



DAFTAR PUSTAKA

- AOAC. 2005. Official Method of Analysis. 18th ed. W. Harwitz, ed. Association of Official Analytical Chemist, Washington DC, USA.
- Anggraeni, D. 2007. Konsumsi dan kecernaan nutrien serta kualitas semen domba Garut dengan ransum yang bernilai neraca kation anion berbeda. Tesis. Magister Sains. Departemen Ilmu Nutrisi dan Teknologi Pakan. Institut Pertanian Bogor, Bogor.
- Anonim. 2011. Keputusan Menteri Pertanian Republik Indonesia Nomor 2914/Kpts/OT.140/6/2011 tentang Penetapan Rumpun Domba Garut. <http://bibit.ditjenpkh.pertanian.go.id/sites/default/files/Domba%20Garut.p>. Diakses tanggal 21 Mei 2020.
- Abarghuei, M. J., Y. Rouzbehani, A.Z.M. Salem, and M.J. Zamiri. 2013. Nutrient digestion, ruminal fermentation and performance of dairy cows fed pomegranate peel extract. *Livest. Sci.* 157(2-3):452-461.
- Alberts, B., D. Bray, K. Hopkin, A. Johnson, J. Lewis, K. Roberts, and P. Walter. 2014. Essential Cell Biology. Garland Science, New York.
- Akinlade, A. T. and T. O. Ososanya, T. 2016. Nutrient utilization, ruminal microbial population and fermentation characteristics of West African Dwarf (WAD) rams fed ammonium sulphate fortified diets. *J. Anim. Prod. Res.* 28(1):309-317.
- Belenguer, A., D. Yanez, J. Balcells, N.H.O. Baber, and M. González-Ronquillo. 2002. Urinary excretion of purine derivatives and prediction of rumen microbial outflow in goats. *Livest. Prod. Sci.* 77(2):127–135.
- Bach, A., S. Calsamiglia, and M. D. Stern. 2005. Nitrogen Metabolism in Rumen. *J. Dairy Sci.* 88(1):9-21.
- Bhatta, R., K. Tajima, and M. Kurihara. 2006. Influence of Temperature and pH on Fermentation Pattern and Methane Production in the Rumen Simulating Fermenter (RUSITEC). *Asian-Aust. J. Anim. Sci.* 19(3):376-380.
- Bowen, M. K., D. P. Poppi, S. R. McLennan, and V. J. Doogan. 2006. A comparison of the excretion rate of endogenous purine derivatives in the urine of Bos indicus and Bos Taurus steers. *Aust. J. Agric. Res.* 52(7): 173-177.
- Berthiaume, R., C. Benchaar, A. V. Chaves, G. F. Tremblay, Y. Castonguay, A. Bertrand, G. Belanger, R. Michaud, C. Lafreniere, T. A. McAllister, and A. F. Britos. 2010. Effects of nonstructural carbohydrate concentration in alfalfa on fermentation and microbial protein synthesis in continuous culture. *J. Dairy Sci.* 93(2):693–700.
- Borjesson, A. E., M. K Lagerquist, C. Liu, R. Shao, S. H Windahl, C. Karlsson, K. Sjögren, S. Movere-Skrtic, M. C. Antal, A. Krust, S. Mohan, P. Chambon, L. Saavendahl, and C. Ohlsson. 2010. The role of estrogen receptor α in growth plate cartilage for longitudinal bone growth. *J. Bone Miner. Res.* 25(12):2690–2700.



- Barbosa, A. M., R. F. D. Valadares, S. C. V. Filho, D. S. Pina, E. Detmann, and M. I. Leão. 2011. Endogenous fraction and urinary recovery of purine derivatives obtained by different methods in Nellore cattle. *J. Anim. Sci.* 89(2):510–519.
- Basal, S. and G. Goel. 2015. Rumen Microbiology: From Evolution to Revolution. Commercial Application of Rumen Microbial Enzymes. A. K. Puniya, R. Singh, and D. N. Kamra, eds. Springer, New Delhi.
- Buehler, L. K. 2016. Cell Membranes. Garland Science, New York, USA.
- Blanco, A. and G. Blanco. 2017. Medical Biochemistry. Academic Press, Cambridge, Massachusetts, USA.
- Bernard, D. J. and E. Brule. 2020. Anterior pituitary: glycoprotein hormones from gonadotrope (FSH and LH) and thyrotrope (TSH) cells. In: Hormonal Signaling in Biology and Medicine. G. Litwack, ed. Academic Press, Cambridge, Massachusetts, USA. pp 110-144
- Bintang, M., F. Rahmawati, U. M. Safira, dan D. Andrianto. 2020. Biokimia Fisik. IPB Press, Bogor.
- Chen X. B. and M. J. Gomes. 1992. Estimation of Microbial protein supply to sheep and cattle based on urinary excretion of purine derivates and overview of technical detail. International feed resources unit. Rowett research institute, Bucsburn Aberdeen, UK. Occasional Publication. pp. 1-21.
- Chen, X. B. and E. R. Ørskov. 2004. Research on Urinary Excretion of Purine Derivatives in Ruminants: Past, Present and Future. In: Estimation of Microbial Protein Supply in Ruminants Using Urinary Purine Derivatives. H. P. S. Makkar and X. B. Chen, eds. Springer, Berlin. pp 180-210.
- Campbell, M. K. and S. O. Farrell. 2006. Biochemistry. 5th ed. Thomson Brooks, USA.
- Costa, R. G., A. S. M. Batista, M. S. Madruga, S. G. Neto, R. C. R. E. Queiroga, J. T. A. Filho, and A. S. Villarroel. 2009. Physical and chemical characterization of lamb meat from different genotypes submitted to diet with different fibre contents. *Small Rumin. Res.* 81(1):29–34.
- Cheeke, P. R. and E. Dierenfeld. 2010. Comparative Animal Nutrition and Metabolism. CABI, Wallingford, UK.
- Chanthakhoun, V., M. Wanapat, and J. Berg. 2012. Level of crude protein in concentrate supplements influenced rumen characteristics, microbial protein synthesis and digestibility in swamp buffaloes (*Bubalus bubalis*). *Livest. Sci.* 144(3):197-204.
- Carro, M. D., G. Cantalapiedra-Hijar, M. J. Ranilla, and E. Molina-Alcaide. 2012. Urinary excretion of purine derivatives, microbial protein synthesis, nitrogen use, and ruminal fermentation in sheep and goats fed diets of different quality. *J Anim Sci.* 90(11):3963-3972.
- Carrey, E. A., D. Perrett, and H. A. Simmonds. 2013. Encyclopedia of Human Nutrition: Nucleic Acids, Purine, and Pyrimidine Nucleotides and Nucleosides. In: Encyclopedia of Human Nutrition. B. Caballero, L. Allen,



- and A. Prentice eds. Academic Press, Amsterdam, Netherlands. pp 189-196.
- Clark, D. P. and N. J. Pazdernik. 2013. Molecular Biology. 2nd ed. Academic Press, Cambridge, Massachusetts, USA.
- Craig, N. L., O. Cohen-Fix, R. Green, C. Greider, G. Storz, and C. Wolberger. 2014. Molecular Biology: Principles of Genome Function. Oxford University Press, New York, USA.
- Choudhury, P. K., A. Z. M. Salem, R. Jena, S. Kumar, R. Singh, and A. K. Puniya. 2015. Rumen Microbiology: From Evolution to Revolution. In: Rumen Microbiology: An Overview. A. K. Puniya, R. Singh, and D. N. Kamra, eds. Springer, New Delhi. pp 3-16.
- Cleaves, H. J. 2018. Nucleobases on the Primitive Earth: Their Sources and Stabilities. In: Prebiotic Chemistry and Chemical Evolution of Nucleic Acids. C. Menor-Salvan, ed. Springer Nature, Cham, Switzerland. pp 1-20.
- Dias, A. M., L. C. V. Ítavo, J. C. Damasceno, G. T. Santos, É. Nogueira, and C. C. B. F. Ítavo. 2012. Ruminal parameters of bovines fed diets based on sugar cane with doses of calcium hydroxide. R. Bras. Zootec. 41(4):963-969.
- Dughita, P. A. 2016. Kontribusi ekskresi basal purin terhadap total ekskresi derivat purin dalam urin domba ekor gemuk dan domba ekor tipis. Tesis. Magister Ilmu Peternakan, Fakultas Peternakan, Universitas Gadjah Mada, Yogyakarta.
- Diaz, A., R. López-Grueso, J. Gambini, D. Monleón, C. Mas-Bargues, K. M. Abdelaziz, J. Viña, and C. Borrás. 2019. Sex differences in age-associated type 2 diabetes in rats—role of estrogens and oxidative stress. Oxid. Med. Cell. Longev. 2019:1-13.
- DuBourdieu, D. 2019. Colostrum antibodies, egg antibodies and monoclonal antibodies, providing passive immunity for animals. In: Nutraceuticals in Veterinary Medicine. R. C. Gupta, A. Srivastava, R. Lall, eds. Springer Nature, Cham, Switzerland. pp 245-260.
- Ee, P. L. R., S. Kamalakaran, D. Tonetti, X. He, D. D. Ross, and W. T. Beck. 2004. Identification of a novel estrogen response element in the breast cancer resistance protein (ABCG2) gene. Cancer Res. 64(4):1247-1251.
- Edmunds, B., K. H. Südekum, R. Bennett, A. Schröder, H. Spiekers, and F. J. Schwarz. 2013. The amino acid composition of rumen-undegradable protein: a comparison between forages. J. Dairy Sci. 96(7):4568-4577.
- Evans, E. and U. Messerschmidt. 2017. Review: sugar beets as a substitute for grain for lactating dairy cattle. J. Anim. Sci. and Biotechnol. 8(25):1-10.
- Erickson, P. S. and K. F. Kalscheur. 2020. Nutrition and feeding of dairy cattle. In: Animal Agriculture: Sustainability, Challenges, and Innovations. F. W. Bazer, G. C. Lamb, and G. Wu, eds. Academic Press, Cambridge, Massachusetts, USA. pp 158-179



- Fujihara, T. and M. N. Shem. 2011. Metabolism of microbial nitrogen in ruminants with special reference to nucleic acids. *Anim. Sci. J.* 82(2):198-208.
- Fathallah-Shaykh, S. A. dan M. T. Cramer. 2014. Uric acid and the kidney. *Pediatr. Nephrol.* 29(6):999-1008.
- Forslind, B. and M. Lindberg. 2014. Skin, Hair, and Nails: Structure and Function. CRC Press, Boca Raton, Florida, USA.
- Frank, E. L. 2018. Nonprotein Nitrogen Compounds. In: *Clinical Chemistry: Principles, Techniques, and Correlations*. M. L. Bishop, E. P. Fody, and L. E. Schoeff, eds. Jones and Bartlett Learning, Burlington, Massachusetts, USA. pp 244-259.
- George, S. K., A. K. Verma, U. R. Mehra, M. T. Dipu, and P. Singh. 2011. Evaluation of purine metabolites - creatinine index to predict the rumen microbial protein synthesis from urinary spot samples in Barbari goats. *J. Anim. Feed Sci.* 20(4):509-525.
- Ghasemi, S., A. A. Naserian A , R. Valizadeh A , A. M. Tahmasebi A , A. R. Vakili A and M. Behgar. 2012. Effects of pistachio by-product in replacement of lucerne hay on microbial protein synthesis and fermentative parameters in the rumen of sheep. *Anim. Prod. Sci.* 52(11):1052-1057.
- Gonzalez, J. J. M. Arroyo, M. Ouarti, J. Guevara-Gonzalez, C. A. Rodriguez, M. R. Alvir, V. J. Moya and O. Piquer. 2012. Composition of free and adherent ruminal bacteria: inaccuracy of the microbial nutrient supply estimates obtained using free bacteria as reference samples and ¹⁵N as the marker. *Animal.* 6(3):468-475.
- Genzebu, D. and G. Tesfay. 2015. The role of bacteria in nitrogen metabolism in the rumen with emphasis of cattle. *Research J. Agric. Environ. Manag.* 4(7):282-290.
- Govur, W. A., S. D. Rasad, dan N. Solihat. 2015. Pengaruh umur terhadap bobot dan diameter ovarium sera kualitas oosit pada domba lokal. *Students e-Journal.* 4(4):1-13.
- Gao, X. dan M. Oba. 2016. Effect of increasing dietary nonfiber carbohydrate with starch, sucrose, or lactose on rumen fermentation and productivity of lactating dairy cows. *J. Dairy Sci.* 99(1):1-10.
- Griesenbeck, J., H. Tschochner, and D. Grohmann. 2017. Structure and Function of RNA Polymerases and the Transcription Machineries. In: *Macromolecular Protein Complexes: Structure and Function*. J. R. Harris and J. Marles-Wright, eds. Springer, Switzerland. pp 225-271.
- Gibson, W. and C. Koch. 2019. *Biotechnology and Genetic Engineering*. ED-Tech Press, Essex, UK.
- Hall, M. B. and G. B. Huntington. 2008. Nutrient synchrony: Sound in theory, elusive in practice. *J. Anim. Sci.* 86(14):E287-E292.
- Harvey, R. A. and D. R. Ferrier. 2011. *Biochemistry*. Lippincott Williams & Wilkins, Philadelphia.
- Hurley, W. L. and P. K. Theil. 2011. Perspectives on immunoglobulins in colostrum and milk. *Nutrients.* 3(4):442-474.



- Haldar, A., S. K. Pal, M. Datta, D. Majumdar And B. S. Prakash. 2014. Plasma micronutrients status and gonadotrophin hormone profiles during peripubertal period in female Black Bengal goat. Indian J. Anim. Sci. 84(12):1270–1275.
- Huo, W., W. Zhu, and S. Mao. 2014. Impact of subacute ruminal acidosis on the diversity of liquid and solid-associated bacteria in the rumen of goats. World J. Microbiol. Biotechnol. 30(2):669-680.
- Hynd, P. I. 2019. Animal Nutrition: From Theory to Practice. CSIRO Publishing, Clayton, Australia.
- Ichida, K., H. Matsuo, T. Takada, A. Nakayama, K. Murakami, T. Shimizu, Y. Yamanashi, H. Kasuga, H. Nakashima, T. Nakamura, Y. Takada, Y. Kawamura, H. Inoue, C. Okada, Y. Utsumi, Y. Ikebuchi, K. Ito, M. Nakamura, Y. Shinohara, M. Hosoyamada, Y. Sakurai, N. Shinomiya, T. Hosoya, and H. Suzuki. 2012. Decreased extra-renal urate excretion is a common cause of hyperuricemia. Nat. Commun. 3(764):1-7.
- Joshi, U. N., S. Kumar, and K. Gupta. 2010. Nutritional and Anti-nutritional Constituents of Forage Legumes. Pages 286-318 in Forage Legumes. J. V. Singh, B. S. Chhillar, B. D. Yadav, and U. N. Joshi, eds. Scientific Publisher, India.
- Jimenez, R. T. and J. G. Puig. 2012. Purine Metabolism in the Pathogenesis of Hyperuricemia and Inborn Errors of Purine Metabolism Associated With Disease. In: Gout & Other Crystal Arthropathies. R Terkeltaub, ed. Elsevier. USA. pp 36-50.
- Kamra, D. N. 2005. Rumen microbial system. Curr. Sci. 89(1):124-135.
- Khampa, S. and M. Wanapat. 2006. Influences of energy sources and level supplementation on ruminal fermentation and microbial protein synthesis in dairy steers. Pak. J. Nutr. 5(4):294-300.
- Knowlton, K. F., D. K. Beede, and E. Kebreab. 2010. Phosphorus and Calcium Requirements of Ruminants. In: Phosphorus and Calcium Utilization and Requirements in Farm Animals. D. M. S. S. Vitti and E. Kebreab, eds. CABI, Oxfordshire, UK. pp 112-132.
- Kazemi-Bonchenari, M., K. Rezayazdi, K., H. A. Ghasemi, A. H. Farahani, M. Dehghan-Banadaky, and A. Mahdavi. 2011. Effect of rumen degradable protein supplementation on purine derivatives excreted through urine and milk in lactating Holstein cows. J. Anim. Vet. Adv. 10(18):2389-2393.
- Kamatani, N., H. A. Jinnah, R. C. M. Hennekam, A. B. P. Kuilenburg. 2013. Purine and Pyrimidine Metabolism. In: Emery and Rimoin's Principles and Practice of Medical Genetics. D. Rimoin, R. Pyeritz and B. Korf, eds. Academic Press, USA. pp 2-22.
- Khotijah, L., R. Zulihar, M. A. Setiadi, K. G. Wiryawan, dan D. A. Astuti. 2014. Effect of sun flower oil addition (*Helianthus annuus*) in diet on nutrient intake, growth performance and characteristics of estrous of pre-mating Garut sheep. IJAVS. 19(1): 9-16.



- Kumar, A., H. Maity, and A. Dua. 2015. Parallel versus off-pathway Michaelis-Menten mechanism for single-enzyme kinetics of a fluctuating enzyme. *J. Phys. Chem.* 119(27): 8490-8500.
- Kannangara, D. R., A. J. Phipps-Green, N. Dalbeth, L. K Stamp, K. M. Williams, G. G Graham, R. O Day, and T. R Merriman. 2016. Hyperuricaemia: contributions of urate transporter ABCG2 and the fractional renal clearance of urate. *Ann. Rheum. Dis.* 75(7):1-4.
- Kessel, A. and N. Ben-Tal. 2018. Introduction to proteins: Structure, Function, and Motion. CRC Press, Boca Raton.
- Kuhns, V. L. H. and O. Woodward. 2020. Sex Differences in Urate Handling. *Int. J. Mol. Sci.* 21(12):1-20.
- Lehnart, S. E. and A. R. Marks. 2011. Transport of ions and small molecules across membranes. In: Lewin's Cells 2nd ed. L. Cassimeris, V. R. Lingappa, and G. Plopper, eds. Jones and Bartlett Publisher, Burlington, Massachusetts, United States. pp 231-290
- Lawrence, T. L. J., V. R. Fowler, and J. E. Novakofski. 2012. Growth of Farm Animals. 3rd ed. CABI International, Wallingford, UK.
- Lascano, G. J., L. E. Koch, and A. J. Heinrichs. 2016. Precision-feeding dairy heifers a high rumen-degradable protein diet with different proportions of dietary fiber and forage-to-concentrate ratios. *J. Dairy Sci.* 99(9):7175–7190.
- Liljas, A., L. Liljas, M. R. Ash, G. Lindblom, P. Nissen, and M. Kjelgaard. 2017. Textbook of Structural Biology. 2nd ed. World Scientific, Singapore.
- Lu, Z., Z. Xu, Z. Shen, Y. Tian and H. Shen. 2019. Dietary energy level promotes rumen microbial protein synthesis by improving the energy productivity of the ruminal microbiome. *Front. Microbiol.* 10(847):1-14.
- Li, C., K. A. Beauchemin, and W. Yang. 2020. Feeding diets varying in forage proportion and particle length to lactating dairy cows: I. Effects on ruminal pH and fermentation, microbial protein synthesis, digestibility, and milk production. *J. Dairy Sci.* 103(5):4340–4354.
- Liu, L., T. Zhao, L. Shan, L. Cao, X. Zhu, and Y. Xue. 2021. Estradiol regulates intestinal ABCG2 to promote urate excretion via P13K/Akt pathway. *Nutr. Metabb.* 18(63):1-11.
- Makkar, H. P. S. 2004. Development, Standardization, And Validation of Nuclear Based Technologies for Estimating Microbial Protein Supply in Ruminant Livestock for Improving Productivity. In: Estimation of Microbial Protein Supply in Ruminants Using Urinary Purine Derivative. H. P. S. Makkar and X. B. Chen, eds. Springer Science_Business Media, Dordrecht. pp 1-13.
- McSweeney, C.S., S. E. Denman and R. I. Mackie. 2005. Rumen Bacteria. In: Methods in Gut Microbial Ecology for Ruminants. H. P. S. Makkar and C. S. MsSweeney, eds. Springer, Netherland. pp 23-37



- Marapana, R.A.U.J. and T. Seresinhe. 2007. Effect of feeding regime on growth, digestibility and excretion of purine derivatives in goats. Proceedings of the fourth academic. pp 23-26.
- Mahesti, G. 2009. Pemanfaatan Protein pada Domba Lokal Jantan dengan Bobot Badan dan Aras Pemberian Pakan yang Berpengaruh. Tesis. Fakultas Peternakan, Universitas Diponegoro, Semarang.
- Menezes, G.C.C., S. C. V. Filho, F. A. Magalhães, R. F. D. Valadares, L. D. Mariz, E. Detmann, O. G. Pereira, and M. I. Leão. 2011. Total and partial digestibility, rates of digestion obtained with rumen evacuation and microbial protein synthesis in bovines fed fresh or ensiled sugar cane and corn silage. *R. Bras. Zootec.* 40(5):1104-1113.
- Maan, R. and N. Kataria. 2012. Serum xanthine oxidase profile in stressed Marwari sheep from arid tracts in India. *J. Stress Physiol. Biochem.* 8(3):189-195.
- Maeda, E. M., L. M. Zeoula, C. C. Jobim, U. Cecato, L. P. Rigolon, R. Kazama, G. Jacob, A. F. G. Carvalho. 2012. Intake, digestibility, rumen characteristics and microbial protein synthesis efficiency in bovine and bubaline fed sugar cane silage with additives. *Re. Bras. Zootec.* 41(3):707-716.
- Ma, T., K.-D.Deng, Y.Tua, N.-F.Zhang, C.-G.Jiang, J.Liu, Y.-G.Zhao, and Q.-Y.Diao. 2014. Effect of dietary forage to concentrate ratios on urinary excretion of purine derivatives and microbial nitrogen yields in the rumen of Dorper crossbred sheep. *Livest. Sci.* 160(1):37-44.
- Matsuo, H., T. Takada, A. Nakayama, T. Shimizu, M. Sakiyama, S. Shimizu, T. Chiba, H. Nakashima, T. Nakamura, Y. Takada, Y. Sakurai, T. Hosoya, N.Shinomiya, and K. Ichida. 2014. ABCG2 dysfunction increases the risk of renal overload hyperuricemia. *Nucleosides, Nucleotides and Nucleic Acids.* 33(4-6):266-274.
- Maksimovic, N., S. Hristov, B. Stanković, M. P. Petrović, C. Mekić, D. Ruzić-Muslić, V. Caro-Petrović. 2016. Investigation of serum testosterone level, scrotal circumference, body mass, semen characteristics, and their correlations in developing MIS lambs. *Turk. J. Vet. Anim. Sci.* 40(1): 53-59.
- McCoard, S. A., F. A. Sales, and Q. L. Sciascia. 2016. Amino acids in sheep production. *Front. Biosci.* 8: 264-288.
- Mohamad, N., I. Soelaiman, K. Chin. 2016. A concise review of testosterone and bone health. *Clin. Interv. Aging.* 11:1317–1324.
- Matsubayashi, M., Y. M. Sakaguchi, Y. Sahara, H. Nanaura, S. Kikuchi, A. Asghari, L. Bui, S. Kobashigawa, M. Nakanishi, R. Nagata, T. K. Matsui, G. Kashino, M. Hasegawa, S. Takasawa, M. Eriguchi, K. Tsuruya, S. Nagamori, K. Sugie, T. Nakagawa, M. Takasato, M. Umetani, E. Mori. 2021. 27-Hydroxycholesterol regulates human SLC22A12 gene expression through estrogen receptor action. *Faseb J.* 35(1):1-15.



- Natsir, A. 2007. Ekskresi Derivat Purin dan Estimasi Suplay Protein Mikrobia pada Ternak Domba yang Mendapat Suplemen Protein Berbeda. JITV. 12(3):183-188.
- Niwinska, B. 2012. Digestion in Ruminants. Pages 245-246 in Caebohydrates: Comprehensive Studies on Glycobiology and Glycotechnology. C. F. Chang, ed. InTech, Croatia.
- Norris, D. O. and J. A. Carr. 2013. Vertebrate Endocrinology. 5th ed. Academic Press, Cambridge, Massachusetts, USA.
- Nilsson, O., M. Weise, E. B. M. Landman, J. L. Meyers, K. M. Barnes, and J. Baron. 2014. Evidence that estrogen hastens epiphyseal fusion and cessation of longitudinal bone growth by irreversibly depleting the number of resting zone progenitor cells in female rabbits. Endocrinology.155(8): 2892–2899.
- Norman, A. W. and H. L. Henry. 2015. Hormones. 3rd ed. Academic Press, Cambridge, Massachusetts, USA.
- Nagaraja, T. G. 2016. Microbiology of the rumen. in Rumenology. D. D. Millen, M. D. B. Arrigoni, R. D. L. Pacheco, eds. Springer International Publishing, Switzerland. pp 39-62.
- Owens, F. N. and M. Basalan. 2016. Ruminal Fermentation. In: Ruminology. D. D. Millen, M. D. B. Arrigoni, and R. D. L. Pacheco, eds. Springer International Publishing, Switzerland. pp 63-102
- Olatunji, L. A., E. D. Areolaa, and O. O. Badmus. 2018. Endoglin inhibition by sodium acetate and flutamide ameliorates cardiac defective G6PD-dependent antioxidant defense in gestational testosteroneexposed rats. Biomed. Pharmacother. 107:1641-1647.
- Pond, W. G., D. C. Church, K. R. Pond, and P. A. Schoknecht. 2005. Basic Animal Nutrition and Feeding. 5th ed. John Wiley & Sons, Inc. USA.
- Pathak, A. K. 2008. Various factors affecting microbial protein synthesis in the rumen. Veterinary World. 1(16):186-189.
- Paengkoum, P. and M. Wanapat. 2009. Utilization of Concentrate Supplements Containing Varying Levels of Sunflower Seed Meal by Growing Goats Fed a Basal Diet of Corn Silages. Pak. J. Nutr. 8(8):1229-1234.
- Prasad, S. B. 2010. Plasma membrane: structure and transport. In: Cellular and Biochemical Sciences. G. Tripathi, ed. I. K. International Publishing House Pvt. Ltd. New Delhi. pp 3-36.
- Pang, B., J. L. McFalinea, N. E. Burgisb, M. Donga, K. Taghizadehc, M. R. Sullivana, C. E. Elmquista, R. P. Cunninghamb, and P. C. Dedon. 2012. Defects in purine nucleotide metabolism lead to substantial incorporation of xanthine and hypoxanthine into DNA and RNA. Proceedings of The National Academy of Sciences of The United Atates of America. 109(7):2319-2324.
- Patnaik, B. K., T. C. Kara, S. N. Ghosh, and A. K. Dalai. 2012. Textbook of Biotechnology. Tata McGraw Hill Eduation Private Limited, New Delhi.



- Purwati, C. S. 2012. Kontribusi ekskresi basal purin terhadap total ekskresi derivat purin dalam urin kambing bligon dan kejobong. Tesis. Magister Ilmu Peternakan, Fakultas Peternakan. Universitas Gadjah Mada, Yogyakarta.
- Pengpeng, W. dan Z. Tan. 2013. Ammonia Assimilation in Rumen Bacteria: A Review. Anim Biotechnology. 24(2): 107-128.
- Polyorach, S. and M. Wanapat. 2014. Improving the quality of rice straw by urea and calciumhydroxide on rumen ecology, microbial protein synthesis in beef cattle. J. Anim. Physiol. Anim. Nutr. 99(3):449–456.
- Parham, P. 2015. The Immune System. 4th ed. Garland Science, New York, USA.
- Putra, D., L. M. Yusiaty, dan R. Utomo. 2016. Estimasi sintesis protein mikroba rumen menggunakan ekskresi derivat purin dalam urin dengan teknik spot sampling pada kambing bligon dan kambing kejobong. Buletin Peternakan. 40(3):178-186.
- Patton, K. T. and G. Thibodeau. 2019. Anatomy and Physiology. Elsevier, Amsterdam, Netherland.
- Qi, M., K. D. Jakober, and T. A. McAllister. 2010. Rumen microbiology. In: Animal and Plant Productivity. R. J. Hudson, ed. Eolss Publishers, UK. pp 161-176
- Quentin, A. G., E. A. Pinkard, M. G. Ryan, D. T. Tissue, L. S. Baggett, H. D. Adams, P. Maillard, J. Marchand, S. M. Landhäuser, A. Lacointe, Y. Gibon, W. R.L. Anderegg, S. Asao, O. K. Atkin, M. Bonhomme, C. Claye, P. S. Chow, A. Clément-Vidal, N. W. Davies, L. T. Dickman, R. Dumbur, D. S. Ellsworth, K. Falk, L. Galiano, J. M. Grünzweig, H. Hartmann, G. Hoch, S. Hood, J. E. Jones, T. Koike, I. Kuhlmann, F. Lloret, M. Maestro, S. D. Mansfield, J. Martínez-Vilalta, M. Maucourt, N. G. McDowell, A. Moing, B. Muller, S. G. Nebauer, Ü. Niinemets, S. Palacio, F. Piper, E. Raveh, A. Richter, G. Rolland, T. Rosas, B. S. Joanis, A. Sala, R. A. Smith, F. Sterck, J. R. Stinziano, M. Tobias, F. Unda, M. Watanabe, D. A. Way, L. K. Weerasinghe, B. Wild, E. Wiley and D. R. Woodruff. 2015. Non-structural carbohydrates in woody plants compared among laboratories. Tree Physiol. 35(11):1146-1165.
- Rotger, A., A. Ferret, S. Calsamiglia, and X. Manteca. 2006. Effects of nonstructural carbohydrates and protein sources on intake, apparent total tract digestibility, and ruminal metabolism in vivo and in vitro with high-concentrate beef cattle diets. J. Anim. Sci. 84(5):1188-1195.
- Rodriguez, R., A. Sosa, and Y. Rodríguez. 2007. Microbial protein synthesis in rumen and its importance to ruminants. Cuba. J. Agric. Sci. 41(4):287-294.
- Ramirez-Perez, A. H., D. Sauvanta, and F. Meschya. 2009. Effect of phosphate solubility on phosphorus kinetics and ruminal fermentation activity in dairy goats. Anim. Feed Sci. Technol. 149(3-4):209-227.
- Reddy, B. V, A. S. Sivakumar, D. W. Jeong, Y. B. Woo, S. J. Park, , S. Y. Lee, J. Y. Byun, C. H. Kim, S. H. Cho, and I. Hwang. 2015. Beef quality traits of



heifer in comparison with steer, bull and cow at various feeding environments. *Anim. Sci. J.* 86(1):1-16.

- Riznaya, P., A. Rochana, D. Latipudin, and I. Hernaman. 2019. The Effect of Energy and protein balance ration to the garut ewes' growth. *JalSPro.* 3(1):158-156.
- Rama, K. A. 2021. Karakteristik siklus estrus dan tingkat keberhasilan perkawinan domba Garut dara. Tesis. Magister Veterinary Medicine. Institut Pertanian Bogor, Bogor.
- Sumantri, C., A. Einstiana, J.F. Salamena, dan I. Inounu. 2007. Keragaan dan Hubungan Phylogenik antar Domba Lokal di Indonesia melalui Pendekatan Analisis Morfologi. *JITV.* 12(1):42-54.
- Schultheisz, H. L., B. R. Szymczyna, L. G. Scott and J. R. Williamson. 2008. Pathway Engineered Enzymatic de novo Purine Nucleotide Synthesis. *ACS Chem. Biol.* 3(8):499-511.
- Seo, J. K., J. Yanga, H. J. Kim, S. D. Upadhyaya, W. M. Cho and J. K. Ha. 2010. Effects of Synchronization of Carbohydrate and Protein Supply on Ruminal Fermentation, Nitrogen Metabolism and Microbial Protein Synthesis in Holstein Steers. *Asian-Aust J. Anim.* 23(11):1455-1461.
- Squire, E. J. 2010. *Applied Animal Endocrinology*. CABI, Wallingford, UK.
- Schmidt, J. and E. Zsedely. 2011. *Nutrition of Ruminants*. University of West-Hungary, Hungary.
- Stern, M. D. 2011. Rumen Physiology. In: Minnesota Dairy Health Conference. University of Minnsota, St. Paul, Minnesota. pp 100-118
- Stilwell, G. and R. C. Carvalho. 2011. Clinical outcome of calves with failure of passive transfer as diagnosed by a commercially available IgG quick test kid. *Can. Ve. J.* 52(5):524-526.
- Stentoft, C., B. A. Røjen, S. K. Jensen, N. B. Kristensen, M. Vestergaard and M. Larsen. 2015. Absorption and intermediary metabolism of purines and pyrimidines in lactating dairy cows. *Br. J. Nutr.* 113(4):560–573.
- Santos, E. D. J. D., M. L. A. Pereira, M. P. De Figueiredo, H. G. D. O. Silva, , J. F. Da Cruz, F. O. Barret And L. B. Sousa. 2016. Crude protein levels in diets of lactating goats: nitrogen balance, urea excretion and microbial protein synthesis. *J. Agric. Sci.* 154(6):1102–1109.
- Seifried, N., H. Steinga, W. Schipprack, and M. Rodehutscord. 2016. Variation in ruminal in situ degradation of crude protein and starch from maize grains compared to in vitro gas production kinetics and physical and chemical characteristics. *Arch. Anim. Nutr.* 70(5):333-349.
- Stoker, H. S. 2016. *Organic and Biological Chemistry*. 7th ed. Cengage Learning, Boston, USA.
- Subhandiawan, H., S. B. Komar, N. Suwarno. 2016. Persamaan laju pertumbuhan domba lokal jantan dan betina umur 1-12 bulan yang ditinjau dari panjang badan dan tinggi pundak. *Students e-Journal.* 5(4): 1-13



- Satyana Rayana, U. and U. Chakrapani. 2017. Biochemistry. 5th ed. Elsevier, Amsterdam, Netherland.
- Schwab, C. G. and G. A. Broderick. 2017. A 100-Year Review: Protein and amino acid nutrition in dairy cows. *J.Dairy Sci.* 100(12):10094-10112.
- Shevchenko, K. V., I. Y. Nagaeva, L. A. Andreeva, V. P. Shevchenko, and N. F. Myasoedov. 2019. Stability of Proline-Containing Peptides in Biological Media. *Biomed. Chem.* 13(3):179-201.
- Supapong, C., A. Cherdthong, M. Wanapat, P. Chanjula, and S. Uriyapongson. 2019. Effects of sulfur levels in fermented total mixed ration containing fresh cassava root on feed utilization, rumen characteristics, microbial protein synthesis, and blood metabolites in thai native beef cattle. *Animals.* 9(261):1-11.
- Saghiv, M. S. and M. S. Sagiv. 2020. Basic Exercise Physiology: Clinical and Laboratory Perspectives. Springer, Berlin, Germany.
- Silverthorn, D. U. 2020. Principles of Epithelial Transport. In: Basic Epithelial Ion Transport Principles and Function. K. L. Hamilton and D. C. Devor, eds. Springer Nature, Basingstoke, UK. pp 53-82.
- Stricker, S. A. 2022. Human Microanatomy: Cell Tissue and Organ Histology with Celebrity Medical Histories. CRC Press, Boca Raton.
- Thiriet, M. 2011. Cell and Tissue Organization in the Circulatory and Ventilatory System. Springer Science and Business Media, Berlin, Germany.
- Thiriet, M. 2012. Signaling at Cell Surface in the Circulatory and Ventilatory Systems. Springer Science and Business Media, Berlin, Germany.
- Tropp, B. E. 2012. Molecular Biology: Genes to Proteins. 4th ed. Jones and Bartlett Learning, Burlington, Massachusetts, USA.
- Trier, N., P. Hansen, and G. Houen. 2019. Peptides, Antibodies, Peptide Antibodies, and More. In. *J. Mol. Sci.* 20(24):1-22.
- Uddin, M. J. Khandaker, Z. H. Khan, M. Jasimuddin and M. M. H. Khan. 2015. Dynamics of microbial protein synthesis in the rumen - A Review. *Ann. Vet. Anim. Sci.* 2(5):117-131.
- Veum, T. L. 2010. Phosphorus and Calcium Nutrition and Metabolism. In: Phosphorus and Calcium Utilization and Requirements in Farm Animals. D. M. S. S. Vitti and E. Kebreab, eds. CABI, Oxfordshire, UK. pp 94-111
- Vecchio, D. D. and R. M. Murray. 2015. Biomolecular Feedback Systems. Princeton University Press, Princeton, New Jersey.
- Van Holde, K. E. and J. Zlatanova. 2018. The Evolution of Molecular Biology: The Search for the Secrets of Life. Academic Press, UK.
- Whitman W. B., D. R. Boone, Y. Koga, and J. Keswani. 2001. Taxonomy of methanogenic archaea. In: Bergey's manual of systematic bacteriology. G. M. Garrity, ed. Springer Verlag, New York. pp 211-213.
- Willmer, P., G. Stone, and I. Johnston. 2005. Environmental Physiology of Animals. 2nd ed. Blackwell Publishing, USA.



- Wankowska, M., T. Misztal, K. Romanowicz, A. Wojcik-Gładysz, and J. Polkowska. 2008. The intrapituitary endocrine events during maturation and timing of puberty in the female sheep. *Anim. Reprod. Sci.* 105(3-4): 258–271.
- Wanasundara, J. P. D. 2011. Proteins of Brassicaceae Oilseeds and their Potential as a Plant Protein Source. *Crit. Rev. Food. Sci. Nutr.* 51(7):635-677.
- Wijaya, G. H., M. Yamin, H. Nuraini, dan A. Esfandiari. 2016. Performans Produksi dan profil metabolismik darah domba garut dan jonggol yang diberi limbah tauge dan omega-3. *J. Veteriner.* 17(2):246-256.
- Wijaya, S. K., L. I. T. A. Tumbelaka, I. Supriatna, dan D. Tambajong. 2019. Evaluasi status reproduksi domba Garut jantan tipe tangkas. *Acta Vet. Indones.* 7(1):55-63.
- Wu, G. 2018. *Principles of Animal Nutrition*. CRC Press, Boca Raton.
- Yusiatyi, L. M. 2004. pengembangan metode sintesis protein mikroba rumen menggunakan ekskresi derivat purin dalam urin berbagai ternak ruminansia Indonesia. Disertasi. Fakultas Peternakan. Universitas Gadjah Mada, Yogyakarta.
- Yang, J. Y, J. Seo, H. J. Kim, S. Seo, and Jong K. Ha. 2010. Nutrient Synchrony: Is it a Suitable Strategy to Improve Nitrogen Utilization and Animal Performance?. *Asian-Aust J. Anim. Sci.* 23(7):972-979.
- Yu, P., D. Damiran, A. Azarfar and Z. Niu. 2011. Detecting Molecular Features of Spectra Mainly Associated with Structural and Non-Structural Carbohydrates in Co-Products from BioEthanol Production Using DRIFT with Uni- and Multivariate Molecular Spectral Analyses. *Int. J. Mol. Sci.* 12(3):1921-1934.
- Yusiatyi, L. M. and. C. Hanim. 2013. Estimation of rumen microbial nitrogen supply based on purine derivatives excreted in the urine of kejobong and bligon goat feed by king grass and peanut straw. Proceeding 3rd AINI International Seminar. pp 38-42.
- Zadeh, J. B. Z. Moradi kor, and N. Moradi kor. 2013. Synchronization of energy and protein on supply synthesis microbial protein. *Int. J. Adv. Biol. Biom. Res.* 1(6):594-600.
- Zhu, W., Y. Fu, B. Wang , C. Wang, J. A. Ye , Y. M. Wu, and J.-X. Liu. 2013. Effects of dietary forage sources on rumen microbial protein synthesis and milk performance in early lactating dairy cows. *J. Dairy Sci.* 96(3):1727–1734.
- Zhang, L., J. Chung, Q. Jiang, R. Sun, J. Zhang, Y. Zhong, and N. Ren. 2017. Characteristics of rumen microorganisms involved in anaerobic degradation of cellulose at various pH values. *R. Soc. Chem.* 7(64):40303-40310.
- Zhao, Y., B. Xie, J. Gao, and G. Zhao. 2020. Dietary supplementation with sodium sulfate improves rumen fermentation, fiber digestibility, and the plasma metabolome through modulation of rumen bacterial communities in steers. *Appl. Environ. Microbiol.* 86(22):1-18.