously fermented cow and goat milk. *Foods*, 12(9), 1836. <https://doi.org/10.3390/foods12091836>
- Moghimani, M., Onyeaka, H., Hashemi, M., dan Afshari, A. 2024. Evaluation of the probiotic, technological, safety attributes, and GABA-producing capacity of microorganisms isolated from Iranian milk kefir beverages. *Frontiers in microbiology*, 15, 1385301. <https://doi.org/10.3389/fmicb.2024.1385301>
- Motey, G. A., Johansen, P. G., Owusu-Kwarteng, J., Ofori, L. A., Obiri-Danso, K., Siegmundt, H., Larsen, N., dan Jespersen, L. 2020. Probiotic potential of *Saccharomyces cerevisiae* and *Kluyveromyces marxianus* isolated from West African spontaneously fermented cereal and milk products. *Yeast* (Chichester, England), 37(9-10), 403–412. <https://doi.org/10.1002/yea.3513>

- Motoshima, H., Fujioka, I., dan Uchida, K. 2025. Identification of dominant species common to kefir grains from 7 origins for kefir grain reconstruction. *Journal of dairy science*, 108(8), 8222–8236. <https://doi.org/10.3168/jds.2025-26399>
- Mukhopadhyaya, I., dan Louis, P. 2025. Gut microbiota-derived short-chain fatty acids and their role in human health and disease. *Nature Reviews Microbiology*, 23(10), 635–651. <https://doi.org/10.1038/s41579-025-01183-w>
- Muñoz-Bas, C., Muñoz-Tebar, N., Viuda-Martos, M., Lucas-González, R., Pérez-Álvarez, J. Á., dan Fernández-López, J. 2025. Quality properties of innovative goat milk kefir enriched with date paste (*Phoenix dactylifera* L.) and whey derived from goat cheese production. *Foods*, 14(10), 1655. <https://doi.org/10.3390/foods14101655>
- Nahdi, A. M. T. A., John, A., dan Raza, H. 2017. Elucidation of molecular mechanisms of streptozotocin-induced oxidative stress, apoptosis, and mitochondrial dysfunction in Rin-5F pancreatic β -cells. *Oxidative Medicine and Cellular Longevity*, 2017, 7054272. <https://doi.org/10.1155/2017/7054272>
- Nami, Y., Vaseghi Bakhshayesh, R., Mohammadzadeh Jalaly, H., Lotfi, H., Eslami, S., dan Hejazi, M. A. 2019. Probiotic Properties of *Enterococcus* Isolated From Artisanal Dairy Products. *Frontiers in microbiology*, 10, 300. <https://doi.org/10.3389/fmicb.2019.00300>
- Nejati, F., Junne, S., Kurreck, J., dan Neubauer, P. 2020. Quantification of Major Bacteria and Yeast Species in Kefir Consortia by Multiplex TaqMan qPCR. *Frontiers in microbiology*, 11, 1291. <https://doi.org/10.3389/fmicb.2020.01291>
- Nielsen, B., Gürakan, G. C., dan Unlü, G. 2014. Kefir: a multifaceted fermented dairy product. *Probiotics and antimicrobial proteins*, 6(3-4), 123–135. <https://doi.org/10.1007/s12602-014-9168-0>
- Nilsson, R. H., Anslan, S., Bahram, M., Wurzbacher, C., Baldrian, P., dan Tedersoo, L. 2019. Mycobiome diversity: high-throughput sequencing and identification of fungi. *Nature reviews. Microbiology*, 17(2), 95–109. <https://doi.org/10.1038/s41579-018-0116-y>
- Noğay, N. H. 2019. Kefir beverage and its effects on health. In A. M. Grumezescu & A. M. Holban (Eds.), *Milk-based beverages: Volume 9. The science of beverages* (pp. 273–296). *Woodhead Publishing*. <https://doi.org/10.1016/B978-0-12-815504-2.00008-6>
- Nurhasanah, Fu'adah, I.T, Satria, H dan Yuwono, S.D. 2020. Analisis eksopolisakarida dari bakteri asam laktat hasil fermentasi kefir kolostrum.

Analytical and Environmental Chemistry. Vol 5, No.1, 65-73. <https://doi.org/10.23960/aec.v5i1.2020.p65-73>

- Nurliyani, Sadewa, A. H., dan Sunarti. 2015a. Kefir properties prepared with goat milk and black rice extract and its influence on the improvement of pancreatic β -cells in diabetic rats. *Emirates Journal of Food and Agriculture*, 27(10), 727–735. <https://doi.org/10.9755/ejfa.2015-03-242>
- Nurliyani, Harmayani, E., dan Sunarti. 2015b. 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>
- Nuro, F. 2017. Metagenom: Penelusuran Makhluk Tak Kasat Mata dalam Tanah. *BioTrends Majalah Populer Bioteknologi*. 8(2): 7–14.
- Nygaard, A. B., Tunsjø, H. S., Meisal, R., dan Charnock, C. 2020. A preliminary study on the potential of Nanopore MinION and Illumina MiSeq 16S rRNA gene sequencing to characterize building-dust microbiomes. *Scientific reports*, 10(1), 3209. <https://doi.org/10.1038/s41598-020-59771-0>
- Ondov, B. D., Bergman, N. H., & Phillippy, A. M. 2011. Interactive metagenomic visualization in a web browser. *BMC Bioinformatics*, 12, Article 385. <https://doi.org/10.1186/1471-2105-12-385>
- Ostrom, A. M., Buck, A. E., Du, X., dan Wee, J. 2023. Evaluation of *Kluyveromyces* spp. for conversion of lactose in different types of whey from dairy processing waste into ethanol. *Frontiers in Microbiology*, 14, 1208284. <https://doi.org/10.3389/fmicb.2023.1208284>
- Otles, S., dan Cagindi, O. 2003. Kefir: A probiotic dairy-composition, nutritional and therapeutic aspects. *Pakistan Journal of Nutrition*, 2, 54–59. <https://doi.org/10.3923/pjn.2003.54.59>
- Ozer, B., 2015. Microbiology and biochemistry of yogurt and other fermented milk products. In: Özer, B., Akdemir-Evrendilek, G. (Eds.), *Dairy Microbiology and Biochemistry Recent Developments*. CRC Press, Boca Raton, pp. 167–213.
- Papadopoulou, D., Chrysikopoulou, V., Rampaouni, A., dan Tsoupras, A. 2024. Antioxidant and anti-inflammatory properties of water kefir microbiota and its bioactive metabolites for health promoting bio-functional products and applications. *AIMS Microbiology*, 10(4), 756–811. <https://doi.org/10.3934/microbiol.2024034>
- Pazra, D. F., Purwanti, M., Handayani, K. S., Wahyuningsih dan Wahyuwardani, S. 2023. Antidiabetic and hypolipidemic potential of cow's milk yogurt with the addition of herbal extracts in diabetic rats. *Tropical Animal*

Science Journal, 46(4), 494–501.
<https://doi.org/10.5398/tasj.2023.46.4.494>

Peluzio, M. D. C. G., Dias, M. M. E., Martinez, J. A., dan Milagro, F. I. 2021. Kefir and intestinal microbiota modulation: Implications in human health. *Frontiers in nutrition*, 8, 638740. <https://doi.org/10.3389/fnut.2021.638740>

Peres, A. P., Puerari, C., Bento, J. A. C., Martins, R. A. d. S., Domingues, Y. O., dan Morzelle, M. C. 2026. Optimization of kefir fermentation with plantain peel addition: Effects on composition, microbial viability, and sensory quality. *Frontiers in Nutrition*, 12, Article 1740355. <https://doi.org/10.3389/fnut.2025.1740355>

Perna, A., Simonetti, A., dan Gambacorta, E. 2018. Phenolic content and antioxidant activity of donkey milk kefir fortified with sulla honey and rosemary essential oil during refrigerated storage. *International Journal of Dairy Technology*, 72(1), 74–81. <https://doi.org/10.1111/1471-0307.12561>

Perpetuini, G., Rossetti, A. P., Rapagnetta, A., dan Tofalo, R. 2025. A functional approach to cheese production: Boosting gamma-aminobutyric acid content with *Kluyveromyces marxianus*. *LWT – Food Science and Technology*, 224, 117824. <https://doi.org/10.1016/j.lwt.2025.117824>

Perpetuini, G., Tittarelli, F., Battistelli, N., Suzzi, G., dan Tofalo, R. 2020. γ -Aminobutyric acid production by *Kluyveromyces marxianus* strains. *Journal of Applied Microbiology*, 129(6), 1609–1619. <https://doi.org/10.1111/jam.14736>

Pervez, M. T., Hasnain, M. J. U., Abbas, S. H., Moustafa, M. F., Aslam, N., dan Shah, S. S. M. 2022. A Comprehensive Review of Performance of Next-Generation Sequencing Platforms. *BioMed research international*, 2022, 3457806. <https://doi.org/10.1155/2022/3457806>

Phuah, P., Norton, M., Cheng, S., Roberts, A. G., Pirri, D., Meyer, L., Chung, P.-E., Dunsterville, C., Karwowski, R., Lam, B. Y. H., Otsubo, E., Aleksashina, S., Gribble, F. M., Reimann, F., Hanyaloglu, A. C., Yeo, G. S. H., Bewick, G. A., Jones, B., Owen, B., dan Murphy, K. G. 2026. The microbial tryptophan metabolite indole acts on the gastrointestinal tract to improve glucose homeostasis in a mouse model of diabetes by enhancing GLP-1 secretion and L cell differentiation. *Diabetologia*, 69, 1659–1674. <https://doi.org/10.1007/s00125-026-06688-4>

Powell, J.E., Witthuhn, R.C., Todorov, S.D., Dicks, L.M.T., 2007. Characterization of bacteriocin ST8KF produced by a kefir isolate *Lactobacillus plantarum* ST8KF. *Int. Dairy J.* 17, 190–198. <https://doi.org/10.1016/j.idairyj.2006.02.012>

- Prado, M. R., Blandón, L. M., Vandenberghe, L. P., Rodrigues, C., Castro, G. R., Thomaz-Soccol, V., dan Soccol, C. R. 2015. Milk kefir: composition, microbial cultures, biological activities, and related products. *Frontiers in microbiology*, 6, 1177. <https://doi.org/10.3389/fmicb.2015.01177>
- Pugliero, S., Lima, D. Y., Rodrigues, A. M., Bogsan, C. S. B., Rogero, M. M., Punaro, G. R., dan Higa, E. M. S. 2021. Kefir reduces nitrosative stress and upregulates Nrf2 in the kidney of diabetic rats. *International Dairy Journal*, 114, 104909. <https://doi.org/10.1016/j.idairyj.2020.104909>
- Purwati, E., S. N. Aritonang., S. Melia., I. Juliyarsi dan H. Purwanto. 2016. Manfaat probiotik bakteri asam laktat dadiah menunjang kesehatan masyarakat. Lembaga Literasi Dayak dan Universitas Andalas. Padang.
- Purwoko, D., Cartealy, I. C., Tajuddin, T., Dinarti, D., dan Sudarsono, S. 2018. Analisis Bioinformatika Berbasis Web Pada Sekuen Genom Parsial Sagu (*Metroxylon sagu* Rottb.). *Jurnal Bioteknologi & Biosains Indonesia (JBBI)*. 5(1): 98.
- Qiao, Y., Liu, G., Lv, X., Fan, X., Zhang, Y., Meng, L., Ai, M., dan Feng, Z. 2020. Metabolic pathway profiling in intracellular and extracellular environments of *Streptococcus thermophilus* during pH-controlled batch fermentations. *Frontiers in microbiology*, 10, 3144. <https://doi.org/10.3389/fmicb.2019.03144>
- Radiati, L. E., Umam Al Awaly, K., Jaya, F., Khoirul Umam, A., Supamri, Fardiaz, D., Retha Hapitasari, L., dan Laksamana Hati, D. 2026. Microbial profiling of goat milk kefir and kefir grains by dual-marker amplicon sequencing (16S rRNA and ITS). *International Journal of Food Properties*, 29(1), Article 2629685. <https://doi.org/10.1080/10942912.2026.2629685>
- Ramakrishna, R., Sarkar, D., Dogramaci, M., dan Shetty, K. 2021. Kefir culture-mediated fermentation to improve phenolic-linked antioxidant, anti-hyperglycemic and human gut health benefits in sprouted food barley. *Applied Microbiology*, 1(2), 377–407. <https://doi.org/10.3390/applmicrobiol1020026>
- Randazzo, W., Corona, O., Guarcello, R., Francesca, N., Germanà, M.A., Erten, H., Moschetti, G., Settanni, L., 2016. Development of non-dairy beverages from Mediterranean fruit juices fermented with water kefir microorganisms. *Food Microbiol.* 54, 40–51. <https://doi.org/10.1016/j.fm.2015.10.018>
- Rayyan, A. A., dan Kyndt, J. A. 2023. Genome sequences of *Rhodoplanes serenus* and two thermotolerant strains, *Rhodoplanes tepidamans* and “*Rhodoplanes cryptolactis*,” further refine the genus. *Microbiology Resource Announcements*, 12(7), e0009923. <https://doi.org/10.1128/mra.00099-23>

- Ren, F., Ji, N., dan Zhu, Y. 2023. Research progress of α -glucosidase inhibitors produced by microorganisms and their applications. *Foods*, 12(18), 3344. <https://doi.org/10.3390/foods12183344>
- Riachi, R., Khalife, E., Kędzia, A., dan Niechciał, E. 2025. Understanding Insulin Actions Beyond Glycemic Control: A Narrative Review. *Journal of Clinical Medicine*, 14(14), 5039. <https://doi.org/10.3390/jcm14145039>
- Ridwan E. 2013. Etika hewan percobaan dalam penelitian kesehatan. *J Indon Med Assoc* 63(3):112-116.
- Rinanda, T. 2011. Analisis Sekuensing 16S rRNA di Bidang Mikrobiologi. *Jurnal Kedokteran Syiah Kuala*. 11(3): 172–177.
- Rogalska, M., Kmita, K., Gryciuk, A., Kaczmarek, A., Wrońska, A. K., dan Mierzejewska, J. 2025. New generation probiotics: Combining probiotic and biotechnological potential of *Kluyveromyces marxianus*. *Applied Microbiology and Biotechnology*, 109(1), 245. <https://doi.org/10.1007/s00253-025-13628-6>
- Rosa, D. D., Dias, M. M. S., Grześkowiak, Ł. M., Reis, S. A., Conceição, L. L., dan 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>
- Rosli, N. S. A., Abd Gani, S., Khayat, M. E., Zaidan, U. H., Ismail, A., dan Abdul Rahim, M. B. H. 2023. Short-chain fatty acids: possible regulators of insulin secretion. *Molecular and cellular biochemistry*, 478(3), 517–530. <https://doi.org/10.1007/s11010-022-04528-8>
- Ruiz-Ramírez, S., dan Jiménez-Flores, R. 2023. Invited review: Properties of β -galactosidases derived from *Lactobacillaceae* species and their capacity for galacto-oligosaccharide production. *Journal of dairy science*, 106(12), 8193–8206. <https://doi.org/10.3168/jds.2023-23392>
- Rutkowska, J., Antoniewska-Krzeska, A., Żbikowska, A., Cazón, P., dan Vázquez, M. 2022. Volatile composition and sensory profile of lactose-free kefir, and its acceptability by elderly consumers. *Molecules* (Basel, Switzerland), 27(17), 5386. <https://doi.org/10.3390/molecules27175386>
- Saati-Santamaría, Z., Baroncelli, R., Rivas, R., dan García-Fraile, P. 2022. Comparative genomics of the genus *Pseudomonas* reveals host- and environment-specific evolution. *Microbiology Spectrum*, 10(e02370-22). <https://doi.org/10.1128/spectrum.02370-22>
- Salari, A., Ghodrat, S., Gheflati, A., Jarahi, L., Hashemi, M., dan Afshari, A. 2021. Effect of kefir beverage consumption on glycemic control: A systematic review and meta-analysis of randomized controlled clinical trials. *Complementary Therapies in Clinical Practice*, 44, Article 101443. <https://doi.org/10.1016/j.ctcp.2021.101443>

- Samiksha, F., San Valentin, E. M. D., Li, G., Blazer, M., McCormick, T. S., dan Ghannoum, M. 2025. A narrative review on the functional applications, safety, and probiotic characteristics of *Pichia*. *Nutrients*, 17(22), 3594. <https://doi.org/10.3390/nu17223594>
- Santos, A., San Mauro, M., Sanchez, A., Torres, J. M., dan Marquina, D. 2003. The antimicrobial properties of different strains of *Lactobacillus* spp. isolated from kefir. *Systematic and applied microbiology*, 26(3), 434–437. <https://doi.org/10.1078/072320203322497464>
- Sarkar, S. 2007. Potential of kefir as a dietetic beverage – a review. *British Food Journal*, Vol. 109 No. 4 pp. 280–290, <https://doi.org/10.1108/00070700710736534>
- Sarkar, S. 2008. Biotechnological innovations in kefir production: a review. *British Food Journal*, Vol. 110 No. 3 pp. 283–295, <https://doi.org/10.1108/00070700810858691>
- Sarmad, S., Viant, M. R., Dunn, W. B., Goodacre, R., Wilson, I. D., Chappell, K. E., Griffin, J. L., O'Donnell, V. B., Naicker, B., Lewis, M. R., Suzuki, T., dan UK Consortium on Metabolic Phenotyping (MAP/UK). 2023. A proposed framework to evaluate the quality and reliability of targeted metabolomics assays from the UK Consortium on Metabolic Phenotyping (MAP/UK). *Nature Protocols*, 18(4), 1017–1027. <https://doi.org/10.1038/s41596-022-00801-8>
- Satir, G., dan Güzel-Seydim, Z. B. 2015. Influence of kefir fermentation on the bioactive substances of different breed goat milks. *LWT – Food Science and Technology*, 63(2), 852–858. <https://doi.org/10.1016/j.lwt.2015.04.057>
- Shavit, E., 2008. Renewed interest in kefir, the ancient elixir of longevity. *Fungi* 1, 14–18.
- Shen, Y., Kim, D.H., Chon, J.W., Kim, H., Song, K.Y., dan Seo, K.H. 2018. Nutritional effects and antimicrobial activity of kefir (grains). *Journal of Dairy Science and Biotechnology*, 36(1), 1–13. <https://doi.org/10.22424/jmsb.2018.36.1.1>
- Silva Alexandre, M. A. da, Santana, T. N. de, Pena, L. A., Duarte, A. M., Santos, L. C. dos, Alves, S. J. F., Dias, R. M., Oliveira, A. V. de A., Machado, S. G., dan Eller, M. R. 2025. A comprehensive review on the prevalence and issues caused by *Pseudomonas* spp. in food. *Food Control*, 177, 111428. <https://doi.org/10.1016/j.foodcont.2025.111428>
- Silva, K. R., Rodrigues, S. A., Filho, L. X., dan Lima, A. S. 2009. Antimicrobial activity of broth fermented with kefir grains. *Applied biochemistry and biotechnology*, 152(2), 316–325. <https://doi.org/10.1007/s12010-008-8303-3>

- Sindi, A., Badsha, M. B., dan Ünlü, G. 2020. Bacterial Populations in International Artisanal Kefirs. *Microorganisms*, 8(9), 1318. <https://doi.org/10.3390/microorganisms8091318>
- Ströher, J. A., Oliveira, W. d. C., Freitas, A. S. d., Salazar, M. M., Flôres, S. H., dan Malheiros, P. d. S. 2025. Microbial Dynamics and Volatile Compound Profiles in Artisanal Kefir During Storage. *Fermentation*, 11(2), 105. <https://doi.org/10.3390/fermentation11020105>
- Sudarmadji, S., Haryono, B., dan Suhardi. 2003. Analisa Bahan Makanan dan Pertanian. Liberty.Yogyakarta.
- Sun, Y., Guo, S., Wu, T., Zhang, J., Kwok, L. Y., Sun, Z., Zhang, H., dan Wang, J. 2023. Untargeted mass spectrometry-based metabolomics approach unveils biochemical changes in compound probiotic fermented milk during fermentation. *NPJ science of food*, 7(1), 21. <https://doi.org/10.1038/s41538-023-00197-z>
- Susanti S., Nurwantoro N., Elto J. J., Nugroho T., Suryani A. E., Rizqianti H. 2022. Preclinical study of goat milk kefir as an antihyperglycemic functional food. *Functional Foods in Health and Disease*; 12(12): 705-712. DOI: <https://www.doi.org/10.31989/ffhd.v12i12.987>
- Tasma, I. M. 2015. Pemanfaatan teknologi sekuensing genom untuk mempercepat program pemuliaan tanaman. *Jurnal penelitian dan pengembangan pertanian*. 34(4): 159.
- Thomas, T., Gilbert, J., dan Meyer, F. 2012. Metagenomics - a guide from sampling to data analysis. *Microbial informatics and experimentation*, 2(1), 3. <https://doi.org/10.1186/2042-5783-2-3>
- Tingirikari, J. M. R., Sharma, A., da Lee, H.J. 2024. Kefir: A fermented plethora of symbiotic microbiome and health. *Journal of Ethnic Foods*, 11, Article 35. <https://doi.org/10.1186/s42779-024-00252-4>
- Turkmen, N. 2017. Kefir as a Functional Dairy Product. Chapter book. Dairy in Human Health and Disease Across the Lifespan. *Elsevier Inc. All rights reserved*. <https://doi.org/10.1016/B978-0-12-809868-4.00029-7>
- Ullah, M., Rizwan, M., Raza, A., Xia, Y., Han, J., Ma, Y., dan Chen, H. 2023. Snapshot of the Probiotic Potential of *Kluveromyces marxianus* DMKU-1042 Using a Comparative Probiogenomics Approach. *Foods*, 12(23), 4329. <https://doi.org/10.3390/foods12234329>
- Ulusoy, B., Colak, H dan Hampikyan, H. 2007. An in vitro study on the antibacterial effect of kefir against some foodborne pathogens. *Turkish Society of Clinical Microbiology and Infectious Diseases*. Vol. 37: 103–107.

- Üstün-Aytekin, Ö., Şeker, A., dan Arısoy, S. 2020. The effect of *in vitro* gastrointestinal simulation on bioactivities of kefir. *International Journal of Food Science and Technology*, 55(1), 283–292. <https://doi.org/10.1111/ijfs.14274>
- Üstün-Aytekin, Ö., Şeker, A., dan Arısoy, S. 2020. The effect of *in vitro* gastrointestinal simulation on bioactivities of kefir. *International Journal of Food Science & Technology*, 55(1), 283–292. <https://doi.org/10.1111/ijfs.14274>
- Van Hijum, S. A., Vaughan, E. E., dan Vogel, R. F. 2013. Application of state-of-art sequencing technologies to indigenous food fermentations. *Current Opinion in Biotechnology*, 24(2), 178–186. <https://doi.org/10.1016/j.copbio.2012.08.004>
- Van Wyk, J. 2019. Kefir: The Champagne of Fermented Beverages. Elsevier Inc. Amsterdam, The Netherlands. ISBN 9780128152713. <https://doi.org/10.1016/B978-0-12-815271-3.00012-9>
- Van Wyk, J., Witthuhn, R.C., Britz, T.J., 2011. Optimisation of vitamin B12 and folate production by *Propionibacterium freudenreichii* strains in kefir. *Int. Dairy J.* 21, 69–74. Vandenplas, Y., Huys, G., Daubec, G., 2015. Probiotics: an update. *J. Pediatr.* 91, 6–21. <https://doi.org/10.1016/j.idairyj.2010.09.004>
- Vedamuthu, E.R., 2013. Other fermented and culture-containing milks. second ed. John Wiley & Sons, Inc, Chapel Hill, NC, pp. 393–410. <https://doi.org/10.1002/9781118481301.ch19>
- Vičić, V., Pandel Mikuš, R., dan Ferjančič, B. 2024. Review of history and mechanisms of action of lactulose (4-O-β-D-galactopyranosyl-β-D-fructofuranose): Present and future applications in food. *Journal of Food Science and Technology*, 61, 2036–2045. <https://doi.org/10.1007/s13197-024-05997-z>
- Vieira, C. P., Álvares, T. S., Gomes, L. S., Torres, A. G., Paschoalin, V. M., dan Conte-Junior, C. A. 2015. Kefir Grains Change Fatty Acid Profile of Milk during Fermentation and Storage. *PloS one*, 10(10), e0139910. <https://doi.org/10.1371/journal.pone.0139910>
- Vieira, C. P., Rosario, A. I. L. S., Lelis, C. A., Rekowsky, B. S. S., Carvalho, A. P. A., Rosário, D. K. A., Elias, T. A., Costa, M. P., Foguel, D., dan Conte-Junior, C. A. 2021. Bioactive compounds from kefir and their potential benefits on health: A systematic review and meta-analysis. *Oxidative Medicine and Cellular Longevity*, 2021, Article 9081738. <https://doi.org/10.1155/2021/9081738>
- Vinderola, G., Perdígón, G., Duarte, J., Farnworth, E., dan Matar, C. 2006. Effects of the oral administration of the exopolysaccharide produced by

- Lactobacillus kefiranofaciens* on the gut mucosal immunity. *Cytokine*, 36(5-6), 254–260. <https://doi.org/10.1016/j.cyto.2007.01.003>
- Walsh, L. H., Coakley, M., Walsh, A. M., Crispie, F., O'Toole, P. W., dan Cotter, P. D. 2023. Analysis of the milk kefir pan-metagenome reveals four community types, core species, and associated metabolic pathways. *iScience*, 26(10), 108004. <https://doi.org/10.1016/j.isci.2023.108004>
- Wang, H., dan Guo, M. 2023. Microbiological profiles, physiochemical properties and volatile compounds of goat milk kefir fermented by reconstituted kefir grains. *LWT – Food Science and Technology*, 183, Article 114943. <https://doi.org/10.1016/j.lwt.2023.114943>
- Wang, H., Zhou, X., Sun, Y., Sun, X., dan 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, S.Y., Chih, D.R., Chen, Y.P., Shiu, J.S., dan Chen, M.J. 2026. Milk composition shapes structural and microbial dynamics of kefir grain formation: Linking microbiota, metabolites, and grain architecture. *Journal of Dairy Science*, 109(1), 149–164. <https://doi.org/10.3168/jds.2025-26986>
- Wang, X., Li, W., Xu, M., Tian, J., dan Li, W. 2022. The Microbial Diversity and Biofilm-Forming Characteristic of Two Traditional Tibetan Kefir Grains. *Foods*, 11(1), 12. <https://doi.org/10.3390/foods11010012>
- Wang, Y., Xiao, R., Liu, S., Wang, P., Zhu, Y., Niu, T., dan Chen, H. 2024. The impact of thermal treatment intensity on proteins, fatty acids, macro/micro-nutrients, flavor, and heating markers of milk—A comprehensive review. *International Journal of Molecular Sciences*, 25(16), 8670. <https://doi.org/10.3390/ijms25168670>
- Warakaulle, S., Ayyash, M. M., dan Kamal-Eldin, A. 2025. Profiling protein hydrolysis and amino acid metabolism in camel and bovine milk fermented by *Lactobacillus helveticus*, *L. bulgaricus*, and *Streptococcus thermophilus*. *Scientific Reports*, 15, Article 18371. <https://doi.org/10.1038/s41598-025-02944-6>
- Wei, G., Wang, D., Wang, T., Wang, G., Chai, Y., Li, Y., Mei, M., Wang, H., dan Huang, A. 2025. Probiotic potential and safety properties of *Limosilactobacillus fermentum* A51 with high exopolysaccharide production. *Frontiers in Microbiology*, 16, 1498352. <https://doi.org/10.3389/fmicb.2025.1498352>
- Wen, B., Mei, Z., Zeng, C., dan Liu, S. 2017. metaX: a flexible and comprehensive software for processing metabolomics data. *BMC bioinformatics*, 18(1), 183. <https://doi.org/10.1186/s12859-017-1579-y>

- Wick, R. R., Judd, L. M., dan Holt, K. E. 2019. Performance of neural network basecalling tools for Oxford Nanopore sequencing. *Genome biology*, 20(1), 129. <https://doi.org/10.1186/s13059-019-1727-y>
- Witthuhn, R.C., Schoeman, T. and Britz, T.J. 2004. Isolation and characterization of the microbial population of different South African kefir grains. *International Journal of Dairy Technology*, 57: 33-37. <https://doi.org/10.1111/j.1471-0307.2004.00126.x>
- Wszolek, M., Kupiec-Teahan, B., Skov Guldager, H. dan Tamime, A.Y. 2006. Production of Kefir, Koumiss and other Related Products. In *Fermented Milks*, A. Tamime (Ed.). <https://doi.org/10.1002/9780470995501.ch8>
- Wszolek, M., Tamime, A. Y., Muir, D. D., dan Barclay, M. N. I. 2001. Properties of kefir made in Scotland and Poland using bovine, caprine and ovine milk with different starter cultures. *LWT – Food Science and Technology*, 34, 251–261. <https://doi.org/10.1006/fstl.2001.0773>
- Xie, X., Lv, B., Gu, Y., Nian, X., dan Yang, X. 2025. Research progress of α -glucosidase inhibitors from fermented food. *Journal of Functional Foods*, 135, 107076. <https://doi.org/10.1016/j.jff.2025.107076>
- Yılmaz, C., dan Gökmen, V. 2018. Determination of tryptophan derivatives in kynurenine pathway in fermented foods using liquid chromatography tandem mass spectrometry. *Food chemistry*, 243, 420–427. <https://doi.org/10.1016/j.foodchem.2017.10.004>
- Yadav H, Jain S, Sinha PR. 2007. Production of free fatty acids and conjugated linoleic acid in probiotic dahi containing *Lactobacillus acidophilus* and *Lactobacillus casei* during fermentation and storage. *Int Dairy J.* 17(8): 1006–1010. <https://doi.org/10.1016/j.idairyj.2006.12.003>
- Yadav, M. K., Song, J. H., Vasquez, R., Lee, J. S., Kim, I. H., dan Kang, D.-K. 2024. Methods for detection, extraction, purification, and characterization of exopolysaccharides of lactic acid bacteria—A systematic review. *Foods*, 13(22), 3687. <https://doi.org/10.3390/foods13223687>
- Yang, H., He, Y., Liao, J., Li, X., Zhang, J., Liebl, W., dan Chen, F. 2022. RNA-Seq transcriptomic analysis reveals gene expression profiles of acetic acid bacteria under high-acidity submerged industrial fermentation process. *Frontiers in Microbiology*, 13, 956729. <https://doi.org/10.3389/fmicb.2022.956729>
- Yen, C., Tsai, C., Chang, G. R., Ko, C., Tu, M., Lan, Y., Chen, H., dan Chen, C. 2025. Kefir-derived exopolysaccharide ameliorates hyperglycemic control and beta cell integrity in a rat model of type 2 diabetes mellitus. *Nutrition & Diabetes*, 15(1), 36. <https://doi.org/10.1038/s41387-025-00388-5>

- Yenrina, R. 2015. Metode Analisis Bahan Pangan dan Komponen Bioaktif. *Andalas University Press*. Padang.
- Yergaliyev, T., Rios-Galicia, B., dan Camarinha-Silva, A. 2026. NaMeco - Nanopore full-length 16S rRNA gene reads clustering and annotation. *BMC Genomics*, 27, Article 62. <https://doi.org/10.1186/s12864-025-12415-x>
- Youn, H. Y., Kim, D. H., Kim, H. J., Bae, D., Song, K. Y., Kim, H., dan Seo, K. H. 2022. Survivability of *Kluyveromyces marxianus* Isolated From Korean Kefir in a Simulated Gastrointestinal Environment. *Frontiers in microbiology*, 13, 842097. <https://doi.org/10.3389/fmicb.2022.842097>
- Yuan, B., Liu, X., Li, J., Gao, R., Zhao, X., Kwok, L.Y., dan Bao, Q. 2025. Evaluation of *Lentilactobacillus kefir* NM119–2 as a novel probiotic in fermented milk: functional properties and metabolic impact. *Food Research International*, 221, 117314. <https://doi.org/10.1016/j.foodres.2025.117314>
- Yuksekdag, Z. N., Beyatli, Y., dan Aslim, B. 2004a. Determination of some characteristics coccoid forms of lactic acid bacteria isolated from Turkish kefir with natural probiotic. *LWT – Food Science and Technology*, 37, 663–667. <https://doi.org/10.1016/j.lwt.2004.02.004>
- Yüksekdağ, Z. N., Beyath, Y., dan Aslim, B. 2004b. Metabolic activities of *Lactobacillus* spp. strains isolated from kefir. *Die Nahrung*, 48(3), 218–220. <https://doi.org/10.1002/food.200300414>
- Yusuf, D., Nuraida, L., Dewanti-Hariyadi, R., dan Hunaefi, D. 2021. In vitro antioxidant and α -glucosidase inhibitory activities of *Lactobacillus* spp. isolated from Indonesian kefir grains. *Applied Food Biotechnology*, 8(1), 39–46. <https://doi.org/10.22037/afb.v8i1.30367>
- Zhang, D., Jian, Y. P., Zhang, Y. N., Li, Y., Gu, L. T., Sun, H. H., Liu, M. D., Zhou, H. L., Wang, Y. S., dan Xu, Z. X. 2023. Short-chain fatty acids in diseases. *Cell communication and signaling : CCS*, 21(1), 212. <https://doi.org/10.1186/s12964-023-01219-9>
- Zhang, T., Chang, M., Zhou, Y., Wang, M., Yan, M., Hou, X., Liu, R., Yuan, Y., dan Yue, T. 2024. Dynamic alterations of flavor, functional nutrients, and microbial community during fermentation of different animal milk kefir. *Food research international* (Ottawa, Ont.), 186, 114305. <https://doi.org/10.1016/j.foodres.2024.114305>
- Zhang, T., Li, H., Ma, S., Cao, J., Liao, H., Huang, Q., dan Chen, W. 2023. The newest Oxford Nanopore R10.4.1 full-length 16S rRNA sequencing enables the accurate resolution of species-level microbial community profiling. *Applied and Environmental Microbiology*, 89(10), e00605-23. <https://doi.org/10.1128/aem.00605-23>

- Zheng, J., Wittouck, S., Salvetti, E., Franz, C. M. A. P., Harris, H. M. B., Mattarelli, P., O'Toole, P. W., Pot, B., Vandamme, P., Walter, J., Watanabe, K., Wuyts, S., Felis, G. E., Gänzle, M. G., dan Lebeer, S. 2020. A taxonomic note on the genus *Lactobacillus*: Description of 23 novel genera, emended description of the genus *Lactobacillus* Beijerinck 1901, and union of *Lactobacillaceae* and *Leuconostocaceae*. *International journal of systematic and evolutionary microbiology*, 70(4), 2782–2858. <https://doi.org/10.1099/ijsem.0.004107>
- Zhong, H., Wang, L., Jia, F., Yan, Y., Xiong, F., Hidayat, K., dan Li, Y. 2024. Effect of probiotic fermented milk supplementation on glucose and lipid metabolism parameters and inflammatory markers in patients with type 2 diabetes mellitus: A meta-analysis of randomized controlled trials. *Biology*, 13(8), 641. <https://doi.org/10.3390/biology13080641>
- Zhou, J., Liu, X., Jiang, H., dan Dong, M. 2009. Analysis of the microflora in Tibetan kefir grains using denaturing gradient gel electrophoresis. *Food microbiology*, 26(8), 770–775. <https://doi.org/10.1016/j.fm.2009.04.009>
- Zhou, Y., Shi, L., Wang, J., Yuan, J., Liu, J., Liu, L., Da, R., Cheng, Y., dan Han, B. 2021. Probiotic potential analysis and safety evaluation of *Enterococcus durans* A8-1 isolated from a healthy chinese infant. *Frontiers in microbiology*, 12, 799173. <https://doi.org/10.3389/fmicb.2021.799173>
- Zhu, L., Sha, L., Li, K., Wang, Z., Wang, T., Li, Y., Liu, P., Dong, X., Dong, Y., Zhang, X., dan Wang, H. 2020. Dietary flaxseed oil rich in omega-3 suppresses severity of type 2 diabetes mellitus via anti-inflammation and modulating gut microbiota in rats. *Lipids in health and disease*, 19(1), 20. <https://doi.org/10.1186/s12944-019-1167-4>
- Zubillaga, M., Weill, R., Postaire, E., Goldman, C.G., Caro, R.A., dan Boccio, J.R. 2001. Effect of probiotics and functional foods and their use in different diseases. *Nutrition Research*, 21, 569-579. [https://doi.org/10.1016/S0271-5317\(01\)00281-0](https://doi.org/10.1016/S0271-5317(01)00281-0)