

DAFTAR PUSTAKA

- Ahmad, I., S. Effendi, M. Kathryn, dan W. Cale. 2023. Analysis of crude fiber and crude protein fermented corn cob for animal feed. *Sciencetechno: Journal of Science and Technology*. 2(2): 97-107.
- Ahmed, S. R., S. H. Hoseinifar, H. V. Doan, W. Rossi, S. Davies, A. M. A. Goda, dan E. El-Haroun. 2025. Implication of fermented plant protein ingredients: a critical review of nutrition, physiology and growth: related aspects. *Annals of Animal Science*.
- Akbar, S. A., D. S. Putri, dan H. Harissatria. 2022. Pengaruh penggunaan EM4 terhadap fermentasi ampas serai wangi terhadap kandungan bahan kering, kadar abu dan bahan organik. *Jurnal Peternakan Mahaputra*. 3(1): 23-31.
- Amrullah, D. T., Widodo, N., Khasanah, H., dan Jadmiko, M. W. 2024. Analisis Performa Produksi Ayam Broiler Strain Cobb 500 dan Cobb 700 Pada Fase *Starter* di Kandang Closed House PT DMC Malang. *Jurnal Peternakan Lingkungan Tropis*, 7(2), 7-13.
- Ardiansyah, R. 2018. Pengaruh Level Penggunaan EM4 pada Fermentasi Campuran Darah dan Dedak Padi. Skripsi. Universitas Mataram.
- Arif, S., H. N. M'Barek, B. Bekaert, M. B. Aziz, M. Diouri, G. Haesaert, H. Hajjaj. 2024. Lignocellulolytic enzymes production by four wild filamentous fungi for olive stones valorization: comparing three fermentation regimens. *Journal of Microbiology and Biotechnology*. 34(5): 1017-1028.
- Aziz, M., A. Sulaeman, dan P. D. Ruhayat. 2022. Pengaruh dosis EM4 pada dedak padi fermentasi. *Jurnal Ilmu Peternakan*. 7(1): 29-37.
- Babatunde, O. O., C. S. Park, dan O. Adeola. 2021. Nutritional potentials of atypical feed ingredients for broiler chickens and pigs. *Animals*. 11(5): 1196.
- Belous, A. A., Semyagin, A. A., Kostyunina, O. V., Brem, G., dan Zinovieva, N. A. 2019. Study of genetic architecture of feed conversion rate in Duroc young boars (*Sus scrofa*) based on the genome-wide SNP analysis. *Sel'skokhozyaistvennaya Biologiya (Agricultural Biology)*, 54(4), 705–712.
- Betchem, G., Monto, A. R., Lu, F., Billong, L. F., & Ma, H. 2024. Prospects and application of solid-state fermentation in animal feed production – a review. *Annals of Animal Science*, 24(4), 1123–1137.
- Bidura, I. G. N. G. 2012. Pengaruh fermentasi terhadap kandungan nutrisi dan pencernaan dedak padi pada ternak. *Jurnal Peternakan Tropis*. 37(2): 45-55.
- Canibe, N., dan B. B. Jensen. 2012. Fermented liquid feed for pigs:

- microbial and nutritional aspects and impact on the gastrointestinal health. *Animal Feed Science and Technology*. 173(1-2): 17-40.
- Chantziaras, I., Van Meensel, J., Hoschet, I., Leen, F., Messely, L., Maes, D., dan Millet, S. 2020. *Carcass Gain per kg Feed Intake: Developing a stakeholder-driven benchmark for comparing grow-finishing pig performance*. *Animal*, 14(12), 2609–2618.
- Chen, L., L. Gao, H. Zhang, dan Y. Liu. 2020. Effects of fermented feed on growth performance and gut health in pigs: A review. *Journal of Animal Science and Biotechnology*. 11(1): 1-12.
- Costa, H. H. A., P. de T. V. Filho, M. de O. M. Parente, E. de O. S. Saliba, A. P. Souza, A. C. Costa, F. N. de S. Santos, dan A. V. Landim. 2022. Nutritional effects and feeding behavior in ewes fed with biscuit bran and cashew nut bran, with different energy levels. *Tropical Animal Health and Production*. 54(6): 374.
- Dalla Bona, M., Schiavon, S., Carraro, L., dan Gallo, L. 2016. Growth performance, carcass traits and meat quality of growing pigs on different feeding regimes slaughtered at 145 kg BW. *Italian Journal of Animal Science*, 15(3), 419–427.
- Dalle, N. S., H. D. Tukan, W. G. Utama, H. Y. Sikone, A. A. Jeramat, M. A. A. Karlina, dan P. C. Achmadi. 2025. Pelatihan pembuatan pellet ternak babi fase *grower* bersama mahasiswa peternakan. *Jurnal Masyarakat Mandiri*. 9(1): 935-945.
- Datta, F. U., N. D. F. K. Foeh, A. I. R. Detha, G. A. Mandala, C. D. R. I. Bero, L. R. W. Toha, dan N. A. Ndaong. 2024. Manajemen pemeliharaan ternak babi pada peternakan babi Tolu Wei Sumba Timur. *Media Tropika: Jurnal Pengabdian Masyarakat*. 4(2): 1-11.
- Dewi, Y. L., A. Ismail, M. Akramullah, G. Bouk, Y. Kamlasi, M. K. Sinabang, dan D. C. D. Soares. 2022. Effect of corn waste fermentation as livestock feed on fiber fraction content. *International Journal of Environment, Agriculture and Biotechnology*. 7(6): 108-112.
- Du Toit, S. C., Rossouw, D., Du Toit, M., & Bauer, F. F. (2020). Enforced mutualism leads to improved cooperative behavior between *Saccharomyces cerevisiae* and *Lactobacillus plantarum*. *Microorganisms*, 8(8), 1109.
- Gusnadi, M. I. 2023. Pengaruh penambahan effective microorganism 4 (EM4) terhadap kualitas kompos dari bahan feses sapi, ampas tebu dan kulit kopi. Skripsi. Fakultas Peternakan, Universitas Jambi.
- Halid SA, Mustaring M. 2019. Kajian Bahan Pakan Alternatif (Substitusi) Ruminansia Kecil Sebagai Pakan Komplek. *Bomba: Jurnal Pembangunan Daerah*, 1(1):29–35.
- Hendraningsih, R. 2005. Pengaruh fermentasi terhadap kandungan nutrisi

- bahan pakan. *Jurnal Ilmu Ternak dan Veteriner*. 10(3): 134-142.
- Hilbrands, A. M., L. J. Johnston, R. B. Cox, F. Forcella, R. Gesch, dan Y. Z. Li. 2021. Effects of increasing dietary inclusion of camelina cake on growth performance of growing-finishing pigs. *Translational Animal Science*. 5(3): 140.
- Horodyska, J., Hamill, R. M., Varley, P. F., Reyer, H., dan Wimmers, K. 2017. Genome-wide association analysis and functional annotation of positional candidate genes for feed conversion efficiency and growth rate in pigs. *PLoS ONE*, 12(6), e0173482.
- Huang, B., H. Shi, L. Wang, L. Wang, Z. Lyu, Q. Hu, J. Zang, D. Li, dan C. Lai. 2021. Effects of defatted rice bran inclusion level on nutrient digestibility and growth performance of different body weight pigs. *Animals*. 11(5): 1374.
- Jin, S., Wijerathne, C. U. B., Au-Yeung, K. K. W., Lei, H., Yang, C., & Karmin, O. 2022. Effects of high- and low-fiber diets on intestinal oxidative stress in growing-finishing pigs. *Journal of Animal Science*, 100(11), 1–10.
- Kementerian Pertanian Republik Indonesia. 2023. *Statistik Peternakan dan Kesehatan Hewan 2023 Vol. 2*. Direktorat Jenderal Peternakan dan Kesehatan Hewan.
- Kil, D. Y., B. G. Kim, dan H. H. Stein. 2013. Feed energy evaluation for growing pigs. *Asian-Australasian Journal of Animal Sciences*. 26(9): 1205-1217.
- Kilimpares, S., D. Suryani, dan B. Purwanto. 2021. Efektivitas fermentasi pakan terhadap pencernaan dan performa ternak. *Jurnal Teknologi Peternakan Indonesia*. 9(4): 25-34.
- Lee, C. H., Yun, W., Lee, J. H., Kwak, W. G., Oh, H. J., An, J. S., Liu, S. D., dan Cho, J. H. 2019^a. Effects of artificial sweeteners on feed palatability and performance in weaned pigs. *Canadian Journal of Animal Science*, 99(2), 307–314.
- Lee, N., Choi, J. W., Ko, H. S., Ohh, S. J., Kim, Y. H., Jang, A. R., dan Kim, J. S. 2019^b. Comparison of linear functions to estimate growth performance and *Feed Intake* variations pattern in growing and finishing pigs in high ambient temperature. *Journal of the Indonesian Tropical Animal Agriculture*, 44(2), 177–186.
- Li, W., Wang, Z., Luo, S., Wu, J., Zhou, L., dan Liu, J. 2022. Genome-wide association analysis and genetic parameters for feed efficiency and related traits in Yorkshire and Duroc pigs. *Animals*, 12(15), 1902.
- Li, Z., Xu, B., Lu, Z., dan Wang, Y. 2019. Effects of long-chain fatty acid supplementation on the growth performance of *grower* and *finisher* pigs: a meta-analysis. *Journal of Animal Science and Biotechnology*,

10(65).

- Lian, X., M. Shi, Y. Liang, Q. Lin, dan L. Zhang. 2024. The effects of unconventional feed fermentation on intestinal oxidative stress in animals. *Antioxidants*. 13(3): 305.
- Liu, S., H. Xiao, Y. Xiong, J. Chen, Q. Wu, X. Wen, Z. Jiang, dan L. Wang. 2022^a. Effects of fermented feed on the growth performance, intestinal function, and microbiota of piglets weaned at different age. *Frontiers in Veterinary Science*. 9: 841762.
- Liu, S., M. Du, Y. Tu, W. You, W. Chen, G. Liu, J. Li, Y. Wang, Z. Lu, T. Wang, dan T. Shan. 2023. Fermented mixed feed alters growth performance, carcass traits, meat quality and muscle fatty acid and amino acid profiles in finishing pigs. *Animal Nutrition*. 12: 87-95.
- Liu, Y., C. D. Espinosa, J. Abelilla, G. Casas, L. Lagos, S. Lee, dan H. H. Stein. 2017. Nutritional value of fermented soybean meal fed to pigs. *Journal of Animal Science*. 95(4): 1936-1946.
- Liu, Y., T. Jia, Y. Ren, Z. Wang, dan W. Zhu. 2022^b. Roles of ghrelin and leptin in body mass regulation under food restriction based on the AMPK pathway in the red-backed vole, *eothenomys miletus*, from Kunming and Dali Regions. *Animals*. 12(23): 3333.
- Ly, J., dan N. H. G. Kallau. 2014. Pengaruh suplementasi *Saccharomyces cerevisiae* sebagai probiotik dalam ransum berbasis pakan lokal terhadap performans dan pencernaan nutrisi pada babi lokal fase *starter*. *Jurnal Kajian Veteriner*. 2(2): 111-118.
- Mangisah, I. 2003. Ilmu Nutrisi dan Makanan Ternak Babi. Diktat Kuliah. Fakultas Pertanian Universitas Diponegoro. Semarang.
- Maulana, H., dan Baliarti, E. 2021. Kemampuan produksi domba ekor tipis pada berat badan awal berbeda yang diberi pakan kangkung kering. *Biospecies*, 14(2), 31–36.
- Missotten, J. A. M., J. Michiels, A. Owyn, S. De Smet, dan N. A. Dierick. 2010. Fermented liquid feed for pigs: a review. *Archives of Animal Nutrition*. 64(6): 437-466.
- Missotten, J. A. M., J. Michiels, J. Degroote, dan S. De Smet. 2015. Fermented liquid feed for pigs: an ancient technique for the future. *Journal of Animal Science and Biotechnology*. 6: 4.
- Molo, N. J., G. Oematan, dan G. Maranatha. 2023. Pengaruh level dan lama waktu fermentasi tongkol jagung menggunakan EM4 terhadap kandungan protein kasar, lemak kasar, kadar abu, dan energi. *Animal Agricultura*. 1(2): 59-68.
- Navarro, D. M. D. L., J. J. Abelilla, dan H. H. Stein. 2019. Structures and characteristics of carbohydrates in diets fed to pigs: a review. *Journal of Animal Science and Biotechnology*. 10: 39.

- National Research Council. 2012. Nutrient Requirements of Swine: Eleventh Revised Edition. Washington, DC: The National Academies Press.
- Nugraeni, D. L., H. A. M. Setyadi, H. A. Malik, dan A. Wahyudi. 2023. Pembuatan pakan ternak fermentasi (silase) dan penentuan HPP ternak. *Suluh: Jurnal Abdimas*. 4(2): 148-155.
- Nurhayati, N., B. Berliana, N. Nelwida, D. Depison, E. Musnandar, H. Handoko, Y. Alwi, R. A. Muthalib, dan A. Azis. 2022. Nutritional quality of fermented feed for local chickens containing banana tree waste in Sidolego Village, Tabir Lintas District, Merangin Regency. *Livestock and Animal Research*. 20(1): 76-82.
- Patience, J. F. (Ed.). 2012. Feed efficiency in swine. Wageningen Academic Publishers.
- Patience, J. F., M. C. Rossoni-Serão, dan N. A. Gutiérrez. 2015. A review of feed efficiency in swine: biology and application. *Journal of Animal Science and Biotechnology*. 6: 33.
- Prabowo, A. 2016. Penggunaan teknologi fermentasi pakan dalam sistem integrasi sapi tanaman jagung. *Jurnal Triton*. 7(2): 99-106.
- Pu, G., L. Hou, T. Du, B. Wang, H. Liu, K. Li, P. Niu, W. Zhou, R. Huang, dan P. Li. 2022. Effects of short-term feeding with high fiber diets on growth, utilization of dietary fiber, and microbiota in pigs. *Frontiers in Microbiology*. 13: 963917.
- Purba, I. O., M. K. Budiasa, dan I. B. K. Ardana. 2014. Penampilan reproduksi induk babi *Landrace* yang dipelihara secara intensif di Kabupaten Badung. *Indonesia Medicus Veterinus*. 3(2): 163-168.
- Qu, H., G. Zan, H. Li, X. Wang, J. Zhou, X. Wang, dan H. Yan. 2025. Fermented feed promotes gut development by enhancing intestinal stem cell expansion via activation of the Wnt/ β -Catenin signaling pathway. *Fermentation*, 11(2): 52.
- Rao, Z.-X., Tokach, M. D., Woodworth, J. C., DeRouchey, J. M., Goodband, R. D., dan Gebhardt, J. T. (2023). Effects of various feed additives on finishing pig growth performance and carcass characteristics: A review. *Animals*. 13(2): 200.
- Recharla, N., D. Kim, S. Ramani, M. Song, J. Park, B. Balasubramanian, P. Puligundla, dan S. Park. 2019. Dietary multi-enzyme complex improves in vitro nutrient digestibility and hind gut microbial fermentation of pigs. *PLoS ONE*. 14(5): e0217459.
- Renaldi, A. 2022. Pengaruh perendaman, fermentasi dan perkecambahan terhadap kandungan senyawa anti gizi asam fitat pada tepung kacang gude (*Cajanus cajan*). Skripsi. Universitas Hasanuddin.
- Ritchie, M. L., dan T. N. Romanuk. 2012. A meta-analysis of probiotic

- efficacy for gastrointestinal diseases. PLoS One. 7(4): e34938.
- Saladrigas-García, M., M. Durán, M. D'Angelo, J. Coma, J. F. Pérez, dan S. M. Martín-Orúe. 2022. An insight into the commercial piglet's microbial gut colonization: from birth towards weaning. *Animal Microbiome*. 4(1): 68.
- Santoso, U., dan I. Aryani. 2007. Perubahan komposisi kimia daun ubi kayu yang difermentasi oleh EM4. *Jurnal Sain Peternakan Indonesia*. 2(2): 53-56.
- Sarungu, Y. T., A. Ngatin, dan R. P. Sihombing. 2020. Fermentasi jerami sebagai pakan tambahan ternak ruminansia. *Jurnal Fluida*. 13(1): 24-29.
- Sijabat, D. 2016. Perubahan komposisi kimia kulit buah kopi yang difermentasi dengan Effective Microorganisms 4. *Jurnal Ilmiah Peternakan*. 2(3): 257-261.
- Silva, W. C. da, Campos, P. H. R. F., Santos, L. S. dos, Veira, A. M., Fraga, A. Z., dan Hauschild, L. 2021. Sequential feeding with diets varying in amino acid content for growing-finishing pigs. *Scientia Agricola*, 78(4), e20190241.
- Singh, A. K., dan W. K. Kim. 2021. Effects of dietary fiber on nutrients utilization and gut health of poultry: a review of challenges and opportunities. *Animals*. 11(1): 181.
- Singh, K. A., Saroch, A., & Rajput, R. 2023. Microbial diversity of fermented foods. *Current Journal of Applied Science and Technology*, 42(47), 20–31.
- Souza, C. F., F. M. C. Andrade, C. R. Santos, J. A. Campos, E. A. A. Duarte, dan A. B. C. Filho. 2017. Effective Microorganisms (EM) as biofeeders for anaerobic digestion. *Engenharia na Agricultura*. 25(6): 491-499.
- Souza, C. S. da, G. Bosch, J. E. Bolhuis, L. J. N. Stappers, H. M. J. van Hees, W. J. J. Gerrits, dan B. Kemp. 2014. Effects of alginate and resistant starch on feeding patterns, behaviour and performance in *ad libitum*-fed growing pigs. *Animal*. 8(12): 1917-1927.
- Sureshkumar, S., J. Song, V. Sampath, dan I. Kim. 2023. Exogenous enzymes as zootechnical additives in monogastric animal feed: a review. *Agriculture*. 13(12): 2195.
- Suryani, Y., I. Hernaman, dan N. H. Hamidah. 2017. Pengaruh tingkat penggunaan EM4 (Effective Microorganisms-4) pada fermentasi limbah padat bioetanol terhadap kandungan protein dan serat kasar. *Jurnal Ilmiah Peternakan Halu Oleo*. 10(1): 139-150.
- Tang, X., X. Liu, dan K. Zhang. 2021. Effects of microbial fermented feed on serum biochemical profile, carcass traits, meat amino acid and

- fatty acid profile, and gut microbiome composition of finishing pigs. *Frontiers in Veterinary Science*. 8: 744630.
- Tang, Z., Z. Peng, B. Liu, B. Fan, S. Zhao, X. Li, S. Xu, dan K. Li. 2008. Effect of breed, sex and birth parity on growth, carcass and meat quality in pigs. *Frontiers of Agriculture in China*. 2(3): 331-337.
- Thacker, P. A., dan R. N. Kirkwood. 2018. Nontraditional feed sources for use in swine production. In *CRC Revivals: Nontraditional Feed Sources for Use in Swine Production (Reissue of 1990 ed.)*. CRC Press.
- Tyra, M., A. Mucha, R. Eckert, G. Żak, dan M. Małopolska, M. 2021. Genetyczne, indywidualne i żywieniowe czynniki wpływające na dzienne spożycie i efektywność wykorzystania paszy u świń rosnących. *Rocz. Nauk. Zoot.* 48(2): 135-143.
- Wang, Q., Z. Qi, W. Fu, M. Pan, X. Ren, X. Zhang, dan Z. Rao. 2024. Research and prospects of enzymatic hydrolysis and microbial fermentation technologies in protein raw materials for aquatic feed. *Fermentation*. 10(12): 648.
- Wijaya, G. H., Yamin, M., Nuraini, H., dan Esfandiari, A. 2016. Performans produksi dan profil metabolik darah domba Garut dan Jonggol yang diberi limbah tauge dan omega-3. *Jurnal Veteriner*, 17(2), 246-256.
- Wu, Y., S. Chen, X. Sheng, X. Qi, X. Wang, H. Ni, Y. Guo, C. Wang, dan K. Xing. 2020. Research on differential expression of mRNA and lncRNA in Longissimus dorsi muscle of Songliao Black pig and Landrace pig based on high-throughput sequencing technique. *Scientia Agricultura Sinica*. 53(4): 836-847.
- Xia, J., H. Fan, J. Yang, T. Song, dan J. Deng. 2022. Research progress on diarrhoea and its mechanism in weaned piglets fed a high-protein diet. *Journal of Animal Physiology and Animal Nutrition*. 106(6): 1277-1287.
- Xin, H., M. Wang, Z. Xia, B. Yu, J. He, J. Yu, X. Mao, Z. Huang, Y. Luo, J. Luo, H. Yan, H. Wang, Q. Wang, P. Zheng, dan D. Chen. 2021. Fermented diet liquid feeding improves growth performance and intestinal function of pigs. *Animals*. 11(5): 1452.
- Xu, B., L. Zhu, J. Fu, Z. Li, Y. Wang, dan M. Jin. 2019. Overall assessment of fermented feed for pigs: a series of meta-analyses. *Journal of Animal Science*. 97(12): 4810-4821.
- Xu, B., Z. Li, C. Wang, J. Fu, Y. Zhang, dan Y. Wang. 2020. Effects of fermented feed supplementation on pig growth performance: a meta-analysis. *Animal Feed Science and Technology*. 259: 114315.
- Xu, S., X. Feng, W. Zhao, Y. Bi, Q. Diao, dan Y. Tu. 2024. Rumen and hindgut microbiome regulate *GainAverage Daily Gain* of preweaning

Holstein heifer calves in different ways. *Microbiome*. 12: 131.

Yarmots, G. A. 2021. Use of local raw materials in the composition of protein-vitamin-mineral additives. *E3S Web of Conferences*. 254: 08005.

Yunilas, L. Warly, Y. Marli, dan I. Riyanto. 2019. The activity of cellulose enzyme from indigenous bacteria "Bacillus Sp YLB1" as bioactivator. *Journal of Integrative Animal Production*. 7(2): 10-17.