DAFTAR PUSTAKA

Anonim, 2003. *Paraserianthes falcataria* (L.) Nielsen. Danida Forest Seed Centre. Denmark.

Abarghuei, M.J., Y. Rouzbehan, dan D. Alipour. 2011. Effect of oak (*Quercus libani* Oliv.) leave tannin on ruminal fermentation of sheep. Journal of Agriculture Science and Technology. 13: 1021-1032.

Abecia, L., P.G. Toral, A.I. Martín-García, G. Martínez, N.W. Tomkins, E. Molina-Alcaide, C.J. Newbold, D.R. Yáñez-Ruiz. 2012. Effect of bromochlorometane on metane emission, rumen fermentation pattern, milk yield, and fatty acid profile in lactating dairy goats. Journal of Dairy Science. 95: 2027–2036.

Aghamohamadi, N., F. Hozhabri, dan D. Alipour. 2014. Effect of oak acorn (*Quercus persica*) on ruminal fermentation of sheep. Small Ruminant Research. 120: 42–5.

Anantasook, N., M. Wanapat, A. Cherdthong, dan P. Gunun. 2013. Changes of microbial population in the rumen of dairy steers as influenced by plant containing tannins and saponins and roughage to concentrate ratio. Asian-Australas Journal of Animal Science. 26: 1583–1591.

Animut, G., R. Puchala, A.L. Goetsch, A.K. Patra, T. Sahlu, V.H. Varel, dan J. Wells. 2008. Metane emission by goats consuming different sources of condensed tannins. Animal Feed Science and Technology. 144: 228-241.

Annison, E.F., D.B. Lindsay, dan J.V. Nolan. Sheep Nutrition: Digestion and Metabolism. Cabi Publishing. CSIRO Plant Industry. Canberra, Australia.

AOAC. 2005. Official Method of Analysis of the Association of Official Analitycal Chemist. 18th ed. Maryland: AOAC International. William Harwitz (ed). United Stated of America.

Ashrafuzzaman, M., S. Kar, D. Khanam, dan S.H. Prodhan. 2012. In vitro regeneration and multiplication of jackfruit (*Artocarpus heterophyllus* L.). Research Journal of Biology. 2: 59-65.

Attia, M.F.A., A.N. Nour El-Din, K.A. El-Shazly, dan S.M. Sallam. 2013. Effect of quebracho tannins supplementation on nutrients utilization and rumen fermentation characteristics in sheep. Alexandria Journal of Agriculture Research. 58: 165-171.

Azad, A.K., J.G. Jones, dan N. Haq. 2007. Assesing morphological and isozyme variation of jackfruit (*Artocarpus heterophyllus* Lam.) in Bangladesh. Agroforest Systems. 71: 109-125.

Bhatta, R., Y. Uyeno, K. Tajima, A. Takenaka, Y. Yabumoto, I. Nonaka, O. Enishi, dan M. Kurihara. 2009. Difference in the nature of tannins on in vitro ruminal metane and volatile fatty acid production and on metanogenic archaea and protozoal populations. Journal of Dairy Science. 92: 5512–5522.

Beauchemin, K.A. dan S.M. McGinn. 2006. Metane emissions from beef cattle: effects of fumaric acid, essential oil, and canola oil. Journal of Animal Science. 84: 1489–1496.

Beauchemin, K.A., S.M. McGinn, dan H.V. Petit. 2007. Metane abatement strat-egies for cattle: lipid supplementation of diets. Journal of Animal Science. 87: 431–440.

Beauchemin, K.A., M. Kreuzer, F. O'Mara, T. McAllister. 2008. Nutritional management for enteric metane abatement: a review. Australian Journal of Experimental Agriculture. 48: 21–27.

Behlke, E.J. 2007. Attenuation of ruminal methanogenesis. Dissertation the University of Nebraska. Lincoln, Nebrasca.

Bennick, A. 2002. Interaction action of plant polyphenols with salivary proteins. Crit Rev Oral Biol Med. 13 (2): 184-196

Brask, M., P. Lund, M.R. Weisbjerg, A.L. Hellwing, M. Poulsen, M.K. Larsen, T. Hvelplund. 2013. Metane production and digestion of different physical forms of rapeseed as fat supplement in dairy cows. Journal of Dairy Science. 96: 2356–2365.

Bréas, O., C. Guillou, F. Reniero, dan E. Wada. 2001. The global methane cycle: isotopes and mixing ratios, sources and sinks. Isotopes Environmental and Health Studies. 37: 257–379.

Bueno, I.C.S, R.A. Brandi, R. Franzolin, G. Benetel, G.M. Fagundes, A. L. Abdalla, H. Louvandin, J.P. Muir. 2015. *In vitro* methane production and tolarance to condensed tannins in five ruminant species.Animal Feed Science and Technology 205: 1-9.

Busquet, M., S. Calsamiglia, A. Ferret, M.D. Carro, dan C. Kamel. 2005. Effect of garlic oil and four of its compounds on rumen microbial fermentation. Journal of Dairy Science. 88: 4393–4404.

Calabrò, S., S. Lopez, V. Piccolo, J. Dijkstra, M.S. Dhanoa, J. France. 2005. Comparative analysis of gas production profiles obtained with buffalo and sheep ruminal fluid as the source of inoculum. Animal Feed and Tecnology Science 123: 51-65

Calabrò, S., G. Moniello, V. Piccolo, F. Bovera, F. Infascelli, R. Tudisco, M.I., Cutrigneli. 2008. Rumen fermentation and degradability in

buffalo and cattle using the *in vitro* gas production technique. Journal Animal Physicology Animal Nutrition. 92:356-362.

Calabrò, S., M.I. Cutrignelli, A. Guglielmelli, R. Tudisco, V. Piccolo, M. Grossi, dan F. Infascelli. 2012. *In vitro* metane production from different feeds. Proc. 1st International Conference on Animal Nutrition and Environment, Sep. 14–15, Khon Kaen (Thailand), pp 109–112.

Calsamiglia, S., M. Busquet, P. Cardozo, L. Castillejos, A. Ferret. 2007. Inveted review: essential oils as modifiers of rumen microbial fermentation. Journal Dairy Science 90: 2580-2595.

Cannas, Antonello. 2014. Tannins: fascinating but sometimes dangerous molecules. Cornell University Department of Animal Science. USA

Carro, M.D. dan M.J. Ranilla. 2003. Influence of different concentrations of disodium fumarate on metane production and fermentation of concentrate feeds by rumen microorganisms in vitro. British Journal of Nutrition. 90: 617–623.

Carulla, J. E., M. Kreuzer, A. Machmuller, dan H. D. Hess. 2005. Supplementation of *Acacia mearnsii* tannins decreases metanogenesis and urinary nitrogen in forage fed sheep. Australian Journal of Agriculture Research. 56: 961-970.

Cieslak, A., M. Szumacher-Strabel, A. Stochmal, dan W. Oleszek. 2013. Plant components with specific activities against rumen metanogens. Animal. 7:253–265

Chaney, A.L. dan E.P. Marbach. 1962. Modified reagents for determination of urea and ammonia. Clinical Chemistry. 8: 130 - 132.

Chaudhary, L.C., N. Agarwal, V. Verma, K. Rikhari, dan D.N. Kamra. 2011. Effect of feeding tannin degrading bacteria (Isolate-6) on rumen fermentation, nutrient utilization and growth performance of goats fed on Ficus infectoria leaves. Small Ruminant Research. 99: 143–147.

Cheeke, P.R. 1999. Actual and potential application of *Yucca schidigera* and *Quillaja saponaria* saponins in human and animal nutrition. Proceedings of the American Society of Animal Science: 1–10.

Clemens, J. dan H.J. Ahlgrimm. 2001. Greenhouse gases from animal husbandry mitigation option. Nutrient Cycling in Agro ecosystems 60: 287-300.

Coates J.D., C.F. Michael, dan E. Colleran. 1996. Simple method for the measurement of the hydrogenotrophic methanogenic activity of anaerobic sludges. J.Microbiol. Methods. 26: 237 - 246.

Cortés, J.E., B. Moreno, M.L. Pabón, P. Avila, M. Kreuzer, H.D. Hess, J.E. Carulla. 2009. Effects of purified condensed tannins extracted from Calliandra, Flemingia and Leucaena on ruminal and postruminal degradation of soybean meal as estimated *in vitro.* Journal Animal Feed Science and Technology, 151: 194-204

Daning, D. R. A. 2010. Tanin limbah teh hitam (*Camellia sinensis*) sebagai agen defaunasi untuk menurunkan produksi metan secara *in vitro*. Fakultas Peternakan UGM.

Denman, S.E., N.W. Tomkins, C.S. McSweeney. 2007. Quantitation and diversity analysis of ruminal metanogenic populations in response to the anti-metanogenic compound bromochlorometane. Federation of European Microbiology Sciences. 62: 313–322.

DeRamus, H.A, T.C. Clement, D.D. Giampola, dan P.C. Dickison. 2003. Methane emissions of beed cattle on forages: efficiency of grazing management system. Journal of Environmental Science Societies. 32: 269-277.

Dentinho, M. T.P., A. T. Belo, dan R. J.B Bessa. 2014. Digestion, ruminal fermentation and microbial nitrogensupply in sheep fed soybean meal treatedwith *Cistus ladanifer* L. tannins. Small Ruminant Research, 119: 57-64.

Diaz, A., M. Avendro, dan A. Escobar. 1993. Evaluation of sapindus saponaria as a defaunating agent and its effects on different ruminal digestion paramaters. Livestock research for Rural Development. 5 (2): 1 - 6.

Ding, X., R. Long, Q. Zhang, X. Huang, X. Guo, J. Mi. 2012. Reducing metane emissions and the metanogen population in the rumen of Tibetan sheep by dietary supplementation with coconut oil. Tropical Animal Health and Production. 44: 1541–1545.

Dohme, F., A. Machmüller, A. Wasserfallen, dan M. Kreuzer. 2000. Comparative efficiency of various fats rich in medium-chain fatty acids to suppress ruminal metanogenesis as measured with RUSITEC. Canadian Journal of Animal Science. 80: 473–484.

Filipek, J. dan R. Dvorak. 2009. Determination of the volatile fatty acid content in the rumen liquid: comparison of gas chromatograpy and capillary isotachophoresis. Acta Vet. Brno. 78: 627 - 633.

Finlay, B. J., G. Esteban, K. J. Clarke, A. G. Wiliams, T. M. Embley, and R. P. Hirt. 1994. Some rumen ciliates have endosymbiotic metanogens. EMS Microbial. 117: 157-162.

FAO. 2006. Livestock's Long Shadow Environmental Issues and Option. Rome: FAO.

FAO. 2013. Tackling Climate through Livestock: A Global Assessment of Emissions and Mitigation Opportunities. Rome: FAO.

Foley, P., D. Kenny, J. Callan, T. Boland, dan F. O'Mara. 2009. Effect of DL-malic acid supplementation on feed intake, metane emission, and rumen fermentation in beef cattle. Journal of Animal Science. 87: 1048–1057.

Foster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz, dan R.V. Dorland. 2007. Changes in Atmospheric constituents and in radiative forcing. In: Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt KB, Tignor M, Miller HL (eds) Climate change 2007: the physical science basis. Contribution of working group I to the fourth assessment report of the intergovernmental panel on climate change. Cambridge University Press, Cambridge, pp 131–217.

Gandra, J.R., P.C.N. Gil, N.R.B. Cônsolo, E.R.S. Gandra, dan A.A.O. Gobesso. 2012. Addition of increasing doses of ricinoleic acid fromcastor oil (*Ricinus communis* L.) in diets of Nellore steers in feedlots. Journal of Animal and Feed Science. 21: 566–576.

García-Martínez, R., M.J. Ranilla, M.L. Tejido, dan M.D. Carro. 2005. Effects of disodium fumarate on in vitro rumen microbial growth, metane production and fermentation of diets differing in their forage:con-centrate ratio. British Journal of Nutrition. 94: 71–77.

Gerber, P.J., H. Steinfeld, B. Henderson, A. Mottet, C. Opio, J. Dijkman, A. Falcucci, dan G. Tempio. 2013. Tackling climate change through livestock: A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO). Rome.

Giraldo, L.A., M.J. Ranilla, M.L. Tejido, M.D. Carro. 2007. Influence of exogenous fibrolytic enzyme and fumarate on metane production, microbial growth and fermentation in Rusitec fermenters. British Journal of Nutrition. 98: 753–761.

Godland, R. dan J. Anhang. 2009. Livestock and Climate Change. World Watch.

Goel, G., A.K. Puniya, C.N. Aguilar, dan K. Singh. 2005. Interaction of gut microflora with tannins in feeds. Naturwissenschaften. 92: 497–503.

Goel, G. dan H.P.S. Makkar. 2012. Methane mitigation from ruminants using tannins and saponins. Tropical Animal Health and Production. 44: 729–739.

Grainger, C. dan K.A. Beauchemin. 2011. Can entericmetane emissions from ruminants be lowered without lowering their production?. Animal Feed Science and Technology. 166–167: 308–320.

Guglielmelli, A., S. Calabro, R. Primi, F. Carone, M.I. Cutrignelli, R. Tudisco, G. Piccolo, B. Ronchi, dan P.P. Danieli. 2011. In vitro fermentation patterns and metane production of sainfoin (*Onobrychis viciifolia* Scop.) hay with different condensed tannin contents. Grass and Forage Science. 66: 488–500.

Hanim, C., L.M. Yusiati, dan I.M. Santo. 2004. Pengaruh penambahan daun ketepeng cina sebagai sumber saponin pada pakan terhadap fermentasi rumput raja dan dedak halus di dalam rumensecara *in vitro*. Proceeding Seminar Nasional Dies Natalis ke-38. Fakultas Peternakan, Universitas Gadjah Mada. Yogyakarta.

Hartung, E., dan G.J. Monteny. 2000. Metane (CH_4) and nitrous oxide (N_2O) emissions from animal husbandry. Agrartechnische Forschung. 6: 62–69.

Hendriawan, I., F. Achmad, dan S. Armiadi. 2014. Karakteristik dan Pemanfaatan Kaliandra (*Calliandra calothyrsus*). Lokakarya Nasional Tanaman Pakan Ternak. Bogor.

Hervás, G., P. Frutos, A. R. Mantecón, dan F. J. Giráldez. 2004. Effect of the administration of quebracho extract on rumen fermentation and diet digestibility in sheep. Spanish Journal of Agricultural Research 2: 63-71.

Hess, H.D., T.T. Tiemann, F. Noto, J.E. Carulla, dan M. Kreuzer. 2006. Strategic use of tannins as means to limit metane emission from ruminant livestock. International Congress Series. 1293: 164–167.

Hook, S.E., A.D. Wright, dan B.W. McBride. 2010. Metanogens: metane producers of the rumen and mitigation strategies. Hindawi Publishing Corporation, Archaea. doi:10.1155/2010/945785, Article ID 945785.

Huntington, G.B. 1997. Starch utilization by ruminant: from basic to the bunk. Journal of Animal Science. 75: 52-67.

Isah, O.A., S.A. Oguntuyo, R.O. Dawodu, O.O Diya, M.O. Afolabi, dan L.A Omoniyi. 2013. Feed utilization, rumen parameters, and microbial profile of goats fed different tropical browse plants with *Pennisetum purpureum* as basal diet. The Pasific Journal of Science and Technology Vol. 14.

Ismarani. 2012. Potensi senyawa tanin dalam menunjang produksi peternakan ramah lingkungan. Jurnal Agribisnis dan Pengembangan Wilayah. 3: 46-55.

Jayanegara, A. dan A. Sofyan. 2008. Penentuan aktivitas biologis tanin beberapa hijauan secara *in vitro* menggunakan “Honheim Gas Test” dengan polietilen glikol sebagai determinan. Media Peternakan. 51: 44-52.

Jayanegara, A., E. Wina, C.R. Soliva, S. Marquardt, M. Kreuzer, dan F. Leiber. 2011. Dependence of forage quality and metanogenic potential of tropical plants on their phenolic fractions as determined by principal component analysis. Animal Feed Science and Technology. 163: 231–243.

Jayanegara, A., H.P.S. Makkar, dan K. Becker. 2009. Emisi metan dan fermentasi rumen *in vitro* ransum *hay* yang mengandung tanin murni pada konsentrasi rendah. Media Peternakan. 32: 184-194.

Jayanegera, A., F. Leiber, dan M. Kreuzer. 2011. Meta-analysis of the relationship between dietary tannin level and metane formation in ruminants from *in vivo* and *in vitro* experiments. Journal of Animal Physiology and Animal Nutrition. 96: 365–375.

Johnson, K.A. dan D.E. Johnson. 1995. Metane emissions from cattle. Journal of Animal Science. 73: 2483 - 2492.

Jordan, E., D. Lovett, F. Monahan, J. Callan, B. Flynn, dan F. O'Mara. 2006. Effect of refined coconut oil or coprameal on metane output and on intake and performance of beef heifers. Journal of Animal Science. 84: 162–170.

Kähkönen, M.P., A.I. Hopia, dan M. Heinonen. 2001. Berry phenolics and their antioxidant activity. Journal of Agricultural and Food Chemistry. 49: 4076-4082.

Kamra, D. N. 2005. Rumen microbial ecosystem. Special Section: Microbial Diversity Current Science. 89:124-135.

Kamra, D.N., M. Pawar, dan B. Singh. 2012. Effect of plant secondary metabolites on rumen metanogens and metane emissions by ruminants. Dieatry Phytochemichals and Microbes. 12: 351-370.

Key, N. dan G. Tallard. 2012. Mitigating metane emissions from livestocks: a global analysis of sector policies. Climatic Change. 112: 387-414.

Kong, Y., M. He, T. McAlister, R. Seviour, dan R. Forster. 2010. Quantitative fluorescence in situ hybridization of microbial communities in the rumens of cattle fed different diets. Applied and Environmental Microbiology. 76: 6933-6938.

Kozloski, G.V., C.J. Härter, F. Hentz, S.C. de Ávila, T. Orlandi, dan C.M. Stefanello. 2012. Intake, digestibility and nutrients supply to wethers fed ryegrass and intraruminally infused with levels of Acacia mearnsii tannin extract. Small Ruminant Research 106: 125-130.

Krisnawati, H., E. Varis, M. Kallio, dan M. Kanninen. 2011. *Paraserianthes falcataria* (L.) Nielsen: ecology, silviculture and productivity. CIFOR. Bogor.

Kumar, R. dan M. Singh. 1984. Tannins: their adverse role in ruminant nutrition. Journal of Agriculture and Food Chemistry. 32: 447-453.

Kumar, S., S.S. Dagar, A.K. Puniya, dan R.C. Upadhyay. 2013. Changes in metane emission, rumen fermentation in response to diet and microbial interactions. Research in Veterinary Science. 94: 263-268.

Kurniawati, A., B. Nugroho, dan C. Hanim. 2013. Effect of black tea (*Camelia sinensis*) waste on rumen degradation of feed protein. 3rd AINI International Seminar.

Lascano, C., Avila P., dan Stewart J. 2003. Intake, digestibility, and nitrose utilization by sheep fed with provenances of *Calliandra calothyrsus* Meissner with different tannin structure. Archivos Latinoamericanos de Produccion Animal, 11: 21-28.

Lascano, C.E. dan E. Cárdenas. 2010. Alternatives for metane emission mitigation in livestock systems. Revista Brasileira de Zootec. 39: 175-182.

Leinmuller, E., dan K. H. Menke. 1990. Tannine in Futtermittenln fur Wiederkauer 1. Chemische Eigenschaften und Reaktionen mit Makromolekulen. Ubersichten Tierernahr. 18: 91–114.

Leng, R.A. 1985. Prinsiple and Pratice of Feeding Tropical Crop and By Product to Ruminant. Department of Biochemistry and Nutritional University of England. Armidale, Australia. Pp. 47 - 50.

Liu, Y. dan Whitman, W. B. 2010. Metabolic, phylogenetic, and ecological diversity of methanogenic archaea. Annals of New York Academy of Sciences, 1125, 171-189.

Lovett, D.K., L.J. Stack, S. Lovell, J. Callan, B. Flynn, M. Hawkins, dan F.P. O'Mara. 2005. Manipulating enteric metane emissions and animal performance of late lactation dairy cows through concentrate supplementation at pasture. Journal of Dairy Science. 88: 2836-2842.

Lovley, D.R., R.C. Greening, dan J.G. Ferry. 1984. Rapidly growing rumen methanogenic organism that synthesizes coenzyme M and has a high affinity for formate. Appl. Environ. Microbiol. 48 (1): 81 - 87.

Macheboeuf, D., D.P. Morgavi, Y. Papon, J.L. Mousset, dan M. Arturo-Schaan. 2008. Dose response effects of essential oils on *in vitro* fermentation activity of the rumen microbial population. Animal Feed Science and Technology. 145: 335-350.

Machmüller, A. dan M. Kreuzer. 1999. Methane suppression by coconut oil and associated effects on nutrient and energy balance in sheep. Canadian Journal of Animal Science. 79: 65-72.

Makkar, H.P.S., Blummel, M., dan Becker, K. 1995. *In vitro* affects of *quebraco powder* and interactions between tannins and saponins

and fate of tannins in the rumen. Journal of food science and agriculture, 69: 481-493.

Makkar, H.P.S. 1998. Effect of antinutrients on the nutritional value of legume diets. Proceedings of the seventh scientific workshop in tromso.

Makkar, H.P.S. 2003. Effects and fate of tannins in ruminant animals, adaptation to tannins, and strategies to overcome detrimental effects of feeding tannin rich feeds. Small Ruminant Research, 49: 241-256.

Makkar, H.P.S. 2003. Quantification of Tanin in Tree and Shrub Legumes: A Laboratory Manual. Kluwer Academic Publishers, Dordrecht. The Netherlands.

Mangunwardoyo, W., E. Cahyaningsih, dan T. Usia. 2009. Ekstraksi dan identifikasi senyawa antimikrobia herba meniran (*Phyllantus niruri* L.). Jurnal Ilmu Kefarmasian Indonesia. 7: 57-63.

Marhaeniyanto, E. dan S. Susanti. 2014. Product fermentation and gas production *in vitro* of feed content from *Moringa oleifera*, Lamm and *Paraserianthes falcataria* leaves. Journal of Agriculture and Veterinary Science. 7: 12-18.

Martin, S.A. dan J. Macy. 1985. Effects of monensin, pyromellitic diimide and 2-bromoethanesulfonic acid on rumen fermentation *in vitro*. Journal of Animal Science. 60: 544-550.

Martin, C., D.P. Morgavi, dan M. Doreau. 2010. Methane mitigation in ruminants: from microbe to the farm scale. Animal. 4: 351-365.

May, C., A.L. Payne, P.L. Stewart, dan J.A. Edgar. 1995. A delivery system for agents. International Patent Application No. PCT/AU95/00733.

McAllister, T.A., E.K. Okine, G.W. Mathison, dan K.J. Cheng. 1996. Dietary, environmental and microbiological aspects of metane production in ruminants. Canadian Journal of Animal Science. 76: 231-243.

McCrabb, G.J., K.T. Berger, T. Magner, C. May, dan R.A. Hunter. 1997. Inhibiting metane production in Brahman cattle by dietary supplementation with a novel compound and the effects on growth. Australian Journal of Agricultural Research. 48: 323-329.

McDonald, P., R.A. Edwards, J.F.D. Greeshalgh, dan C.A. Morgan. 2002. Animal Nutrition Sixth Edition.England: Pearson Education Limited.

McSweeney, C.S., B. Palmer, R. Bunch, dan D.O. Krause. 2001. Effect of the tropical forage calliandra on microbial protein synthesis and ecology in the Rumen. Journal Applied Microbiology. 90:78-88.

Menke, K.H. dan H. Steinngas. 1988. Estimation of energetic feed value obtained from chemical analysis and *in vitro* gas production using rumen fluid. Anim. Res. Develop. 28: 7 - 55.

Miller, T.I. 1995. Ecology of metane production and hydrogen sinks in the rumen. 3: 317 - 331.

Min, B.R., T.N. Barry, G.T. Attwood, dan W.C. McNabb. 2003. The effect of condensed tannins on the nutrition and health of ruminants fed fresh temperate forages: a review. Animal Feed Science and Technology. 106: 3-19.

Mohammadabadi, T. dan M. Chaji. 2012. The Influence of the plant tannins on in vitroruminal degradation and improving nutritive value of sunflower meal in ruminants. Pakistan Veterinary Journal. 32: 225-228.

Moss, A.R., J.P. Jounany, dan J. Neevbold. 2000. Metane production by ruminants: its contribution to global warming. Annales de Zootechnie. 49: 231-253.

Muhammed, S., C.S. Stewart, dan T. Acamovic. 1994. Effects of tannin acid on cellulose degradation, adhesionand enzymic activity of rumen microorganisms. Procedings of The Society of Nutrition Physiology. 3: 25-30.

Muhi, A.H. 2011. Praktek lingkungan hidup. Institut Pemerintahan Dalam Negeri (IPDN). Bandung.

Nevel, C.V., dan D. Demeyer. 1995. Feed additives and other interventions for decreasing metane emissions. Biotechnology Animal Feeds and Animal Feeding. 17: 329-349.

Norrapoke, T., M. Wanapat, dan S. Wanapat. 2012. Effects of protein level and mangosteen peel pellets (Mago-pel) in concentrate diets on rumen fermentation and milk production in lactating dairy crossbreds. Asian-Australas Journal Animal Science. 25: 971-979.

Nyachoti, C.M., J.L, Atkinson, dan S. Lesson. 1997 Shorgum tannins: a review. World's Journal Poultry Science. 53: 5-21.

Odongo, N., M.M. Or-Rashid, E. Kebreab, J. France, dan B. McBride. 2007. Effect of supplementing myristic acid in dairy cow rations on ruminal metanogenesis and fatty acid profile in milk. Journal of Dairy Science. 90: 1851-1858.

Orskov, E.R. 1992. Protein Nutrition In Ruminant. Published by Academic Press Limited, London.

Orwa, C., A. Mutua, R. Kindt, R. Jamnadass, dan S. Anthony. 2009. *Artocarpus heterophyllus.* Tersedia pada: Agroforestry.org. Diakses pada tanggal 25 Juni 2015.

Orwa, C., A. Mutua, R. Kindt, R. Jamnadass, dan S. Anthony. 2009. *Calliandra calothyrsus.* Tersedia pada: Agroforestry Database 4.0. Diakses pada tanggal 25 Juni 2015.

Owens, F. N. dan R. Zinn. 1988. Protein metabolism of ruminant animals. In: D.C. Church (Ed), The Ruminant Animal Digestive Physiology and Nutrition. Reston Book Prentice Hall, Englewood Cliffs, New Jersey.

Ozutsumi, Y., K. Tajima, A. Takenaka, dan H. Itabashi. 2005. The Effect of protozoa on the composition of rumen bacteria in cattle using 16S rRNA gene clone libraries. Bioscience, Biotechnology, Biochemistry. 69: 499-506.

Paengkoum, P. dan S. Traiyakun. 2011. Ruminal and intestinal digestibility of leucaena (*Leucaena leucocephala*) and jackfruit (*Artocarpus heterophyllus*) foliages using *in sacco* and three step technique. Research Journal of Applied Science. 6: 88-91.

Patra, A.K. dan J. Saxena. 2009. Dietary phytochemicals as rumen modifiers: a review of the effects on microbial populations. Antonie van Leeuwenhoek. 96: 363-375.

Patra, A.K. dan J. Saxena. 2010. A new perspective on the use of plant secondary metabolites to inhibit metanogenesis in the rumen. Phytochemistry. 71: 1198-1222.

Patra, A.K. 2012. Enteric metane mitigation technologies for ruminant livestock: a synthesis of current research and future directions. Mental Monitoring and Assessment. 184: 1929–1952.

Patra, A.K. dan Z. Yu. 2012. Effects of essential oils on metane production and fermentation by, and abundance and diversity of rumen microbial populations. Applied and Environmental Microbiology. 78: 4271-4280.

Pelletier, N. dan P. Tyedmers. 2010. Forecasting potential global environmental costs of livestock production 2000-2050. Proceedings of the National Academy of Sciences. 107: 18371-18374.

Plummer, D.T. 1987. An Introduction to Practical Biochemistry. Third Edition. Mc. Graw-Hill Book Company. Publ. New Delhi.

Popp, A., H. Lotze-Campen, dan B. Bodirsky. 2010. 'Food consumption, diet shifts and associated non-CO_2 greenhouse gases from agricultural production', global environmental change, 20, pp. 451–62

Prakash, O., R. Kumar, A. Mishra, dan R. Gupta. 2009. *Artocarpus heterophyllus* (Jackfruit): An overview. Pharmaccognosy Review. 3: 353-358.

Prosea. 1997. PROSEA (Plant Resources of South-East Asia 11) Auxiliary Plants. Prosea Foundation. Bogor.

Puchala, R., Min, B.R., Goetsch, dan A.L., Sahlu, T. 2005. The effect of a condensed tannin-containing forage on metane emission by goats. Journal of Animal Science. 83: 182-186.

Rafael, A., Naflkov, dan C. Donald. 2007. Carbohydrate and lipid metabolism in farm. Animal Journal Nutrition. 137: 702-705.

Ragsdale, S.W. dan E. Pierce. 2008. Acetogenesis and the Wood - Ljungdahl pathway of CO_2 fixation. Biochimica et Biophysica Acta. 1784: 1873 - 1898.

Reay, D., P. Smith, dan A. van Amstel. 2010. Metane and climate change. Earthscan. UK.

Rira, M., D.P. Morgavi, dan H. Archimède. 2015. Potential of tannin rich plants for modulating ruminal microbes and ruminal fermentation in sheep. Journal of Animal Science. 93: 334-347.

Russell, J. B., and D. B. Wilson. 1996. Why are ruminal cellulolytic bacteria unable to digest cellulose at low pH? J. Dairy Sci. 79:1503–1509.

Santos-Buelga, C. dan de Freitas, V. 2008. Wine Chemistry and Biochemistry: Influence of Phenolics on Wine Organoleptic Properties. Springer Science & Business Media. Page 569.

Sasogko, W.T. 2010. Pemanfaatan tanin daun nangka untuk meningkatkan nilai rumen undegradated protein pada bahan pakan protein tinggi. Tesis. Fakultas Peternakan UGM.

Sejian, V. dan B. Saumya. 2011. Enteric metane emissions in livestock: contributors, prediction, estimations and repercussion. In: Sejian V, Naqvi SMK, Bhatt RS, Karim SA (eds) NAIP sponsored national training manual on ‘‘Carbon sequestration, carbon trading and climate change’’., Division of physiology and biochemistryCentral Sheep and Wool Research Institute, Avikanagar, pp 68–80.

Sejian, V. dan S. M.K. Naqvi. 2011. Mitigation strategies to reduce metane production from livestock.In: Training manual on NAIP national training on ‘‘Climate change carbon sequestration and carbon credits’’ at Indian Institute of Soil Science (ICAR), Nabi Bagh, Bhopal, pp 90-105.

Sejian, V., R. Lal, J. Lakritz, dan T. Ezeji. 2011. Measurement and prediction of enteric metane emission. International Journal of Biometeorology. 55: 1-16.

Selinger, L.B., C.W. Forsberg, dan K.J. Cheng. 1996. The rumen: a unique source of enzymes for enhancing livestock production. Anaerobe. 2: 263-284.

Simbala, H.E.I. 2009. Analisis senyawa alkaloid beberapa jenis tumbuhan obat sebagai bahan aktif fitofarmaka. Pacific Journal. 1: 489-494.

Singh, B., L.C. Chaudhary, N. Agarwal, dan D.N. Kamra. 2011. Effect of feeding *ficus infectoria* leaves on rumen microbial profile and nutrient utilization in goats. Asian-Australian Journal of Animal Science. 24: 810-817.

Smith, A.H., E. Zoetendal, dan R.I. Mackie. 2005. Bacterial mechanisms to overcome inhibitory effects of dietary tannins. Microbial Ecology. 50: 197-205.

Soliva, C.R., L. Meile, A. Cieslak, M. Kreuzer, dan A. Machmuller. 2004. Rumen simulation technique study on the interactions of dietary lauric and myristic acid supplementation in suppressing ruminal metanogenesis. British Journal of Nutrition. 92: 689-700.

Steinfeld, A., P. Gerber, T. Wassenaar, V. Castel, M. Rosales, dan C deHaan. 2006. Livestock's Long Shadow. Food and Agriculture Organization of United Nation: Rome.

Stewart, J. Mulawarman, J.M. Roshetko dan M.H. Powell. 2001. Produksi dan pemanfaatan kaliandra (*Calliandra calothyrsus*): Pedoman lapang. International Centre for Research in Agroforestry (ICRAF), Bogor, Indonesia dan Winrock International, Arkansas, AS.

Strabel, M.S. dan Cieślak, A. 2012. Dietary possibilities to mitigate rumen metane and ammonia production, greenhouse gases capturing, uilization, and reduction. InTech Europe. Croatia.

Subrata, A., L.M. Yusiati, dan A. Agus. 2005. Pemanfaatan tanin ampas teh terhadap efek defaunasi, parameter fermentasi rumen dan sintesis protein mikrobia secara in vitro. Agrosains. 18: 473-488.

Susanti, S. dan E. Marhaeniyanto. 2014. Kadar saponin daun tanaman yang berpotensi menekan gas metana secara *in vitro*. Buana Sains. 14: 29-38.

Tan, H.Y., C.C. Sieo, N. Abdullah, J.B. Liang, X.D. Huanga, dan Y.W. Hoa. 2011. Effects of condensed tannins from leucaena on metane production, rumen fermentation and populations of metanogens and protozoa *in vitro*. Animal Feed Science and Technology. 169: 185-193.

Tejido, M.L., M.J. Ranilla, R. García-Martínez, dan M.D. Carro. 2005. *In vitro* microbial growth and rumen fermentation of different diets as affected by the addition of disodium malate. Journal of Animal Science. 81:31-38.

Tezel, U., J. A., Pierson dan S. G., Pavlostathis. 2006. Fate and effect of quaternary ammonium compounds on a mixed metanogenic culture. Water Research. 40: 3660-3668.

Tiemann, T.T., C.E. Lascano, M. Kreuzer, dan H.D. Hess. 2008. The ruminal degradability of fibre explains part of the low nutritional value and reduced metanogenesis in highly tannin in various tropical legumes. Journal of the Science of Food and Agricultural. 88: 179-1803.

Tavendale, M.H., L.P. Meagher, D. Pacheco, N. Walker, G.T. Attwood, dan S. Sivakumaran. 2005. Methane production from *in vitro* rumen incubations with *Lotus pedunculatus* and *Medicago sativa*, and effects of extractable condensed tannin fractions on metanogenesis. Animal Feed Science and Technology. 123: 403-419.

Ungerfeld, E., R. Kohn, R. Wallace, dan C. Newbold. 2007. A meta-analysis of fumarate effects on metane production in ruminal batch cultures. Journal of Animal Science. 85: 2556-2563.

Vaithiyanathan, S., R. Bhatta, A.S. Mishra, R. Prasad, D.L. Verma, dan N. Singh. 2007. Effect of feeding graded levels of prosopis cineraria leaves on rumen ciliate protozoa, nitrogen balance and microbial protein supply in lambs and kids. Animal Feed Science and Technology. 133: 117-191.

Waghorn, G.C. dan W.C. McNabb. 2003. Consequences of plant phenolic compounds for productivity and health of ruminants. Procedings of Nutrition Socety. 62: 383-392.

Widodo, W. 2005. Tanaman beracun dalam kehidupan ternak. UMM Press. Malang.

Williams, C.M. 2010. Assessment of ruminal fermentation characteristics of condensed tannin containing forages using continuous cultures. All Graduate Theses and Dissertations. Paper 773.

Wischer, G., J. Boguhn, H. Steing, M. Schollenberger, dan M. Rodehutscord. 2012. Effects of different tannin extracts and rapeseed tannin monomers on metane formation and microbial protein synthesis *in vitro*. Disertation: Institut für Tierernährung, Universität Hohenheim.

Wood, T., R. Wallace, A. Rowe, J. Price, D. Yáñez-Ruiz, P. Murray, dan C. Newbold. 2009. Encapsulated fumaric acid as a feed ingredient to decrease ruminal metane emissions. Animal Feed Science and Technology. 152: 62-71.

Yang, S.S., C.M. Liu, dan Y.L. Liu. 2003. Estimation of metane and nitrous oxide emission from animal production sector in Taiwan during 1990–2000. Chemosphere. 52: 1381-1388.

Yildiz, S., I. Kaya, Y. Unal, D.A. Elmali, S. Kaya, M. Censiz, dan A. Oncuer. 2005. Digestion and body weight change iin tuj lambs

receiving oak (*quercus hartwissiana*) leaves with and without PEG. Animal Feed Science and Technology. 122: 159-172.

Yusiati, L.M., Z. Bachrudin, C. Hanim, dan H. Musyaidah. 2008. Addition of sardine (*sardinella longiceps*) oil as reducing methanogenesis agent on *in vitro* rumen fermentation of King Grass. The 13th Anim. Sci. The AAAP Congress. Hanoi. Vietnam.

Yusiati, L.M., Z. Bachrudin, C. Hanim, dan L. Indriana. 2010. The effect of Ketepeng Cina leaf (*Cassia Alata* L.) as a source of antraquinone, methanogenesis inhibitor agent on rumen microbial protein synthesis for beef cattle in Sedyo Rukun farmer group. Proceeding, ISTAP-5, UGM.

Yusiati, L.M., Z. Bachrudin, Sugianto, Kustantinah, dan C. Hanim. 2006. The inhibition of metane release from the cellulolytic fermentation as an affect of lemuru fish *(Sardiness longiceps)* oil addition. Proceeding of ISTAP-4, UGM, Yogyakarta.