UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Acamovic, T. and J. D. Brooker. 2005. Biochemistry of plant secondary metabolites and their effects in animals. Proceedings of the Nutrition Society. 64: 403–412.

Aganga, A. A. and K. W. Mosase. 2001. Tannin content, nutritive value and dry matter digestibility of Lonchocarpus capassa, Zizyphus mucronata, Sclerocarya birrea, Kirkia acuminata and Rhus lancea seeds. Animal Feed Science and Technology, 91(1-2), 107–113.

Agustono, B., M. Lamid, A. Ma'ruf, dan M. T. E. Purnama. 2017. Identifikasi limbah pertanian dan perkebunan sebagai bahan pakan inkonvensional di Banyuwangi. Jurnal Medik Veteriner. 1(1): 12-22.

Akanmu, A. M., A. Hassen, dan F. A. Adejoro. 2020. Gas production, digestibility and efficacy of stored or fresh plant extracts to reduce methane production on different substrates. Animals. 10(1): 146.

Akanmu, A. M., A. Hassen dan F. A. Adejoro. 2020. Haematology and Serum Biochemical Indices of Lambs Supplemented with Moringa oleifera, Jatropha curcas and Aloe vera Leaf Extract as Anti-Methanogenic Additives. MDPI Journal Antibiotics. 9(601). doi:10.3390/antibiotics9090601.

Al Rharad, A., A. Bouassab, M. Acherkouk, and M. Ayadi. 2025. Polyphenol content of pastoral forage plants consumed by goats in high mountains of the Moroccan northwest region. African and Mediterranean Agricultural Journal – Al Awamia. (147): 43–53.

Amam, A., M. W. Jadmiko, P. A. Harsita, O. Sjofjan, and D. N. Adli. 2023. Growth traits, hematological, and ruminal fluid profile of sheep offered ensiled coffee skin replacing dried water spinach. *Veterinary World*. 16: 1238–1245.

Andara, G., M. Y. Sumaryadi, and D. M. Saleh. 2022. The effect of prolification levels on hematological profile in Batur sheep. *ANGON: Journal of Animal Science and Technology*. 4(1): 139–151. https://doi.org/10.20884/1.angon.2022.4.1.p139

Andhika, R., A. Setyaningrum, dan I. Haryoko. 2023. Pertambahan bobot badan harian dan pertambahan ukuran linear tubuh berbasis jenis kelamin Domba Ekor Tipis muda di lumbung Ternak Wakaf. Journal of Animal Science and Technology. 5 (2) : 194-205.

Andi., A. Muchlis, dan Syarifuddin. 2021. Nilai Henday Production (HDP) dan Income Over Feed Cost (IOFC) ayam petelur produktif yang diberi pakan tambahan tepung cacing tanah dan tepung rumput laut. Jurnal ilmu dan Teknologi Peternakan Terpadu. 1 : 23-27.

Antonius. 2010. Pengaruh Pemberian Jerami Padi Terfermentasi Terhadap Palatabilitas Kecernaan Serat dan Digestible Energy Ransum Sapi. Seminar Nasional Teknologi Peternakan dan Veteriner 2010.

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Arisandi, B. dan A. Aruman. 2021. Analisis Pendapatan Usaha Penggemukan Sapi Potong KTT Padusan Kabupaten Cirebon. Kandang: Jurnal Peternakan, 13(1). https://doi.org/10.32534/jkd.v13i1.3190.

Astuti, A., Erwanto, dan P. E. Santosa. 2015. Pengaruh cara pemberian konsentrat-hijauan terhadap respon fisiologis dan performa Sapi Peranakan Simmental. Jurnal Ilmiah Peternakan Terpadu, 3(4), 201–207.

Astuti. D. A., N. E. Maharani., D. Diapari., L. Khotijah, dan K. Komalasari. 2022. Profil hematologic induk domba dengan pemberian pakan flushing berbeda. Jurnal Ilmu Nutrisi dan Teknologi Pakan. 20 (2) : 44-50.

Azis, U., A. Agus, A. Astuti, L. M. Yusiati, and M. A. Anas. 2022. Effect of Mineral premiks Supplementation on Intake and Digestibility of Repeat Breeder Cows. He 4th International Conference on Agriculture and Bio-industry. 1-6

Baris, A. 2025. Impact of feed quality on livestock productivity. Journal of Livestock Policy, 2(1), 1–10. https://doi.org/10.47604/jlp.v2i1.2112.

Barros-Rodríguez, M., Solorio-Sánchez, J., Ku-Vera, J. C., Ayala-Burgos, A., Sandoval-Castro, C., and G. Solís-Pérez. 2012. Productive performance and urinary excretion of mimosine metabolites by hair sheep grazing in a silvopastoral system with high densities of Leucaena leucocephala. Tropical Animal Health and Production. 44: 1873–1878. DOI: 10.1007/s11250-012-0150-0.

Bauman, D. E., J. W. Perfield II, M. J. de Veth, and A. L. Lock. 2003. *New perspectives on lipid digestion and metabolism in ruminants. Proceedings cornell nutrition conf.* 175-189.

Behan, A. A., T. C. Loh, S. Fakurazi, U. Kaka, A. Kaka, and A. A. Samsudin. 2019. Effects of supplementation of rumen-protected fats on rumen ecology and digestibility of nutrients in sheep. Animals. 9(7): 400.

Besharati, M., A. Maggiolino, and V. Palangi. 2022. Tannin in Ruminant Nutrition: Review. Molecules, 27(23), 8273.

Bhatta, R., L. Saravanan, M. Baruah, and K. T. Sampath. 2013. Effect of medicinal and aromatic plants on rumen fermentation, protozoa population and methanogenesis in vitro. Journal of Animal Physiology and Animal Nutrition. 97(3): 446–456.

Bodas, R., N. Prieto, R. Garcia-Gonźalez, S. Andrés, F. J. Giráldez, and S. López. 2012. Manipulation of rumen fermentation and methane production with plant secondary metabolites. Animal Feed Science and Technology, 176, 78–93.

Bórnez, R., M. B.Linares. and H. Vergara.2009. Haematological, hormonal and biochemical blood parameters in lamb: Effect of age and blood sampling time. Livest. Sci. 121:200–206.

Buccioni, A., M. Pauselli, C. Viti, S. Minieri, G. Pallara, V. Roscini, S. Rapaccini, M. Trabalza Marinucci, P. Lupi, G. Conte, and M. Mele. 2015. Milk fatty acid composition, rumen microbial population, and animal performances in

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

response to diets rich in linoleic acid supplemented with chestnut or quebracho tannins in dairy ewes. Journal of Dairy Science. 98(2): 1145–1156.

Budiari, N. L. G. dan I. N. Suyasa. 2018. Optimalisasi pemanfaatan hijauan pakan ternak (HPT) lokal mendukung pengembangan usaha ternak sapi. Pastura. 8(2): 118-122.

Campbell, J. R., M. Douglas Kenealy, and K. L. Campbell. 2003. Animal Sciences. 4th Edition. McGraw-Hill, New York.

Candra, R. A., H. S. Febriansyah, V. F. Ardani, T. F. Astika, A. Amam, and P. A. Harsita. 2024. Penyuluhan dan praktik pembuatan pakan complete feed block thaca Kelompok Ternak Subur Berkah di Desa Sulek Kecamatan Tlogosari Kabupaten Bondowoso. Jurnal Pengabdian dan Pemberdayaan Masyarakat. 5(1): 66–73.

Cerrilla, E. O. and G. M. Martínez. 2003. Starch Digestion And Glucose Metabolism In The Ruminant: A Reviewm. Inci. 28(7)..

Christi, R. F., A. Rochana, dan I. Hernaman. 2018. Kualitas fisik dan palatabilitas konsentrat fermentasi dalam ransum kambing perah peranakan Ettawa. Jurnal Ilmu Ternak. 18(2): 121–125.

Dai, H., X. Zhang, Y. Li, and J. Wang. 2021. Effects of dietary energy level on growth performance, nutrient digestibility, rumen fermentation, and microflora in sheep. Animals. 11(2), 355.

Davis, M. E., M. A. Brown, and G. Wu. 2014. Relationships between body weight gain, dry matter intake, and apparent digestibility in growing cattle. *Journal of Animal Science*. 92(7), 3077–3084.

Delano, M. L., S. A. Mischler, and W. J. Underwood. 2002. Biology and Diseases of Ruminants: Sheep, Goats, and Cattle. In *Laboratory Animal Medicine* (2nd ed.). Elsevier Science.

Demirtaş, A., C. Bingöl, M. Yılmaz, and H. Özkan. 2018. Effects of plant bioactive compounds on rumen fermentation, nutrient digestibility, animal performance and health. Turkish Journal of Veterinary and Animal Sciences. 42(6): 558–569.

Derix, C. 2017. Effects of dietary tannins on rumen protein degradation and amino acid supply in ruminants. Animal Feed Science and Technology. 230: 1–12.

Devoto, A., R. Ponce, J. Tello, and P. Herrera. 2006. Serum albumin, prealbumin, and blood urea nitrogen as predictors of nutritional status. *Nutrition in Clinical Practice*. 21(2): 118–127. https://doi.org/10.1177/0115426506021002118

Dhanasekaran, D. K., T. P. D. Silva, A. L. A. Filho, G. Z. Sakita, A. L. Abdalla, H. Louvandini, and M. M. M. Y. Elghandour. 2020. Plants extract and bioactive compounds on rumen methanogenesis. Agroforestry Systems. 94(4): 1541–1553.

Direktorat Jenderal Perkebunan. 2022. Statistik Perkebunan Non Unggulan Nasional 2020-2022. Jakarta (ID) : Sekr Direktorat Jenderal Perkebunan

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Donadio, G., Francesca, M., Valentina, S., Valentina, P., Maria, L., B., Nunziatina, D. T., Viviana, Izzo., and Fabrizio Dal P. 2021. Interactions with Microbial Proteins Driving the Antibacteria Activity of Flavonoids. Pharmaceutics. 13(660).

Du, S., Xu, M., and J. Yao. 2015. Relationship between fibre degradation kinetics and chemical composition of forages and by-products in ruminants. Journal of Applied Animal Research, 44(1), 1–5.

Durmic, Z. dan D. Blache. 2012. Bioactive plants and plant products: Effects on animal function, health and welfare. Animal Feed Science and Technology. 173(1–2): 1–12.

Durmic. Z., J. L. Black., G. B. Martin., and P. E. Vercoe. 2021. Harnessing plant bioactivity for enteric methane mitigation in Australia. Animal Production Science. 62(12): 1160-1172.

Ebrahim, H. and Fasil, N. 2020. Effect of secondary compounds on nutrients utilization and productivity of ruminant animals: A review. Journal of Agricultural Science and Practice. 5(1), pages 60-73

Faisal, F., A. Rochana., dan K. A. Kamil. 2017. Kajian kandungan kimia darah dan pertambahan bobot badan Domba Garut betina lepas sapih dengan imbangan protein dan energi yang berbeda. Jurnal Ilmu Ternak. 17 (2) : 92-96.

Fanta, Y., Y. Kechero, dan N. Yemane. 2024.Hematological parameters of sheep and goats fed diets containing various amounts of water hyacinth (Eichhornia crassipes). Frontiers Veterinary Science. 11:1286563. Doi: 10.3389/fvets.2024.1286563

Farias, L. B., C. C. Brauner., J. B. Carodoso, F. Siegert, J. D. O. Feijo, A. A. Barbosa, M. N. Correa, F. A. B. Del Pino, and R. A. Pereira. 2021. Vitamin and mineral supplementation improves erythrocytic recovery and productive performance of infected by gastrointestinal parasites. Rev. Bras. Saúde Prod. Anim. Salvador. 22:01-13. http://dx.doi.org/10.1590/S1519-99402122132021.

Febrina, D. 2012. Kecernaan ransum sapi peranakan Ongole berbasis limbah perkebunan kelapa sawit yang diamoniasi urea. Jurnal Peternakan, 9(2), 68–74.

Ferreira, F. G.,Laudí C. Leite, Henry D. R. Alba, Douglas dos S. Pina, Stefanie A. Santos, Manuela S. L. Tosto, Carlindo S. Rodrigues, Dorgival M. de Lima Júnior, Juliana S. de Oliveira, José E. de Freitas Júnior, Bruna M. A. de C. Mesquita, and Gleidson G. P. de Carvalho. 2022. Palm Kernel Cake in Diets for Lactating Goats: Intake, Digestibility, Feeding Behavior, Milk Production, and Nitrogen Metabolism. Animals. 12(2323).

Firkins, J. L., Z. Yu, and M. Morrison. 2007. Ruminal nitrogen metabolism: perspectives for integration of microbiology and nutrition for dairy. Journal of Dairy Science, 90(Suppl. 1), E1–E16.

UNIVERSITAS GADJAH MADA
**Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein
terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis**
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

FOSS Analytical. 2018. Fibre analysis of animal feed: Crude fibre, neutral detergent fibre and acid detergent fibre – the standards and the automation options. Hillerød: FOSS Analytical.

Fries, R. and A. Ruvinsky. 1999. The Genetics of Sheep. First Published. Oxfordshire, UK: CABI Publishing.

Gallo, S. B., Brochado, T., F. J. C. Kyomen, and L. Brochine. 2018. Block of mineral salt in the diet of sheep and lambs and their effects on health and performance. Australian Journal of Basic and Applied Sciences. 12(12): 55-60. DOI: 10.22587/ajbas.2018.12.12.10.

Hamed, C. H. and M. K. Arf. 2022. Effect of dietary protein on lipid profile and testosterone of Karadi male lambs. International Journal of Health Sciences. 6(S6): 7230–7238.

Haryanto, B. dan A. Thalib. 2009. Emisi metana dari fermentasi enterik: kontribusinya secara nasional dan faktor-faktor yang mempengaruhinya pada ternak. Wartazoa. 19 (4) : 157-165.

Hoffman, P. C., Shaver, R. D., Combs, D. K., Undersander, D. J., Bauman, L. M., and Seeger, T. K. 2001. Understanding NDF Digestibility of Forages. *Focus on Forage*, 3(10), 1–3. University of Wisconsin Extension.

Hutu, I., K. Oldenbroek, and V. D. Waaij. 2020. Animal breeding and husbandry. Agroprint Timisoara.

Iñiguez, L. and B. Gunawan. 1990. Reproductive performance of Javanese thin-tailed sheep. In: Small Ruminant Production Systems in Indonesia. Proceedings of a Workshop. Indonesian Research Institute for Animal Production–ILRI, Bogor. Pp. 121–129.

Isharyudono, K., Isna, M., dan Jufriyah. 2019. Penggunaan Bahan Inkonvensional Sebagai Sumber Bahan Pakan. Jurnal Pengelolaan Laboratorium Pendidikan, 1 (1): 1-6

Jayanegara, A., M. Ridla., D.A. Astuti., K. G. Wiryawan., E.B. Laconi., dan Nahrowi. 2016. Determination of energy and protein requirements of sheep in Indonesia using a Meta-analytical approach. Media Peternakan. 40 (2) : 118-127.

Jiménez-Peralta, F. S., A. Z. M. Salem, P. Mejía-Hernández, M. González-Ronquillo, B. Albarrán-Portillo, R. Rojo-Rubio, dan J. L. Tinoco-Jaramillo. 2011. Influence of individual and mixed extracts of two tree species on in vitro gas production kinetics of a high concentrate diet fed to growing lambs. Livestock Science. 136(2–3): 192–200.

Jun, P., M. Gibbs, and Gaffney, K. 2000. CH4 and N2 Emission from Livestock Manure In Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (pp. 321–346). Intergovernmental Panel on Climate Change (IPCC). ICF Incorporated.

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Kamagate, S., J. P. Amani, H. Ouattara, D. T. Gleanou, and P. A. Yapo. 2023. Blood Lipid Profile of Sheep Intended for Consumption in the Area of Korhogo. Journal of Food Security. 11(3): 101–105.

Katsaros, M., P. Paschos, and O. Giouleme. 2020. Red cell distribution width as a marker of activity in inflammatory bowel disease: a narrative review. Ann Gastroenterol. 33(4): 348–354.

Kementerian Pertanian. 2023. Buku Outlook Komoditas Peternakan Daging Domba. Pusat Data dan Sistem Informasi Pertanian, Sekretariat Jenderal, Kementerian Pertanian.

Kholif, A. E. 2023. A Review of Effect of Saponins on Ruminal Fermentation, Health and Performance of Ruminants. Journal Veterinary Sciences. 10 (450)

Kiran, S., A. M. Bhutta, B. A. Khan, S. Durrani, M. Ali, M. Ali, dan F. Iqbal. 2012. Effect of age and gender on some blood biochemical parameters of apparently healthy small ruminants from Southern Punjab in Pakistan. *Asian Pac J Trop Biomed*. 2(4): 304–306. DOI:10.1016/S2221-1691(12)60028-8.

Ku-Vera, J. C., R. Jiménez-Ocampo, S. S. Valencia-Salazar, M. D. Montoya-Flores, I. C. Molina-Botero, J. Arango, C. A. Gómez-Bravo, C. F. Aguilar-Pérez and F. J. Solorio-Sánchez. (2020). Role of secondary plant metabolites on enteric methane mitigation in ruminants. Frontiers in Veterinary Science. 7:584. https://doi.org/10.3389/fvets.2020.00584.

Kurniawan, Devi, G. P. P., Wibowo A. M., Novi, K. A. Z., Athaya S. R.,Elis H., Dinda, N., Nandana, R. W., dan Arif D. 2024. Optimalisasi Pakan dengan Penggunaan Feed Supplement sebagai Upaya Pengembangan Peternakan di Desa Karangtengah, Banjarnegara. Jurnal Pusat Inovasi Masyarakat, 6: 24–32

Kurniawan, H. 2016. Kecernaan in-vivo serat kasar dan bahan organik pakan sapi bali dikandang kelompok ternak patut patuh pacu kota mataram. Skripsi Universitas Mataram.

Kustanto, M. N., N. Ilminnafik, M. Darsin, I. R. Sugara, D. T. Andrianto, dan A. I. Fawaid. 2021. Pelatihan pembuatan bahan bakar minyak nyamplung (Calophyllum inophyllum) bagi masyarakat Banyuwangi Jawa Timur. Jurnal Abdi Masyarakat Indonesia. 2(1): 35–40.

Lakhani, N. dan P. Lakhani. 2018. Plant secondary metabolites as a potential source to inhibit methane production and improve animal performance. International Journal of Chemical Studies. 6(3): 3375–3379.

Lakhani, N., and Preeti, L. 2018. Plant secondary metabolites as a potential source to inhibit methane production and improve animal performance. International Journal of Chemical Studies. 6(3): 3375-3379.

Lee, S. J., H. S. Kim, J. S. Eom, Y. Y. Choi, S. U. Jo, G. M. Chu, Y. Lee, J. Seo, K. H. Kim, and S. S. Lee. 2021. Effects of olive (Olea europaea L.) leaves with antioxidant and antimicrobial activities on in vitro ruminal fermentation and methane emission. Animals, 11(7).

UNIVERSITAS GADJAH MADA
**Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein
terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis**
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Lee, S. J., H. S. Kim, J. S. Eom, Y. Y. Choi, S. U. Jo, G. M. Chu, Y. Lee, J. Seo, K. H. Kim, and S. S. Lee. 2021. Effects of olive (Olea europaea L.) leaves with antioxidant and antimicrobial activities on in vitro ruminal fermentation and methane emission. Animals. 11(7).

Lian, X., M. Shi, Y. Liang, Q. Lin, and L. Zhang. 2024. The Effects of Unconventional Feed Fermentation on Intestinal Oxidative Stress in Animals. Antioxidants. 13(3): 305. https://doi.org/10.3390/antiox13030305

López-Leyva, Y., R. González-Garduño, A. A. Cruz-Tamayo, J. Arece-García, G. Torres-Hernández, M. E. López-Arellano, and M. Huerta-Bravo. 2022. Protein supplementation as a nutritional strategy to reduce gastrointestinal nematodiasis in periparturient and lactating Pelibuey ewes in a tropical environment. Pathogens. 11(8): 941.

Luthfi, M., Asril M. R., dan Mira D. 2022. Pertambahan Berat Badan Domba Ekor Tipis Jantan Yang Diberikan Bungkil Inti Sawit Sebagai Substitusi Dedak Padi Dengan Pakan Basal Rumput Odot Kering dan Limbah Sereh Wangi (Cymbopogon Nardus) Amoniasi. Jurnal Ilmiah Mahasiswa Pertanian, 7 (1): 308-317

Mastopan, M. Tafsin, dan N. D. Hanafi. 2015. Kecernaan lemak kasar dan TDN (Total Digestible Nutrient) ransum yang mengandung pelepah daun kelapa sawit dengan perlakuan fisik, kimia, biologis dan kombinasinya pada domba. Jurnal Peternakan Integratif, 3(1), 37–45.

Mathius I. W., D. Yulistiani, E. Wina, B. Haryanto, A. Wilson, dan A. Thalib. 2001. Pemanfaatan energi terlindung untuk meningkatkan efisiensi pakan pada domba induk. Jurnal Ilmu Ternak dan Veteriner. 6(1):7-13.

Maulana, H. dan E. Baliarti. 2021. Kemampuan produksi Domba Ekor Tipis pada berat badan awal berbeda yang diberi pakan kangkung kering. Biospecies. 14 (2) : 31-36.

Maulidinoor, F. S., dan R. T. D. W. Broto. 2023. Effect of water content on free fatty acid value reduction in Nyamplung crude oil (Calophyllum Inophyllum L.) extracted by N-Hexane solvent and using factorial experiment. Waste Tech. 11 (2) : 97-101.

Mayulu, H. 2014. The Nutrient Digestibility of Locally Sheep Fed with Amofer Palm Oil Byproduct-Based Complete Feed. International Journal of Science and Engineering. 7(2), 106–112.

Morais, E. de, S. M. Souza, S. C. de Ávila, I. Borges, L. F. Sousa, C. M. C. Guimarães, and A. G. Maciel e Silva. 2023. Effects of dietary palm oil supplementation on ruminal degradation and apparent digestibility of nutrients in sheep. An Acad Bras Ciênc. 95(4): e20190041.

Moses,T., K. K. Papadopoulou and A. Osbourn. 2014. Metabolic and functional diversity of saponins, biosyntheticintermediates and semi-synthetic derivatives. Crit Rev Biochem Mol Biol. 49(6): 439–462.

UNIVERSITAS
GADJAH MADA
**Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein
terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis**
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Mutaqin, B.K. dan U. H. Tanuwiria. 2024. Pelatihan manajemen pemberian ransum domba di kelompok peternak Sauyunan, Desa Sukalilah. Jurnal Abdimas. 5 (2) : 216-224.

Njidda, A. A., Shuai'bu, A. A., and Isidahomen, C. E. 2014. Haematological and Serum Biochemical Indices of Sheep in Semi-Arid Environment of Northern Nigeria. Global Journal of Science Frontier Research: Agriculture and Veterinary. 14(2):1-10.

Nørskov, N. P., M. Battelli, M. V. Curtasu, D. W. Olijhoek, E. Chassé, and M. O. Niselsen. 2023. Methane reduction by quercetin, tannic, salicylic acids: Influence of molecular structures on methane formation and fermentation in vitro. Scientific Reports.

Novianti, J., B. P. Purwanto dan A. Atabany. 2014. Efisiensi produksi susu dan kecernaan rumput gajah (Pennissetum purpureum) pada sapi perah FH dengan pemberian ukuran potongan yang berbeda. J. Ilmu Produksi dan Teknologi Hasil Peternakan. 2(1): 224-230.

Oskoueian, E., N. Abdullah, dan A. Oskoueian. 2013. Effects of flavonoids on rumen fermentation activity, methane production, and microbial population. Biomed Research International. 2013: 349129.

Obeidat, B. S., M. A. Mayyas, A. Y. Abdullah, M. S. Awawdeh, R. I. Qudsieh, M. D. Obeidat, B. M. Nusairat, K. Z. Mahmoud, S. G. Haddad, F. A. Al-Lataifeh, M. Ata, M. A. Abu Ishmais and A. E. Aljamal. 2019. The potential use of layer litter in Awassi lamb diet: Its effects on carcass characteristics and meat quality. Animals. 9(10):782. https://doi.org/10.3390/ani9100782.

Palmquist, D. L., dan T. C. Jenkins. 2017. A 100-Year Review: Fat feeding of dairy cows. Journal of Dairy Science, 100(12), 10061–10077.

Palomares, R. A. 2022. Trace Minerals Supplementation with Great Impact on Beef Cattle Immunity and Health. Jurnal Animals. 12: 2839.

Panousis, N., C. H. Brozos, I. Karagiannis, N. D. Giadini, S. Lafi, dan M. Kritsepi-Konstantinou. 2012. Evaluation of precision xceed Ò meter for on-site monitoring of blood b-hydroxybutyric acid and glucose concentrations in dairy sheep. Res Vet Sci. 9: 435-439.

Paradhipta, D. H. V., C. Hanim., A. Agus., B. Leksono., A. Umroni., S. Maharani., A. R. D. Wardani., dan M. S. Anam. 2023. Study of nyamplung (Calophyllum inophyllum) kernel cake as an alternative protein source for ruminant feed and its effect on methane emission through in vitro. Livestock Research for Rural Development. 35 (11).

Paradhipta, D. H. V., N. Firdaus, I. H. Ashshaadiq., A. Agus, and B. Leksono. 2025. Effects of Tamanu Kernel Cake from Plantation By-product on Ruminal Digestibility and Methane Emission. Journal Tropical Agriculture Sci. 48 (4): 1151 – 1162.

UNIVERSITAS GADJAH MADA
**Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein
terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis**
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Patra, A. K., dan J. Saxena. 2009. The effect and mode of action of saponins on the microbial populations and fermentation in the rumen and ruminant production. Nutrition Research Reviews. 22(2), 204–219.

Patra, A. K., dan J. Saxena. 2011. Exploitation of dietary tannins to improve rumen metabolism and ruminant nutrition. Journal of the Science of Food and Agriculture. 91(1), 24–37.

Patra, A. K., dan J. Saxena. 2011. Exploitation of dietary tannins to improve rumen metabolism and ruminant nutrition. Journal of the Science of Food and Agriculture. 91(1), 24–37.

Prabhakar, J., dan M. Mounika. 2024. Serum biochemical alterations of sheep and goats affected with anaemia. International Journal of Veterinary Sciences and Animal Husbandry. 9(4): 144–147.

Pratama, R., dan Siswoyo, P. 2024. Evaluasi hasil IB domba local terhadap bobot lahir, letter size, dan sex ratio. Jurnal Cakrawala ilmiah. 3 (9) : 2407-2412.

Puastuti W, Yulistiani D dan Susana I. 2014. Evaluasi nilai nutrisi bungkil inti sawit yang difermentasi dengan kapang sebagai sumber protein ruminansia. Jurnal Ilmu Ternak dan Veteriner 19(2):143- 151

Puastuti, W. 2007. Teknologi Pemrosesan Bulu Ayam Dan Pemanfaatannya Sebagai Sumber Protein Pakan Ruminansia. Wartazoa, 17 (2): 53-60

Purba, E. P., Erwantoa dan Liman. 2017. Pengaruh penambahan silase daun singkong dan mineral mikro 66thaca66 dalam ransum berbasis limbah kelapa sawit terhadap kecernaan serat dan protein kasar. Jurnal Penelitian Peternakan Indonesia 1(1); 16-19.

Purnamasari, L. I. W. Sari., S. Rahayu., dan M. Yamin. 2021. Substitusi rumput dengan kangkong kering dan limbah tauge serta pengaruhnya terhadap performa Domba Garut. Jurnal Peternakan Indonesia. 23(1): 23-32.

Rahman, M. K., S. Islam., J. Ferdous., M. H. Uddin., M. B. Hossain., M. Hassan., A. Islam. 2018. Determination of hematological and serum biochemical reference values for indigenous sheep (Ovies aries) in Dhaka and Chittagong Districts of Bangladesh. Veterinary World. 11 (8) : 1089 – 1093.

Rajaei-Sharifabadi, H., M. Hedayati, dan G. Moghaddam. 2024. Effect of partial or complete replacement of dietary inorganic trace minerals supplement with an advanced chelated source on nutrient digestibility in sheep. *Animals*, 14(22), 3182.

Ramos-Morales, E., G. de la Fuente, R. J. Nash, R. Braganca, S. Duval, M. Bouillon, M. Lahmann, dan J. Newbold. 2017. Improving the antiprotozoal effect of saponins in the rumen by combination with glycosidase inhibiting iminosugars or by modification of their chemical structure. *PLOS ONE*, 12(9): e0184517. https://doi.org/10.1371/journal.pone.0184517

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Rasjid S., dan Ismartoyo. 2014. Nilai Indek Pakan Kambing Berdasarkan Studi *In Sacco Dan In Vivo*. Buletin Nutrisi dan Makanan Ternak. Vol 10, (1). Fakultas Peternakan. Unoversitas Hasanuddin. Makassar.

Rasyaf, M. 2003. Beternak Ayam Pedaging. Penebar Swadaya. Jakarta Utama, Jakarta.

Reece, W. O. dan M. J. Swenson. 2004. The composition and functions of blood. In: REECE, W. O. (Ed.). Dukes' physiology of domestic animals. Ithaca: Cornell University Press. P.26-52.

Reece, W. O. dan M. J. Swenson. 2004. The composition and functions of blood. In: REECE, W. O. (Ed.). Dukes' physiology of domestic animals. Ithaca: Cornell University Press. P.26-52.

Restiani, R. 2017. Hidrolisis Secara Enzimatis Protein Bungkil Biji Nyamplung (Calophyllum inophyllum) Menggunakan Bromelain. Biota : Jurnal Ilmiah Ilmu-Ilmu Hayati. 1(3): 103–110. https://doi.org/10.24002/biota.v1i3.1226

Rifa'I, R., Amam, A., Surjowardojo, P., dan Susilorini, T. E. (2021). Morfometri kambing Senduro plasma nuftah Kabupaten Lumajang, Provinsi Jawa Timur. Buletin Plasma Nutfah, 27(2), 133–140.

Rossi, C. A. Sgoifo, S. Grossi, R. Compiani, G. Baldi, M. Agovino, dan L. Rossi. 2020. Effects of different mineral supplementation programs on beef cattle serum Se, Zn, Cu, Mn concentration, health, growth performance and meat quality. Large Animal Review. 26(2): 57–64.

Samarin, A. A., M. A. Norouzian, dan A. Afzalzadeh. 2022. Efect of trace mineral source on biochemical and hematological parameters, digestibility, and performance in growing lambs. Tropical Animal Health and Production. 54: 40

Sarmin, S., Winarsih, S., Hana, A., Astuti, P., dan Airin, C., M. 2021.Parameters of blood biochemistry in different physiological status of fat-tailed sheep. AIP Conference Proceedings. 2353(1).

Sarmin., P. Astuti., dan C. M. Airin. 2022. The hematological and biochemical profiles of Wonosobo Sheep blood in various physiological conditions. Buletin Peternakan. 46 (3) : 169-178.

Schalm CM, Jain NC, Carrol EJ. 1986. Veterinary Hematology. 4th Ed., 67thaca New York. ML Scott and Associatation.

Schultz, E. B., C. G. de Paula, J. A. Araujo, I. C. Ferreira, A. R. Conceição Dan G. D. L. M. Junior. 2022. Biochemical Energy And Hematological Profile Of Sheep Supplemented With Soy Molasses. Veterinaria Noticias.

Seca, A. M. L. dan A. Trendafilova. 2021. Secondary metabolites in edible species: Looking beyond nutritional value. Foods. 10(5): 1131.

Selim, A.S.M., Hasan, M.N., Rahman, M.A., Rahman, M.M., Islam, M.R., Bostami, A.B.M.R. dan Islam, S., Tedeschi, L.O. 2022. Nutrient content and in vitro

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

degradation study of some unconventional feed resources of Bangladesh. Heliyon, 8(5). Doi: 10.1016/j.heliyon.2022.e09496.

Shahryaria, S., Hosseis, S. Z., Kamahldin, H., Lorenz, A.,Kambiz, A. N. 2018. High phenol degradation capacity of a newly characterized Acinetobacter sp. SA01: Bacterial cell viability and membrane impairment in respect to the phenol toxicity. Journal Ecotoxicology and Environmental Safety. 164:455–466

Shoukry, M. M., El-Badawi, A. Y., El-Garhy, O. H., Abdel-Rahman, M. A., Hassan, M. F., dan Abd El-Aziz, A. H. 2023. Effect of dietary supplementation with zinc methionine and lysine on growth performance, nutrient digestibility, blood metabolites, and antioxidant status of Barki lambs. PeerJ, 11, e16023. https://doi.org/10.7717/peerj.16023

Silva, T. G. P., Lopes, L. A., de Carvalho, F. F. R., Soares, P. C., Guim, A., Silva Júnior, V. A., dan Batista, Â. M. V. 2023. Blood biochemical parameters of lambs fed diets containing cactus cladodes. Arquivos Brasileiros de Medicina Veterinária e Zootecnia. 75(1), 48-60. https://doi.org/10.1590/1678-4162-12833

Soualio Kamagate, S., J. P. Amani, H. Ouattara, D. T. Gleanou dan P. A. Yapo. 2023. Blood Lipid Profile of Sheep Intended for Consumption in the Area of Korhogo. Journal of Food Security. 11(3)101-105.

Spears, J. W., dan W. P. Weiss. 2014. Invited review: Mineral and vitamin nutrition in ruminants. The Professional Animal Scientist. 30(2): 180–191.

Subekti, E. 2007. Pengaruh Jenis Kelamin dan Bobot Potong Terhadap Kinerja Produksi Daging Domba Lokal. MEDIAGRO. 3(1): 59-6.

Sudiyono, S., S. D. Widayati, A. Hanifa, R. F. Hadi, W. P. S. Suprayogi, A. K. Wati, dan W. Pawestri. 2023.Effect of using protected linseed in rations on sheep blood hematology.Livestock and Animal Research. 21(2): 118-126

Suharti, S., Annita, S., dan Asep Sudarman. 2017. Metabolit darah domba yang disuplementasi bakteri pendegradasi HCN dan sulfur pada pakan yang mengandung tepung daun singkong pahit (Manihot glaziovii). Buletin Makanan Ternak, 104 (4): 31-40.

Sultana, N., M. Akter, dan M. M. Rahman. 2022. Effects of dietary trace mineral supplementation on growth performance, nutrient digestibility, and feed conversion efficiency in growing sheep. Tropical Animal Health and Production, 54(123).

Sultana, N., M. Akter, dan M. M. Rahman. 2022. Effects of dietary trace mineral supplementation on growth performance, nutrient digestibility, dan feed conversion efficiency in growing sheep. Tropical Animal Health and Production, 54, 123.

Sunarso, Surono, Sutrisno, dan Indahul Aqliyah. 2023. Kecernaan Lemak, Protein dan Serat Kasar Rumput Pakan Domba yang Ditambahkan Probiotik dan Disuplementasi Nitrogen, Sulfur dan Fosfor. Buletin Sintesis. 26 (1).

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Suttle, N. F. 2010. Mineral Nutrition of Livestock (4th ed.)

Syaifudin, M. I. 2023. Pertumbuhan Domba Ekor Tipis (DET) Betina yang Diberi Pakan Berbasis Limbah Keripik Jagung. Fakultas Pertanian, Universitas Tidar.

Syamsi, A. N., M. Ifani, H. S. Widodo, R. A. Rahayu, dan C. L. Meilinda. 2020. Nutrisi dan indeks sinkronisasi protein-energi beberapa jenis bungkil pengolahan pangan untuk pakan sapi perah. Prosiding seminar nasional dan call for papers ”pengembangan sumber daya perdesaan dan kearifan lokal berkelanjutan x”. 202– 209.

Tahuk, P. K., A. A. Dethan, and S. Sio. 2021. Intake and digestibility of dry and organic matter, and crude protein of male Bali cattle fattened in smallholder farms. Journal of Tropical Animal Science and Technology. 3(1): 21–35.

Tahun, M. R., Maritje, A. Hilakore, M. Nenobais, Emma dan D. Wie Lawa. 2025.Kandungan dan Kecernaan Bahan Kering, Bahan Organik Isi Rumen Sapi Bali Timor secara In Vitro ada Dua RPH Berbeda. Animal Agricultural. 2(3) 840-849.

akó, M., B. K. Erika, Z. Carolina, K. Alexandra, P. Tamás, K. Judit, and V. Csaba. 2020. Plant Phenolics and Phenolic-Enriched Extracts as Antimicrobial Agents against Food-Contaminating Microorganisms. Antioxidants. 9(165).

Tatra, A. J. dan Husnaeni. 2024. Kinetika produksi gas limbah pertanian sebagai pakan alternatif ternak ruminansia. Jurnal Ilmu dan Teknologi Peternakan Indonesia. 10 (1) : 1-9.

Tseu, R. J., J. P. Muir, K. Karges, dan L. O. Tedeschi. 2020. Effects of condensed tannins on feed intake, nutrient digestibility, and protein utilization in ruminants: A meta-analysis. Animal Feed Science and Technology. 259:114338. https://doi.org/10.1016/j.anifeedsci.2019.114338

Udarno, L., dan Tjahjana, B. E. 2019. Morfologi dan Budidaya Tanaman Nyamplung *(Calophyllum inophyllum LINN)*. Balai Penelitian Tanaman Rempah dan Aneka Tanaman Industri.

Umroni, A., H. Rianawati, A. A. D. Rahayu, Krisnawati, B. Leksono, dan D. H. V. Paradhipta,. 2024. Chemical compositions and plant secondary metabolites of nyamplung (Calophyllum inophyllum L) Oilseed presscake from different locations. In IOP Conference Series: Earth and Environmental Science (p. 012001).

Uniyal, S., K. Ashwin, A. Mishra, J. K. Sahoo, dan V. Paladan. 2018. Importance of micro minerals in reproductive performance of farm animals. International Journal of Current Microbiology and Applied Sciences. 7(7): 3584–3589.

Utomo, R., A. Agus, C. T. Noviandi, A. Astuti, A. R. Alimon. 2021. Bahan Pakan dan Formulasi Ransum. Yogyakarta: UGM Press.

Veiko, A. G., E. Olchowik-Grabarek, S. Szymon, R. Anna, A. L. Elena, D. Izabela, Z. Maria, B. Ilya and Zavodnik. 2023. Antimicrobial Activity of Quercetin, Naringenin and Catechin: Flavonoids Inhibit Staphylococcus aureus-Induced

UNIVERSITAS GADJAH MADA
Pengaruh Bungkil Nyamplung (Chalophylum inophyllum) sebagai Substitusi Bahan Pakan Sumber Protein terhadap Kecernaan Nutrien dan Kinerja Pertumbuhan Domba Ekor Tipis
IHSHAN HABI ASHSHAADIQ, Prof. Dr. Ir. Ali Agus, DAA., DEA., IPU., ASEAN Eng.;Ir. Dimas Hand Vidya Paradhipta
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Hemolysis and Modify Membranes of Bacteria and Erythrocytes. Journal Molecules. 28(1252).

Wahyuni, I. M. D., Muktiani, A., dan M. Christiyanto. 2014. Kecernaan bahan kering dan bahan organik dan degradabilitas serat pada pakan yang disuplementasi tanin dan saponin. Jurnal Agripet, 14(2), 115-124.

Wang, X., Y. Zhang, H. Li, J. Zhao, dan Y. Liu. 2024. Effects of dietary energy levels on growth performance, nutrient digestibility, rumen barrier and microflora in sheep. *Animals*, 14(2), 215.

Wang, X., Y. Zhang, H. Li, J. Zhao, dan Y. Liu. 2024. Effects of dietary energy levels on growth performance, nutrient digestibility, rumen barrier and microflora in sheep. Animals, 14(2), 215.

Wicaksana, D., S. Hidanah, W. P. Lokapirnasari, M. A. Al-Arif, M. Lamid, dan K. Suprianondo. 2021. Penggunaan bungkil inti sawit dan ß-Mannanase pada produktivitas ayam petelur. Jurnal Medik Veteriner. 4 (1) : 72-77.

Wulandari, Suci., A. Agus., M. Soejono., M. N. Cahyanto., and R. Utomo. 2014. Performa produksi domba yang diberi complete feed fermentasi berbasis pod kakao serta nilai nutrient tercernanya secara in vivo. Buletin Peternakan. 38(1): 42-50.

Yang, K., C. Wei, G. Y. Zhao, Z. W. Xu and S. X. Lin. 2016. Effects of dietary supplementing tannic acid in the ration of beefcattle on rumen fermentation, methane emission, microbial floraand nutrient digestibility. Journal of Animal Physiology and Animal Nutrition.

Yulianto, R., Nurwidodo, D. C. Widyaningrum, dan H. Khasanah. 2022. Budidaya rumput odot dan teknologi pengawetan hijauan pakan ternak sapi di Desa Kalibendo, Kecamatan Pasirian, Lumajang. Jurnal Pengabdian Kepada Masyarakat Indonesia. 3(1): 27-37.

Yurike, Y. 2024. Estimasi emisi metana (CH4) pada ternak sapi potong di Kabupaten Bengkulu Utara. Buletin Peternakan Tropis. 5 (1) : 99-106.

Zhang, W., L. Chen, dan Y. Zhao. 2024. Effects of organic trace minerals chelated with oligosaccharides on growth performance, antioxidant capacity, and jejunal digestive enzyme activities in sheep. Frontiers in Veterinary Science. 11:1366314. Doi: 10.3389/fvets.2024.1366314

Zhong, H., J. Zhou, M. Abdelrahman, H. Xu, Z. Wu, L. Cui, Z. Ma, L. Yang, and X. Li. 2021. The effect of lignin composition on ruminal fiber fractions degradation from different roughage sources in water buffalo (Bubalus bubalis). *Agriculture*, 11(10), 1015.

Zura Zaja, I., Vince, S. N. P. Milas, I. R. A. Lobpreis, B. Špoljarić, A. S. Vugrovečki, S. Milinković-Tur, M. Šimpraga, L. Pajurin, T. Mikuš, K. Vlahović, M. Popović, and D. Špoljarić. 2019. A new method of assessing sheep red blood cell types from their morphology. Animals 9: 1130. https://doi.org/10.3390/ani9121130.