

DAFTAR PUSTAKA

- Adamczyk, B., J. Simon, V. Kitunen, S. Adamczyk, dan A. Smolander. 2017. Tannins and their complex interaction with different organic nitrogen compounds and enzymes: old paradigms versus recent advances. *ChemistryOpen*. 6(5) : 610–614.
- Aguerre, M.J., M.C Capozzolo, P. Lencioni, C. Cabral, dan M.A. Wattiaux. 2016. Effect of quebracho-chestnut tannin extracts at 2 dietary crude protein levels on performance, rumen fermentation, and nitrogen partitioning in dairy cows. *J. Dairy Sci*. 99(6) : 4476–4486.
- Akoso, B.T. 2012. *Budi Daya Sapi Perah*, 2 ed. Airlangga University Press. Surabaya.
- Ali, C.S., Islam-Ud-Din, M. Sharif, M. Nisa., A. Javaid, N. Hashmi, dan M. Sarwar. 2009. Supplementation of ruminally protected proteins and amino acids: feed consumption, digestion and performance of cattle and sheep. *Int. J. Agric. Biol*. 11(4) : 477–482.
- Anas, M.A. 2015. Skripsi: Penambahan Tanaman Pakan Sumber Tanin Sebagai Agensi Penghambat Produksi Metan Ternak Domba Secara *In vitro*. Universitas Gadjah Mada.
- Anas, M.A., L.M. Yusiati, A. Kurniawati, dan C. Hanim. 2016. Evaluation of *Albazia chinensis* as tannins source for *in vitro* methane production inhibitor agents sheep rumen liquor. 6th Int. Semin. Trop. Anim. Prod. (October 2015) : 261–265.
- Andrade-Montemayor, H., T.G. Gasca, dan J. Kawas. 2009. Ruminal fermentation modification of protein and carbohydrate by means of roasted and estimation of microbial protein synthesis. *R. Bras. Zootec*. 38277–291.
- Astuti, M. 1981. Rancangan Percobaan dan Analisis Statistik Bagian II (Randomized Complete Block Designs, Repeated Measurement and Split Plot Designs). Bagian Pemuliaan Ternak. Fakultas Peternakan. Universitas Gadjah Mada. Yogyakarta.
- Attia, M.F.A., A.N.N. El-din, dan S.M. Sallam. 2013. Effect of quebracho tannins supplementation on nutrients utilization and rumen fermentation characteristics in sheep. 58(2) : 165–171.
- Azzahra, R.M.. 2018. Skripsi: Analisis Morfofisiologis Mahoni (*Swietenia macrophylla King*). Universitas Hasanuddin Makasar.
- Bachruddin, Z. 2014. *Teknologi Fermentasi Pada Industri Peternakan*. Gadjah Mada University Press. Yogyakarta.

- Banaszkiewicz, T. 2011. Nutritional Value of Soybean Meal, Soybean and Nutrition, Prof. Hany El-Shemy, ScienceTM Core Collection. InTech Published. Croatia.
- Barry, T.N., dan Manley, T.R. 1984. The role of condensed tannins in the nutritional value of *Lotus pedunculatus* for sheep. *Br. J. Nutr.* 51493–504.
- Bauman, D.E., dan Lock, a L. 2006. Concepts in lipid digestion and metabolism in dairy cows. *Proceeding Tri-State Dairy Nutr. Conf.* (607) : 1–14.
- Bauman, D.E., J.W. Perfield II, M.J. De Veth, dan A.L. Lock. 2003. New perspectives on lipid digestion and metabolism in ruminants. *Proc. Cornell Nutr. Conf.* 175–189.
- Besharati, M., dan Taghizadeh, A. 2011. Effect of tannin-binding agents (polyethylene glycol and polyvinylpyrrolidone) supplementation on *in vitro* gas production kinetics of some grape yield byproducts. *ISRN Vet. Sci.* 20111–8.
- Bhatta, R., O. Enishi, Y. Yabumoto, I. Nonaka, N. Takusari, K. Higuchi,, K. Tajima, A. Takenaka, dan M. Kurihara. 2013. Methane reduction and energy partitioning in goats fed two concentrations of tannin from *Mimosa* spp. *J. Agric. Sci.* 151(1) : 119–128.
- Cahyani, R.D., L.K. Nuswantara, dan A. Subrata. 2012. Pengaruh proteksi protein tepung kedelai dengan tanin daun bakau terhadap konsentrasi amonia, undegardes protein dan protein total secara *in vitro*. *Anim. Agric. J.* 1(1) : 159–166.
- Cannas, A. 2014. Tannins: Fascinating but Sometimes Dangerous Molecules. Cornell University Department of Animal Science. USA.
- Carrera, C.S., C.M. Reynoso, G.J. Funes, M.J. Martínez, J. Dardanelli, dan S.L. Resnik. 2011. Amino acid composition of soybean seeds as affected by climatic variables. *Pesqui. Agropecu. Bras.* 46(12) : 1579–1587.
- Castillo-González, A., M. Burrola-Barraza, J. Domínguez-Viveros, dan A. Chávez-Martínez. 2014. Rumen microorganisms and fermentation. *Arch Med Vet.* 46349–361.
- Chaney, A.L., dan Marbach, E.P. 1962. Modified reagents for determination of urea and ammonia. *Clin. Chem.* 8130–132.
- Das, L.K., S.S. Kundu, D. Kumar, dan C. Datt. 2014. Metabolizable protein systems in ruminant nutrition. *Vet. World.* 7(8) : 622–629.

- Diaz, A., M. Avendano, dan A. Escobar. 1993. Evaluation of *Sapindus saponaria* as a defaunating agent and its effects on different ruminal digestion parameters. *Res. Rural Dev.* 5:(2) : 1–6.
- FAO. 2000. Quantification of Tannins in Tree Foliage, FAO/ IAEA. Vienna.
- Filípek, J., dan Dvořák, R. 2009. Determination of the volatile fatty acid content in the rumen liquid: Comparison of gas chromatography and capillary isotachopheresis. *Acta. Vet. Brno.* 78(4) : 627–633.
- Frutos, P., G. Hervás, F.J. Giráldez, dan A.R. Mantecón. 2004. Tannins and ruminant nutrition. *Spanish J. Agric. Res.* 2(2) : 191.
- Grieshop, C.M., dan Fahey, G.C. 2001. Comparison of quality characteristics of soybeans from Brazil, China, and the United States. *J. Agric. Food Chem.* 49(5) : 2669–2673.
- Hartadi, H., S. Reksohadiprodjo, S. Lebdosukojo, A.D. Tillman, M.S. Kerley, dan L.E. Harris. 1980. Tabel-Tabel dari Komposisi Bahan Makanan Ternak untuk Indonesia. UGM Press. Yogyakarta.
- Hasanah, C. 2019. Skripsi: Pengaruh Penggunaan Legume Bertanin *Swietenia mahagoni* Terhadap Produksi Metan Dan Keragaman Bakteri Metanogenik Pada Fermentasi Rumen Secara *In vitro*, Fakultas Peternakan Universitas Gadjah Mada. Yogyakarta.
- Hebblewhite, M., E. Merrill, dan G. McDermid. 2008. A multi-scale test of the forage maturation hypothesis for a partially migratory montane elk population. *Ecol. Monogr.* 78(2) : 141–166.
- Heuzé, V., G. Tran, S. Giger-Reverdin, dan F. Lebas. 2016. Elephant grass (*Pennisetum purpureum*) Feed. a Program. by INRA, CIRAD, AFZ FAO. . <https://www.feedipedia.org/node/395> Last updated on June 23, 2016, 17:09.
- Heuzé, V., G. Tran, dan S. Kaushik. 2017. Soybean meal Feed. a Program. by INRA, CIRAD, AFZ FAO. . <https://www.feedipedia.org/node/674>.
- Jayanegara, A., H.P.S. Makkar, dan K. Becker. 2009. Emisi metana dan fermentasi rumen *in vitro* ransum hay yang mengandung tanin murni pada konsentrasi rendah. *Media Peternak.* 32(3) : 184–194.
- Johnson, L., dan Smith, K. 2004. Fact sheet: Soybean processing, The Soybean Meal Information Center. United Soybean Board. USA.
- Jouany, J.P. 1996. Effect of rumen protozoa on nitrogen utilization by ruminants. *JN J. Nut. Am. Inst. Nutr.* 126(4) : 1335–1346.

- Kartika, N.D., U. Tanuwiria, dan R. Hidayat. 2012. Pengaruh tingkat pemberian tepung ampas teh (*Camellia sinensis*) terhadap pencernaan bahan kering (KcBK) dan pencernaan bahan organik (KcBO) ransum sapi potong (*in vitro*). J. Produksi Ternak Terap. 1(1) : 0–4.
- Kerley, M.S., G.C. Fahey, L.L. Berger, N.R. Merchen, dan J.M Gould. 1987. Effects of treating wheat straw with ph-regulated solutions of alkaline hydrogen peroxide on nutrient digestion by sheep. J. Dairy Sci. 70(10) : 2078–2084.
- Khanbabaee, K., dan van Ree, T. 2001. Tannins: Classification and Definition. Nat. Prod. Rep. 18(6) : 641–649.
- Khoiriyah, M., S. Chuzaemi, dan H. Sudarwati. 2016. Effect of flour and papaya leaf extract (*Carica papaya L.*) addition to feed on gas production, digestibility and energy value *in vitro*. J. Ternak Trop. 17(2) : 74–85.
- Kraus, T.E., R.A. Dahlgren, dan R.J. Zasoski. 2003. Tannins in nutrient dynamics of forest ecosystems-a review. Plant Soil. 256(1) : 41–66.
- Mahanani, M.M.P. 2019. Skripsi: Pengaruh Penggunaan Daun Lamtoro (*Leucaena leucochepala*) Sebagai Sumber Tanin Terhadap Aktivitas Enzim Dan Kinetika Produksi Gas. Fakultas Peternakan Universitas Gadjah Mada. Yogyakarta.
- Makkar, H.P., dan Vercoe, P. 2007. Measuring Methane Production from Ruminants. Food and Agriculture Organization of The United Nations. Australia.
- Makkar, H.P.S. 1993. Antinutritional factors in foods for livestock. BSAP Occas. Publ. 16(16) : 69–85.
- Makkar, H.P.S., B. Singh, dan R.K. Dawra. 1988. Effect of tannin-rich leaves of oak (*Quercus incana*) on various microbial enzyme activities of the bovine rumen. Br. J. Nutr. 60(2) : 287–296.
- Mariani, N.P., dan Suryani, N.N. 2016. Kecernaan dan produk fermentasi rumen (*in vitro*) ransum sapi Bali induk dengan level energi berbeda. Maj. Ilm. Peternak. 19(3) : 93–96.
- Masito, G.A.T., D.W. Respatie, dan R. Rogomulyo. 2014. The effect of five kinds of organic fertilizers on the growth and bioactive compounds of the soursop leaves (*Annona muricata L.*). 3(3) : 97–105.
- Mayangsari, N.S., A. Subrata, dan M. Christiyanto. 2013. Pengaruh proteksi protein ampas kecap dengan tanin terhadap konsentrasi amonia, produksi protein total dan persentase rumen undegraded dietary protein secara *in vitro*. Anim. Agric. J. 2(1) : 261–268.

- Maynard, L.A., dan Loosli, J. 1973. *Animal Nutrition*, 6 ed. Tata Mc. Graw Hill Publishing Company Ltd. New Delhi.
- McDonald, P., R.A. Edwards, J.F.D. Greenhalgh, C.A. Morgan, L.A. Sinclair, dan R.G. Wilkinson. 2002. *Animal Nutrition*, 7 ed. Pearson. UK.
- McSweeney, C.S., B. Palmer, D.M. McNeill, dan D.O. Krause. 2001. Microbial interactions with tannins: Nutritional consequences for ruminants. *Anim. Feed Sci. Technol.* 91(1–2) : 83–93.
- Menke, K.H., dan Steingass, H. 1987. Estimation of energetic feed value obtained from chemical analysis and *in vitro* gas production using rumen fluid. *Anim. Res. Dev.* 287–55.
- Millen, D.D., M.D.B. Arrigoni, dan R.D.L. Pacheco. 2016. *Rumenology*. Springer International Publishing. Switzerland.
- Min, B.R., S. Solaiman, R. Shange, dan J.S. Eun. 2014. Gastrointestinal bacterial and methanogenic archaea diversity dynamics associated with condensed tannin-containing pine bark diet in goats using 16S rDNA amplicon pyrosequencing. *Int. J. Microbiol.* Hal 1-11.
- Muhlisin, M.A. Anas, C. Hanim, dan L.M. Yusiati. 2017. Calliandra calothyrsus as tannins source for *in vitro* methane production inhibitor agents. *Prosiding; Contribution of Livestock Production on Food Sovereignty in Tropical Countries*, Yogyakarta 12-14 September 2017. Hal 133–136.
- Mulyana, D., dan Asmarahman, C. 2010. 7 Jenis Kayu Penghasil Rupiah. Agro Media Pustaka. Jakarta.
- Murtidjo, B.A. 1990. *Sapi Potong*. Kanisius. Yogyakarta.
- Novieta, I.D. 2016. Kualitas taiwan grass (*Pennisetum purpureum* CV. Taiwan) pada umut defoliiasi dan konsentrasi efektif mikroorganisme 4 (EM4) yang berbeda. *J. Galung Trop.* 5(3) : 171–177.
- Ørskov, E.. 1992. *Protein Nutrition in Ruminants* 2nd Edition, Second. ed. Academic Press Ltd. London.
- Orwa, C., A. Mutua, R. Kindt, R. Jamnadass, dan S. Anthony. 2009. *World Agroforestry Center: Swietenia mahagoni*, Agroforestry Database 4.0. Kenya.
- Ozkose, E., R. Kuloğlu, U. Comlekcioglu, B. Kar, I. Akyol, dan M.S. Ekinci. 2011. Effects of tannic acid on the fibrolytic enzyme activity and survival of some ruminal bacteria. *Int. J. Agric. Biol.* 13(3) : 386–390.

- Pathak, A.K. 2008. Various factors affecting microbial protein synthesis in the rumen. *Vet. World*. 1(6) : 186–189.
- Patra, A.K., B.R. Min, dan J. Saxena. 2012. *Dietary Phytochemicals and Microbes*, Springer Science+Business Media Dordrecht. Springer Science+Business Media Dordrecht. USA.
- Patra, A.K., dan Saxena, J. 2011. Exploitation of dietary tannins to improve rumen metabolism and ruminant nutrition. *J. Sci. Food Agric*. 91(1) : 24–37.
- Pfeffer, E., dan Hristov, A. 2005. *Nitrogen and Phosphorus Nutrition of Cattle*. CABI Publishing. UK.
- Plummer, D. 1987. *An Introduction to Practical Biochemistry*. McGraw-Hill Book. London.
- Prasetyono, B.W.H.E. 2008. Desertasi: Rekayasa suplemen protein pada ransum sapi pedaging berbasis jerami dan dedak padi. Institut Pertanian Bogor.
- Purbajanti, E., F. Silviana, dan F. Benowo. 2013. Potensi Rumput Gajah (*Pennisetum purpureum*) untuk Pakan Ternak Sapi Perah Di Kecamatan Getasan, Kabupaten Semarang. Prosiding Optimalisasi Sumberdaya dan Kearifan Lokal untuk Pengembangan Agribisnis dan Peningkatan Ketahanan Pangan, Semarang: 10 September 2013. Hal 842–846.
- Putra, S. 2006. Pengaruh suplementasi agensia defaunasi dan waktu inkubasi terhadap bahan kering, bahan organik terdegradasi dan produk fermentasi secara *in vitro*. *J. Protein*. 13(2) : 113–123.
- Rhoades, D.. 1979. Evolution of plant chemical defence against herbivores. In: *Herbivores: their interactions with secondary plant metabolites*. ACADEMIC PRESS, INC. USA.
- Rimbawanto, E.A., L.M. Yusiati, E. Baliarti, dan R. Utomo. 2015. Effect of condensed tannin of leucaena and calliandra leaves in protein trash fish silage on *in vitro* ruminal fermentation, microbial protein synthesis and digestibility. *Anim. Prod*. 17(2) : 83–91.
- Rodriguez, R., A. Sosa, dan Y. Rodriguez. 2007. Microbial protein synthesis in rumen and its importance to ruminants. *Cuba. J. Agric. Sci*. 41(4) : 287–294.
- Russell, J.B., dan Hespell, R.B. 1981. Microbial Rumen Fermentation. *J. Dairy Sci*. 64(6) : 1153–1169.
- Sandiah, N., Y. Pasolon, dan L. Sabaruddin. 2011. Uji keseimbangan hara dan variasi jarak tanam terhadap pertumbuhan dan produksi rumput Gajah. *Agriplus*. 21(2) : 94–100.

- Sasongko, W.T., L.M. Yusiati, dan Z. Bachruddin. 2010. Optimalisasi pengikatan tanin daun nangka dengan protein bovine serum albumin (optimalisation binding of jackfruit leaves tannin with bovine serum albumin protein). *Buletin Peternak*. 34(3) : 154–158.
- Seigler, D.. 1998. *Plant Secondary Metabolism*. Springer Science & Bussines Media. New York.
- Septiana, D. 2014. Analisis kadar alkaloid dan tanin tumbuhan beluntas (*Pluchea indica* Less.) pada lahan salin di Desa Asingi Kecamatan Tinanggea dan non salin di Desa Lambodijaya Kecamatan Lalembuu Sulawesi Tenggara. *Biowallacea*. 1(2) : 82–89.
- Sok, M., D.R. Ouellet, J.L. Firkins, D. Pellerin, dan H. Lapierre. 2017. Amino acid composition of rumen bacteria and protozoa in cattle. *J. Dairy Sci*. 100(7) : 5241–5249.
- Suhartanto, B., R. Utomo, Kustantinah, I.G. Budiarsana, L.M. Yusiati, dan B.P. Widyobroto. 2014. Pengaruh penambahan formaldehid pada pembuatan undegraded protein aktivitas mikrobial rumen secara *in vitro*. *Bul. Peternak*. 38(3) : 141–149.
- Suhono, B. 2010. *Ensiklopedia Biologi Dunia Tumbuhan*. PT Lentera Abadi. Jakarta.
- Sulastri, T. 2009. Analysis of concentration of tannins from ethanol and water extract at the pinang sirih seed (*Areca catechu* L). *J. Chem*. 10(1) : 59–63.
- Suryani, N.I.N., I.K. Mangku, B. Dan, dan I.P. Ari. 2014. Fermentasi rumen dan sintesis protein mikrobial kambing peranakan etawa yang diberi pakan dengan komposisi hijauan beragam dan level konsentrat berbeda. *Maj. Ilm. Peternak*. 17(2)56–60.
- Szumacher-Strabel, M., dan Cielak, A. 2012. Dietary possibilities to mitigate rumen methane and ammonia production. *Greenh. Gases - Capturing, Util. Reduct*. 200–238.
- Tan, H.Y., C.C. Sieo, N. Abdullah, J.B. Liang, X.D. Huang, dan Y.W. Ho. 2011. Effects of condensed tannins from leucaena on methane production, rumen fermentation and populations of methanogens and protozoa *in vitro*. *Anim. Feed Sci. Technol*. 169(3–4) : 185–193.
- Tandon, M., R.A. Siddique, dan T. Ambwani. 2008. Role of Bypass Proteins in Ruminant. *Dairy Plan*. 4(10) : 11–14.
- Vlaeminck, B., V. Fievez, Tamminga, R.J. Dewhurst, A. Van Vuuren, D. De Brabander, dan D. Demeyer. 2006. Milk odd- and branched-chain fatty acids in relation to the rumen fermentation pattern. *J. Dairy Sci*. 89(10) : 3954–3964.

- Wahyono, T., W.T. Sasongko, M. Sholihah, dan M.R. Pikoli. 2017. Pengaruh penambahan tanin daun nangka (*Artocarpus heterophyllus*) terhadap nilai biologis daun kelor (*Moringa oleifera*) dan jerami kacang hijau (*Vigna radiata*) secara *in vitro*. Bul. Peternak. 41(1) : 15.
- Wahyuni, I.M., A. Muktiani, dan M. Christiyanto. 2014. Penentuan dosis tanin dan saponin untuk defaunasi dan peningkatan fermentabilitas pakan. J. Ilmu dan Teknol. Peternak. 3(3) : 133–140.
- Waldi, L., W. Suryapratama, dan F.M. Suhartati. 2017. Pengaruh penggunaan bungkil kedelai dan bungkil kelapa dalam ransum berbasis indeks sinkronisasi energi dan protein terhadap sintesis protein mikroba rumen sapi perah. J. Livest. Sci. Prod. 1(1) : 1–12.
- Wang, Y., G.B. Douglas, G.C. Waghorn, T.N. Barry, A.G. Foote, dan R.W. Purchas. 1996. Effect of condensed tannins upon the performance of lambs grazing Lotus corniculatus and lucerne (*Medicago sativa*). J. Agric. Sci. 126(1) : 87–98.
- Wang, Y., dan Mcallister, T.A. 2002. Rumen microbes, enzymes and feed digestion. J. Anim. Sci. 15(11) : 1659–1676.
- Winding, S. 2014. Methane emission from nitrate-treated tannin rich feed for cattle in Vietnam Sofie Winding. Swedish University of Agricultural Sciences.
- Woods, V.B., F.P. O'Mara, dan A.P. Moloney. 2003. The nutritive value of concentrate feedstuffs for ruminant animals. Anim. Feed Sci. Technol. 110(1–4) : 111–130.
- Yusiati, L.M., A. Kurniawati, C. Hanim, dan M.A. Anas. 2018. Protein binding capacity of different forages tannin. Earth Environ. Sci. 1191–5.