

DAFTAR PUSTAKA

- Abdoun, K., Stumpff, F. and Martens, H. 2006. Ammonia and urea transport across the rumen epithelium: a review. *Animal Health Research Reviews* 7(1/2): 43-59. DOI: 10.1017/S1466252307001156
- Abdullah, M. A., M.S. Nazir and B.A. Wahjoedi. 2011. Development of value-added biomaterials from oil palm agrowaste. In: 2nd International Conference on Biotechnology and Food Science. IPCBEE. Vol. 7. Singapore (Singapore): IACSIT Press. p. 32-34.
- Abubakr A, Alimon AR, Yaakub H, Abdullah N, Ivan M (2015). Effect of feeding palm oil by-products based diets on muscle fatty acid composition in goats. *PLoS One*, 10(3): e0119756. <https://doi.org/10.1371/journal.pone.0119756>
- Akhtar, M., M. Ali, Z. Hayat, M. Yaqoob and M. Sarwar. 2016. Effect of Varying Levels of Dietary Ruminant Undegradable Protein on Feed Consumption and Growth Performance of Growing Kajli Lambs. *Int. J. Agric. Biol.*, 18: 969-974.
- Alimon, A.R. 2006. The nutritive value of palmkernel cake for animal feeds. *Palm Oil Develop*, 40:12-14
- Amalia N, S Rohaeni, A Darmawan, Sumanto, A Subhan, Pagiyanto, S Nurawaliyah. 2003. Pengkajian adaptif sapi potong dalam SUT pangan di lahan kering Kalimantan Selatan. *Pros. Seminar Penelitian dan Penunjang Pengembangan Peternakan*. Banjarbaru: BPTP Kalimantan Selatan
- Andries, J.L., F.X. Buysse, D.L. De Brabander and B.G. Cottyn. 1987. Isoacids in ruminant nutrition: Their role in ruminal and intermediary metabolism and possible influenced on performance. A Review. *Anim. Feed Sci. Technol.* 18: 169 – 180.
- Anggorodi, R. 1994. *Ilmu Makanan Ternak Umum*. Penerbit PT. Gramedia Pustaka Utama, Jakarta.
- Angkasa, S. 2017. *Ramuhan Pakan Ternak*. Penebar Swadaya. Jakarta. Cetakan I. ISBN: 979-002-764-8
- Anwar, E. K. 2007. Effect of earthworm inoculant and organic matter application on fertility and productivity of Ultisol soil. *J. Soil Trop.* 12 (2):121-130.
- Aritonang, D. 1986. Perkebunan kelapa sawit, sumber pakan ternak. *Jurnal Litbang Pertanian*. Vol.4:93-99

- Arifin, M. 2018. Kiat Jitu Menggemukan Sapi secara Maksimal. PT Agromedia Pustaka. Jakarta. Cetakan Pertama. ISBN: 978-979-006-620-5
- Arora, S. P. 1995. Pencernan mikrobial pada ruminansia. Gajah mada University Press, Yogyakarta
- Asplund, J.M. 1994. The influence of energy on amino acid supply and utilization in the ruminant livestock. In: Principles of protein nutrition of ruminant CRC press. pp. 179-186
- Atasoglu, C., A.Y. Guliyev and R.J. Wallace. 2004. Use of stable isotopes to measure de novo synthesis and turnover of amino acid-C and -N in mixed microorganisms from the sheep rumen in vitro. J. Nutr., 91: 235-261. <https://doi.org/10.1079/BJN20031040>
- Atkinson, R. L., C. D. Toone, T. J. Robinson, D. L. Harmon, and P. A. Ludden. 2007. Effects of supplemental ruminally degradable protein versus increasing amounts of supplemental ruminally undegradable protein on nitrogen retention, apparent digestibility, and nutrient flux across visceral tissues in lambs fed low-quality forage. J. Anim. Sci. 85: 3331-3339.
- Azmi and Gunawan, 2005. Utilization of oil palm waste for beef cattle feed. Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner, September 12-13, 2005, Bogor
- Bachman G.R. and J.D. Metzger. 2008. Growth of bedding plants in commercial potting substrate amended with vermicompost. Biores. Technol. 99: 3155–3161
- Badan Pusat Statistik .2016. Bengkulu dalam angka 2016. Badan pusat Statistik Propinsi Bengkulu
- Bakhtiar, A.Y., Sutrisno dan Sunarso. 2013. Pengaruh proteksi protein bungkil kelapa sawit dengan tannin terhadap fermentabilitasnya secara invitro. Animal Agriculture journal, Vol 2:232-239
- Baldwin, R.L. and M.J. Allison. 1983. Rumen metabolism. Journal Animal Science. 57 Suppl, 2:461-477
- Batubara, LP. 2003. Potensi integrasi peternakan dengan perkebunan kelapa sawit sebagai simpul agribisnis ruminan. Wartazoa. 13:83-91

- Batubara, L.P. 2002. Potensi biologisdaun kelapa sawit sebagai pakan basal dalam ransum sapi potong. Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner. 2002.
- Boadi, D., Wittenberg, K.M. and W.P. McCaughey. 2002. Effect of grain supplementation on methane production of grazing steers using the sulphur hexafluoride (SF₆) tracer gas technique. *Can J. Anim Sci.* 82: 151.
- Brata, B. 2003. Pertumbuhan, perkembangbiakan dan kualitas eksmeat dari beberapa spesies cacing tanah pada kondisi lingkungan yang berbeda. Disertasi. Pasca Sarjana Institut Pertanian Bogor.
- Brata, B. 2017. Pengaruh beberapa campuran media pada feses sapi kaur yang diberi pakan rumput setaria dan pelepah sawit terhadap biomassa dan kualitas vermikompos cacing tanah *Pheretima sp.* *Jurnal Sain Peternakan Indonesia.* Vol . 12(2): 142-151.
- Broderick, G. A., Stevenson, M. J. and Patton. R. A. 2009. Effect of dietary protein concentration and degradability on response to rumen-protected methionine in lactating dairy cows¹. *Journal of dairy science* 92 (6): 2719-2728. DOI:10.3168/jds.2008-1277
- Budiarti. 1993. Cacing Tanah. Swadaya, Jakarta.
- Cardellino, R.A. 2006. Status of the World Livestock Genetic Resources: Preparation of the First Report on the State of the World's Animal Genetic Resources. Food and Agriculture Organization of the United Nations, Rome, Italy, pp 3-9.
- Carvalho, L.P.F., D.S.P. Melo, C.R.M. Pereira, M.A.M. Rodrigues, A.R.J. Cabrita and A.J.M. Fonseca. 2005. Chemical composition, in vivo digestibility, nitrogen degradability and enzymatic intestinal digestibility of five protein supplements. *Animal Feed Science Technology.* Vol. 119: 171-178.
- Chanjula, P., V. Petcharat and A. Cherdthong. 2017. Effects of fungal (*Lentinussajorcaju*) treated oil palm frond on performance and carcass characteristics in finishing goats. *Asian Austral. J. Anim. Sci.*, 30(6): 811. <https://doi.org/10.5713/ajas.16.0704>
- Chumpawadee, S. K., Sommart, T., Vongpralab V. and Pattarajina, 2006. Effect of Synchronizing the rate of degradation of dietary energy and nitrogen release on

growth performance in Brahman Cattle. Songklanakar J. Sci. Technol., 28(1)
: 59- 70

Church, D. C and W.G. Ponds. 1988. Basic animal nutrition and feeding. 2nd Ed. Jhon
Wiley and Sons. New York. <https://doi.org/10.1016/B978-0-08-025486-9.50007-4>

Ciptanto, S dan U. Paramita. 2011. Mendulang Emas Hitam melalui Budidaya Cacing
Tanah. Liliy Publisher. Yogyakarta. ISBN:978-979-29-2558-6

Czerkawski, J. W. 1986. An introduction to rumen studies. 1st ed. Pergamon Press,
New York.

Damayanti, E., A. Sofyan dan H. Julendra. 2008. Daya antimikroba tepung cacing
tanah *Lumbricus rubellus* dan potensinya sebagai aditif dalam pakan ternak.
Jurnal Biosfera Vol. 25, No 3 :123-128.

Dani, I. R., Jarmuji, A.W. Pratama and D..A. Nugraha. 2017. Collaboration of mesaba
(cow and sheep feces media) to the response of earthworms (*Pheretima sp.*).
J. Sain Peternak. Indonesia, 12(3): 308-316. <https://doi.org/10.31186/jspi.id.12.3.308-316>

Daru, T.P., A. Yulianti dan E. Widodo. 2014. Potensi hijauan di perkebunan kelapa
sawit sebagai pakan sapi potong di Kabupaten Kutai Negara. Pastura, Vol 3
No. 2; 94-98

Devendra, C. 1990. Roughage Resources for Feeding In The Asean Region. Workshop
on Tecnology of Animal Feed Production Utility Food Faste Material.

Dewhurst, R.J., A.J.F. Webster, F.W. Wainman and P.J.S. Dewey. 1986. Predictionof
the true metabolisable energy concentration in forage for ruminants. Anim.
Prod. 43:183-194.

Direktorat Jenderal Perkebunan. 2019. Statistik Perkebunan Indonesia 2018-2020,
Kelapa Sawit. Direktorat Jenderal Perkebunan Kementrian Pertanian

Dwyanto,K., D. Sitompul, I. Manti, I.W. Mathius dan Soentoro. 2004. Pengkajian
pengembangan usaha sistem integrasi kelapa sawit-sapi. Prosiding Lokakarya
Nasional Sistem Integrasi Kelapa Sawit-Sapi. Deptan bekerja sama dengan
Pem. Prop. Bengkulu dan PT. Agrical.

Dwyanto, K. 2008. Pemanfaatan sumber daya lokal dan inovasi teknologi dalam
mendukung pengembangan sapi potong di Indonesia. Pengembangan Inovasi
Pertanian. Vol 1, No 3:173-188.

- Ebrahimi, M., M. A. Rajion , Y. M. Goh, A.Q. Sazili and A. F. Soleimani. 2013. . Oil palm (*Elaeis guineensis* jacq) fronds feeding of goats in the humid tropics. *J Anim Vet Adv.* 12:431-438.
- Ebrahimi M., M.A. Rajion, Y.M. Goh, P. Shokryzadan and A.Q. Sazili. 2015. Feeding oil palm (*Elaeis guineensis*) fronds alters rumen protozoal population and ruminant fermentation pattern in goat. *Ital. J. Anim. Sci.*, 14: 3877. <https://doi.org/10.4081/ijas.2015.3877>
- FAO. 2000. World Watch List for Domestic Animal Diversity, Food and Agriculture Organization of the United Nations, Rome, Italy
- Farizaldi. 2011. Produktivitas hijauan makanan ternak pada lahan perkebunan kelapa sawit berbagai kelompok umur di PTPN 6 Kabupaten Batanghari Provinsi Jambi. *Jurnal Ilmiah Ilmu-Ilmu Peternakan.* 14:68-73.
- Febrina, D., N. Jamarun, M. Zain., Khasrad and M. Rini. 2014. Biological delignification by *Phanerochaete chrysosporium* with addition of mineral mn and its effect on nutrient content of oil palm frond. The 16th AAAP Animal Science Congress November 1014, 2014. Yogyakarta, Indonesia. pp 1.723–1.726
- Febrina D., R. Febriyanti, S.I. Zam , J. Handoko, A. Fatah and J. Juliantoni. 2018. Anti bacterial activity testing and ethanol extract characterization of oil palm fronds (*Elaeis guineensis* Jacq). *Pak. J. Nutr.*, 17(9): 427-433. <https://doi.org/10.3923/pjn.2018.427.433>
- Febrina D., N. Jamarun, M. Zain and M, Khasrad. 2016. The effects of P, S and Mg supplementation of oil palm fronds fermented by *Phanerochaete chrysosporium* on rumen fluid characteristics and microbial protein synthesis. *Pak. J. Nutr.*, 15: 299-304. <https://doi.org/10.3923/pjn.2016.299.304>
- Fereira, A.C., O.R. Lopes, B.A. Regina, C.G.G. Pinto de, S.R.N. Vaz and O.P. Andreate. 2012. Intake, digestibility and intake behaviour in cattle fed different levels of palm kernel cake. *Revista. MVZ Córdoba* 17(3):3105-3112
- Ferreras, L., E. Gomez, E. Toresani, I. Firpo dan R. Rotondo. 2006. Effect of organic amendments on some physical, chemical and biological properties in a horticultural soil. *Biores. Technol.* 97:635–640.
- Ginting, S.P. 2015. Sinkronisasi degradasi protein dan energi dalam rumen untuk memaksimalkan produksi protein mikroba. *Wartazoa.* Vol. 15 (1) :205-214.
- Ginting, S.P., K. Simanihuruk , A. Tarigan , and K.R. Pond. 2018. Nutritional support for small ruminant development based on oil palm by-products.

Wartazoa Vol. 28 (4): 189-198 DOI:

<http://dx.doi.org/10.14334/wartazoa.v28i4.1919>

- Given, D.I., E. Owen and A.T. Adesogan. 2000. Current procedures, future equipments and the need for standardization. In: Forage evaluation in ruminant nutrition. D.I. Given, E. Owen, R.F.E. Axpord and H.M. Omed. CABI Publishing.pp 449-474. <https://doi.org/10.1079/9780851993447.0449>
- Gonçalves, A.P., Moysés do Nascimento, C.F., Ferreira, F.A., Rodrigo da Costa, G., Marcelo de Queiroz, M., Marino, C.T., de Abreu Demarchi, J.J.A. and Rodrigues, P.H.M. 2015. Slow-release Urea in Supplement Fed to Beef Steers. *Braz. Arch. Biol. Technol.* 58 (1): 22-30. doi.org/10.1590/S1516-8913201502162.
- Gorosito, A.R., J.B. Russel and P.J. Van Soest. 1985. Effect of carbon-4 and carbon-5 volatile fatty acids on digestion of plant cell wall in vitro. *J. Dairy Sci.* 68(4): 840 – 847.
- Gunawan dan Daryanto. 2004. Prospek Pengembangan Sapi Potong Di Bengkulu Dalam Mendukung Agribisnis Yang Berdaya Saing disampaikan dalam acara Lokakarya Sapi Potong.
- Guntoro, S. 2002. *Membudidayakan Sapi Bali*. Penerbit Kanisius. Yogyakarta.
- Hakim M dan C. Suherman. 2018. *Replanting Kelapa Sawit*. Penebar Swadaya Jakarta
- Handayanta, E., Lutojo dan K. Nurdianti. 2017. Efisiensi produksi sapi potong pada peternakan rakyat pada musim kemarau di daerah pertanian lahan kering Kabupaten Gunung Kidul. *Caraka Tani: Journal of Sustainable Agriculture*. Vol. 32(1): 49-54
- Hapsari, N.S., D.W. Harjanti dan A. Muktiani. 2018. Fermentabilitas Pakan dengan Imbuhan Ekstrak Daun Babadotan (*Ageratum conyzoides*) dan Jahe (*Zingiber officinale*) pada Sapi Perah secara in vitro. *Agripet*, 18(1): 1-9. <https://doi.org/10.17969/agripet.v18i1.9672>
- Harahap, A.S dan Jarmuji. 2019. Korelasi ukuran- ukuran tubuh sapi kaur umur 18 bulan di Kecamatan Kaur Selatan, Kabupaten Kaur. *Prosiding. Semirata BKS Barat Inovasi Pertanian Berbasis Sumberdaya Lokal Berorientasi Entrepreneurship*. Jambi. 27-29 Agustus 2019.

- Harianto, R.B. 2017. Pakan Sapi Potong. Penebar Swadaya. ISBN:978-979-002-745-9
- Harsojuwono, B. A., I.W. Arnata, G.A.K. Diah Puspawati dan I.D.P. Kartika Pratiwi. 2021. Rancangan percobaan teori dan aplikasi. Edisi 1. Inteligencia Media, Malang
- Hartadi, H.S., Reksohadiprodjo dan A.D. Tillman. 2017. Tabel Komposisi Pakan untuk Indonesia. Gadjah Mada University Press, Yogyakarta.
- Haryanto, B. 2014. Manipulating protein degradability in the rumen to support higher ruminant production. *Wartazoa* Vol. 24 No. 3.
- Hasan, S. 2012. Hijauan Pakan Tropik. IPB Press. ISBN: 978-979-493-470-8
- Hassan, A.O., and M. Ishida, 1991. Effect of water, molasses and urea addition on oil palm frond silage quality fermentation characteristic and palatability to Kedah-Kelantan Bulls. In Proceeding of the third International Symposium on the Nutrition
- Hayati, S N., H. Herdian, E. Damayanti, L. Istiqomah dan H. Julendra. 2011. Profil asam amino ekstrak cacing tanah (*Lumbricus rubellus*) terenkapsulasi dengan metode spray drying. *Jurnal Teknologi Indonesia*, Volume 34, Edisi Khusus
- Hazra, F., N. Dianisa and R. Widyastuti. 2018. Quality and production of vermicompost using african night crawler worms (*Eudrilus eugeniae*). *J. Il. Tan. Lingk.* 20(2): 77-81. <https://doi.org/10.29244/jitl.20.2.77-81>
- Hermawan, R. 2017. Usaha Budidaya Cacing Lumbricus, Multiguna dan Prospek Ekspor Tinggi. Pustaka Biru Press. Yogyakarta.
- Hidayat dan T. Akbarillah. 2004. Pengaruh penggunaan lumpur sawit yang diberi probion terhadap konsumsi dan pencernaan pakan serta pertambahan berat badan sapi. *Jurnal Pengembangan Peternakan Tropis*. Fakultas Peternakan Universitas Diponegoro. Semarang.
- Highstreet, A., Robinson, P. H., Robison, J. and J. G. Garrett. 2010. Response of Holstein cows to replacing urea with with a slowly rumen released urea in a diet high in soluble crude protein. *Livestock Science*. 129 (1-3) : 179- 185. DOI: <http://dx.doi.org/10.1016/j.liv sci.2010.01.022>
- Hoover, W.H. and T.K. Miller. 1992. Rumen digestive physiology and microbial ecology. *Bulletin. Agriculture and Forestry Experiment Station*. West Virginia University.

- Hoover, W.H. and Stokes. 1991. Balancing carbohydrates and proteins for optimum rumen microbial yield. *Journal dairy Science*. 74:3630-3644
- Huyen, N.T., C. Fryganas, G. Uittenbogaard and I. Mueller-Harvey. 2016. Structural features of condensed tannins affect in vitro ruminal methane production and fermentation characteristics. *J. Agric. Sci.*, 154(8): 1474-1487. <https://doi.org/10.1017/S0021859616000393>
- Indriarta, A.N. 2010. Kelapa Sawit, Budi Daya dan Pengolahannya. CV Sinar Cemerlang Abadi. Jakarta. Cetakan pertama. ISBN:978-979-1106-25-2
- Ishida, M. and O.A. Hassan. 1992. Effect of urea treatment level on nutritive value of oil palm fronds silage in Kedah-Kelantan bulls. Proc. 6th. AAAP Animal Science Congress, vol. 3, AHAT, Bangkok, Thailand, pp. 6
- Ismartoyo. 2011. Degradasi Pakan Ternak Ruminansia. Penerbit. Brillan Internasional. Surabaya.
- Jamarun, N., R. Pazla, M. Zain M dan Arief. 2019. Comparison of in vitro digestibility and rumen fluid characteristics between the tithonia (*Tithonia diversifolia*) with elephant grass (*Pennisetum purpureum*). IOP Conf. Series: Earth Environ. Sci., 287: 012019. <https://doi.org/10.1088/1755-1315/287/1/012019>
- Jarmuji, U. Santoso, B. Brata dan Karyono. 2016. Effect of feces of kaur beef fed palm frond, setaria and sakura block as media on growth of earthworm (*Pheretima sp*). Prosiding. International Seminar and Expo on Promoting Lokal Resources for Food and Healt. Faculty of Agriculture. University of Bengkulu. Pp:291-294
- Jarmuji, U. Santoso dan B. Brata. 2017. Effect of oil palm fronds and *Setaria sp.* as forages plus sakura block on the performance and nutrient digestibility of kaur catle. *Pakistan Journal of Nutrition*. Open acces. ISSN 1680-5194 DOI: 10.3923/pjn.2017.
- Jarmuji., E. Silvia dan E. Sulityowati. 2018a. Peningkatan pendapatan peternak melalui penggunaan pakan sakura blok pada sapi perah di gapoktan Sumbermulya Kecamatan Kabawetan Kabupaten Kepahiang Propinsi Bengkulu. *Jurnal Sain Peternakan Indonesia*. Vol. 13(1) : 148-156
- Jarmuji., D. Suherman, E. Silvia dan I. Apriyani. 2018b. Peningkatan produksi susu dan Income Over Feed Cost (IOFC) kambing perah dengan penambahan katuk (*Sauropus adrogunus*) dan Kunyit (*Curcuma longa*) pada Sakura Blok. *Jurnal Sain Peternakan Indonesia*. Vol. 13(3): 139-148

- Jarmuji. 2019. Pengaruh kunyit dan katuk dalam sakura blok terhadap milk income over feed cost sapi perah di Gapoktan Sumbermulya Kabupaten Kepahiang, Bengkulu. Prosiding. Semirata BKS Barat Inovasi Pertanian Berbasis Sumberdaya Lokal Berorientasi Entrepreneurship. Jambi. 27-29 Agustus 2019.
- Jarmuji., L. Warly, M. Zain and Khasrad. 2021a. Improving sakura block quality as feed supplement to optimize rumen fermentation products and nutrients digestibility in vitro. *Adv. Anim.Vet. Sci.*, 9(10): 1594. <https://doi.org/10.17582/journal.aavs/2021/9.10.1594.1600>.
- Jarmuji., L. Warly, M. Zain and Khasrad. 2021b. In vitro: The Increase of The Quality of Sakura Block As a Dietary Supplement to Increase The Concentration Branched Volatile Fatty Acids (BCFA) and total bacteria. Proceeding of The 1st International Seminar on Sustainable Ruminant and Poultry Production in The Tropics (1st ISSRP), Semarang, Indonesia, October 21, 2021
- Jarmuji., L. Warly, M. Zain and Khasrad. 2021c. Pengaruh sakura blok plus cacing tanah terhadap asam lemak volatile bercabang dan total bakteri rumen pada ransum berbasis pelepah sawit. Prosiding Seminar Nasional Inovasi Teknologi Nutrisi dan Pakan untuk Pengembangan Peternakan Rakyat. Makassar, 21 Oktober 2021
- Jarmuji., D. Suherman, E. Sulistyowati, Yanuri and R. Afriansyah. 2021d. Effect of sakura block on milk production and milk quality of FH cow in late lactation. *Jurnal Sain Peternakan Indonesia*. Vol.16(3):266-272. <https://doi.org/10.31186/jspi.id.16.3.266-272>
- Jarmuji., L. Warly, M. Zain and Khasrad. 2022. In-vitro Efficacy of Sakura Block Plus Supplementation in Oil Palm Fronds (OPF) on Rumen Fermentation, Nutrient Digestibility, and Gas Production. *Adv. Anim. Vet. Sci.* 10(3): 548-554 DOI | <http://dx.doi.org/10.17582/journal.aavs/2022/10.3.548.554>
- Kaleka, N. 2019. Membuat Pakan Fermentasi untuk Ternak Ruminansia Kambin, Domba, Sapi, Kerbau. Pustaka Baru. Yogyakarta. Cetakan pertama. ISBN: 978-602-376-262-0
- Kaufman, J.D. 2016. Effect of varying rumen degradable and undegradable protein on milk production and nitrogen efficiency in lactating dairy cows under summer conditions. Master's Thesis, University of Tennessee.

- Kennedy, PM and E. Charmley. 2012. Methane yields from Brahman cattle fed tropical grasses and legumes. *Anim. Prod.Sci.* 52(4) 225-239
- Kertz, A. F. 2010. Review: Urea Feeding to Dairy Cattle: A Historical Perspective and Review. *The Professional Animal Scientist* 26 (3): 257-272. doi.org/10.15232/S1080-7446(15)30593-3.
- Kurnianto, E. 2017. Sumber daya genetik ternak lokal. Prosiding Seminar Teknologi dan Agribisnis Peternakan V: Teknologi dan Agribisnis Peternakan untuk Mendukung Ketahanan Pangan, Fakultas Peternakan Universitas Jenderal Soedirman
- Kuswati dan T. Susilawati. 2016. *Industri Sapi Potong*. UB Press. Cetakan I.
- Lenhinger, W.W. 1992. *Biochemistry Basics*. Printing I. Publisher Erlangga, Jakarta.
- Li, J.Y., Z. Sun, X. Ge and J. Zhang. 2016. Effects of lignin and surfactant on adsorption and hydrolysis of cellulases on cellulose. *Biotechnol. Biofuels.*, 9(1): 20. <https://doi.org/10.1186>
- Li, J.Y., K. Suzuki, Y. Koike, D.S. Chen, T. Yonezawa, I.M. Nishihara and N. Manabe. 2005. Effects of dietary supplementation with Branched-chain Amino Acids (BCAAs) during nursing on plasma BCAA Levels and subsequent growth in cattle. *Asian-Aust. J. Anim. Sci.* 18 (10) : 1440-1444.
- Liu, J.X., S. Susenbeth and K.H. Sudekum. 2002. In vitro gas production measurements to evaluate interaction between untreated and chemically treated rice straws, grass hay and mulberry leaves. *J. Anim. Sci.*, 80: 517-514. <https://doi.org/10.2527/2002.802517>
- Makin M, A Komar, E Sukraeni, I Hamidah, N Suwardi, IB Suamba, W Djaja. 1980. *Ilmu Produksi Ternak Perah*. Bandung. Fakultas Peternakan, Universitas Padjadjaran
- Manurung, B.P. 2004. Sistem integrasi kelapa sawit model agrinical. Prosiding Lokakarya Nasional Sistem Integrasi Kelapa Sawit-Sapi. Deptan bekerja sama dengan Pem. Prop. Bengkulu dan PT. Agrinical.
- Mathius, I.W., D. Sitompul, B.P. Manurung dan Azmi. 2004. Produk samping tanaman dan pengolahan buah kelapa sawit sebagai bahan dasar pakan komplit. Prosiding. Lokakarya Nasional. Pemda Propinsi Bengkulu dan PT. Agrinical. Hal. 120-128
- Matondang, R.H and C. Talib. 2015. Model pengembangan sapi bali dalam usaha integrasi di perkebunan kelapa sawit. *Wartazoa* vol 25, No. 3 hlm. 147-157 DOI :<http://dx.doi.org/10.1433/wartazoa.v25i3.1159>.

- Minnich, J. 1997. The Earthworm Book How to Rise and Use Earthworm for Your Farm and Garden. Rodale PRESS Emmaus, PA. New York, 199-127.
- McDonald, P., J.F.D. Edwards, R.A. Greenhalgh, and C.A. Morgan. 2002. Animal nutrition. 6th ed. Pretice Hall, London.
- Mijalla, K. 1997. Genetic aspects of domestication, common breeds and their origin. In: PIPER, L. and A. RUVINSKY (Ed.). The genetics of sheep, CAB International, Wallingford, Oxon, UK, pp 13-49. NOTTER
- Nanda, D.D., A. Purnomoadi and L.K. Nuswantara, 2009. Production performance of Bali cattle fed with various levels of oil palm frond. Agromedia, 32: 54-63.
- Ndegwa, P. M and S. A. Thompson. 2001. Integrating composting and ermicomposting in the treatment of bioconversion of biosolids. Biores. Technol. 76: 107 –112.
- Nolan, J.V. 1975. Quantitative models of nitrogen metabolism in : Digestion and metabolism in the ruminant. Macdonald, I.W. and A.C.I. Warner (Eds). Univ of England Pubishing Unit, Armidate, Australia, pp. 416-431.
- Nordin, N.A., O. Sulaiman, R. Hashim and M.H.M. Kassim. 2017. Oil Palm frond waste for the production of cellulose nanocrystals. J. Phys. Ther. Sci., 28(2): 115-126. <https://doi.org/10.21315/jps2017.28.2.8>
- Nur, T.M., C. Fadli dan H. Satriawan. 2018. Analisis potensi integrasi kelapa sawit-ternak sapi di Kabupaten Bireuen, Propinsi Aceh. Agraria: Journal of Agribusiness and Rural Delevopment Research. Vol. 4 No. 2. Doi:<http://dx.doi.org/10.18196/agr4262>.
- Nurhaita, N. Jamarun, L. Warly dan M. Zain. 2010. Kecernaan ransum domba berbasis daun sawit amoniasi yang disuplementasi, S, P dan daun ubi kayu. Jurnal Media Paternakan. Vol.33 (3):144-149
- Nurhaita, Ruswendi, R. Wismalinda dan Robiyanto. 2014. Pemanfaatan pelepah sawit sebagai sumber hijauan dalam ransum sapi potong. Pastura Vol. 4 No. 1:38-41
- Orskov, E.R and I. Mc Donald. 1971. Digestion of concretates in sheep. Journal Nutrition. 25:243-252
- Orskov, E.R. and M.N.M. Ibrahim, 1991. Feed resources, livestock and livestock products with emphasis on crop-livestock farmers. Proceedings of the International Seminar, October 21-25, 1991, Brawijaya University, Malang, Indonesia

- Ooi, Z.X., Y. P. Teoh, B. Kunasundari dan S.H. Shuit. 2017. Oil palm frond as a sustainable and promising biomass source in Malaysia: A review. Environ. Prog. Sustain. Energy (in press). <https://doi.org/10.1002/ep.12642>
- Pahan, I. 2021. Panduan Budidaya Kelapa Sawit untuk Pekebun. Penebar Swadaya, Jakarta
- Palungkun, R. 1999. Sukses Beternak Cacing Tanah (*Lumbricus rubellus*). Penebar Swadaya. Jakarta.
- Parakkasi. A. 1999. Nutrisi dan Hijauan pakan Ruminansia. Universitas Indonesia Press. Jakarta
- Paramita, W., W. E Susanto dan A.B. Yulianto. 2008. Konsumsi dan Kecernaan Bahan Kering dan Bahan Organik dalam Haylase Pakan Lengkap Ternak Sapi Peranakan Ongole. Media Kedokteran Hewan, Vol 4(1):59-62
- Parmelee, R.W., M.H. Beare, W. Cheng, P.F. Hendrix, S.J. Rider, D.A. Crossley and D.C. Coleman. 1990. Earthworm and Enchytraeids in conventional and no-tillage agroecosystems: A biocide approach to assess their role in organic matter breakdown. Biol. Fertil. Soils 10 (3): 1-10
- Pollegioni, L., F. Tonin and E. Rosini. 2015. Lignin-degrading enzymes. FEBS J., 282(7): 1190-1213. <https://doi.org/10.1111/febs.1322>
- Pond, W.G., Church, D.C., Pond, K.R., and Schoknet, P.A. 2005. Basic Animal Nutrition and Feeding. 5th revised edition. New York: John Wiley and Sons Inc
- Puastuti, W. 2009. Manipulasi bioproses dalam rumen untuk meningkatkan penggunaan pakan berserat. Wartazoa, Vol. 19. No. 04
- Purwantari, N.D., B. Tiesnamurti dan Y. Adinata. 2015. Ketersediaan sumber hijauan di bawah perkebunan kelapa sawit untuk penggembalaan sapi. Wartazoa, Vol. 25 No. 1 : 047-054. DOI:<http://dx.doi.org/10.14334/wartazoa.v25i1.1128>
- Putri, E., M. Zain, L. Warly and Hermon. 2019. In vitro evaluation of ruminant feed from West Sumatera based on chemical composition and content of rumen degradable and rumen undegradable proteins. Vet. World, 12(9): 1478-1483. <https://doi.org/10.14202/vetworld.2019.1478-1483>
- Rahmat dan B. Harianto. 2017. Pakan Sapi Potong. Penebar Swadaya. Jakarta. Cetakan I.
- Rahutomo, S., W. Darmosarkoro, F. R. Panjaitan, E. R. Sutarta, M. A. Yusuf, V. D. Leylana, B.G. Yudanto, A. Purba, D. Siahaan, Erwinsyah dan H. Lydiasari.

2012. Integrasi sawit, sapi & energi. Medan (Indonesia): Pusat Penelitian Kelapa Sawit.
- Ramdani, D., L. Abdullah dan N.R. Kumalasari. 2017. Analisis potensi hijauan lokal pada system integrasi sawit dengan ternak ruminansia di Kecamatan Mandau Kabupaten Bengkalis Propinsi Riau. Buletin Makanan Ternak. Vol. 104 No 1:1-8, ISSN:0216-065x
- Ramsey, H.A and C.L. Davis. 1965. Metabolism of n-butyrate by the adult goat. J. Dairy Sci48:381-390
- Rolls, E.T., 2007. Understanding the mechanisms of food intake and obesity. Obesity Rev., 8: 67-72
- Rukmana. 1999. Budidaya Cacing Tanah. Kanisius, Yogyakarta. Fakultas Matematika dan Ilmu Pengetahuan Alam, Bina Widya Pekanbaru. Pekanbaru.
- Rusli, N. D., M. A. Azmi, K. Mat, C.H. Hasnita, M. Zahari, K. Azhar, M. Zamri-Saad and H.A. Hassim. 2019. The effect of physical and biological pre-treatments of oil palm fronds on in vitro ruminal degradability. *Pertanika J. Trop. Agric. Sci.*, 42(2): 791-805.
- Rusli, N. D., A.A. Abdul Gani, K. Mat. M. T. Yusof, M. Zambli-Saad and H.A. Hassim. 2021. The potential of pretreated oil palm frond in enhancing rumen degradability and growth performance: A review. *Adv. Anim. Vet. Sci.*, 9(6): 811-822. <https://doi.org/10.17582/journal.aavs/2021/9.6.811.822>
- Russell, J.B. and C.J. Sniffen. 1984. Effect of carbon 4 and carbon 5 volatile fatty acid on growth of mix rumen bacteria in vitro. *J. Dairy Sci.* 67: 987 – 995.
- Russel, J.B., J.D.O. Connor, D.G. Fox, P.J. Van Soest and C.J. Sniffen. 1992. A net carbohydrate and protein system for evaluating cattle diets: I. Ruminal fermentation. *Journal Animal Science*, 70:3551-3561
- Sagala, W. 2011. Analisis Biaya Pakan dan Performa Sapi Potong Lokal Pada Ransum Hijauan Tinggi yang Disuplementasi Ekstrak Lerak (Sapindus rarak) (Skripsi S1). Bogor: Institut Pertanian Bogor.
- Santos, F.A.P., J.E.P. Santos, C.B. Thesurer and J.T. Hubber, 1998. Effect of rumen undegradable protein on dairy cow performance: A 12-Year Literature Review. *J. Dairy Sci.*, 81: 3182-3213.
- Santoso, U., Jarmuji dan B. Brata. 2017. Peningkatan pendapatan peternak melalui teknologi integrasi sapi-sawit cacing tanah Studi Kasus Di Desa Wonoharjo,

Kecamatan Girimulya, Kabupaten Bengkulu Utara. Jurnal Sain Peternakan Indonesia. Vol.12, No.3

Setiawan D, 2012. Performa Produksi Sapi Peranakan Ongole yang Diberi Pakan Tepung Daun Murbei pada Konsekrat yang Berbeda. Tesis, Institut Pertanian Bogor, Bogor, Indonesia.

Sihombing, G., W. Pratitis dan G.A. Dewangga. 2010. Pengaruh penggunaan tepung cacing tanah (*Lumbricus rubellus*) terhadap pencernaan bahan kering dan bahan organik ransum domba lokal jantan. Caraka Tani XXV. file:///D:/lumbricus/TCT%20utk%20domba.pdf

Sipayung, T. 2012. Ekonomi Agribisnis Minyak Sawit. IPB Pres Cetakan Pertama. ISBN:978-979-493-384-8

Sirait, P., Z. Lubis dan M. Sinaga. 2015. Analisis sistem integrasi sapi dan kelapa sawit dalam meningkatkan pendapatan petani di Kabupaten Labuhanbatu. Agrica J. Agribisnis Sumatera Utara, Vol. 8 No 1 available online <http://ojs.uma.ac.id/index.php/agrica>

Siregar, S.B. 2001. Ransum Ternak Ruminansia. Jakarta: Penebar Swadaya.

Sniffen, G.J., J.D.O. Connor, D.G. Fox, P.J. Van Soest and J.B. Russel. 1992. A net carbohydrate and protein system for evaluating cattle diets: II. Ruminant fermentation. Journal Animal Science, 70:3562-3577

Soetrisno, E., Jarmuji, A. N.N. Andana, A. H. K. Amrullah, A. S. Harahap. 2019. The effect of sakurablok plus supplementation on quality of nubian milk goat. J. Sain Peternakan Indonesia, 14(2): 208-214. <https://doi.org/10.31186/jspi.id.14.2.208-214>.

SPSS. 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

Suharyono, H. Sutanto, Y. Purwanti, Martanti, A. Agus and R. Utomo, 2014. The effect of urea molasses multi-nutrient and medicated block for beef cattle, beef and dairy cow. Atom Indonesia, 40: 77-87

Subagyono, D. 2004. Prospek pengembangan ternak pola integrasi di kawasan perkebunan. Prosiding Sistem Integrasi Tanaman- Ternak. Hal: 13 – 17

Suparjo. 2000. Peningkatan potensi serat sawit sebagai sumber pakan ternak ruminansia. Buletin Peternakan Edisi Tambahan: Fakultas Peternakan Universitas Gajah Mada. Yogyakarta. Hal:223-236

- Supriyati dan B. Haryanto. 2011. Bungkil inti sawit terproteksi molasses sebagai sumber protein pada kambing peranakan etawa jantan muda. *JITV* vol. 16 no 1
- Suryana dan M. Yasin. 2015. Prospek pengembangan integrasi sawit-sapi di Kalimantan Selatan. *Jurnal Litbang Pert.* Vol 34 No.1 hal:9-18
- Sutardi, T. 1980. *Landasan Ilmu Nutrisi*. Jilid 1. Departemen Ilmu Nutrisi Ternak. Fakultas Peternakan IPB.
- Sutardi, T. 1997. *Peluang dan Tantangan Pengembangan Ilmu-ilmu Nutrisi Ternak*. Orasi Ilmiah. Guru Besar Tetap Ilmu Nutrisi Ternak, 4 Januari 1997. Fakultas Peternakan Institut Pertanian Bogor, Bogor. 84 hlm.
- Suzuki, J.Y.L., Y. Koike, D.S. Chen, T. Zonezawa, M. Nishihara and N. Manabe. 2005. Effect of dietary supplementation with branched-chain amino acids (BCAAs) during nurshing on plasma BCAA levels and subsequent growth in cattle. *Asian-Aust. J. Anim*, Vol. 18, No. 10:1440-1444
- Teken, I.B dan Asnawi. 1983. *Teori Ekonomi Produksi Pertanian*. Bogor: IPB Press
- Tilley, J. M and R. A. Terry. 1969. A two-stage technique for in vitro digestion of forage crops. *J. Br. Grassland Soc.*, 18(2): 104-111. <https://doi.org/10.1111/j.1365-2494.1963.tb00335.x>
- Tillman, A. D., H. Hartadi, S. Reksohadiprodjo, S. Prawirokusumo, S. Lebdosoekojo. 1991. *Ilmu Makanan Ternak Dasar*. Gadjah Mada University Press, Fakultas Peternakan, Universitas Gadjah Mada
- Toutenburg, H and H. T. Shalabh. 2009. *Statistical Analysis of Designed Experiments*. 3rd Edn., Springer Science, New York, USA., ISBN-13: 9781441911483, Pages: 615
- Trotta, R. J., J. L. Klotz and D. L. Harmon. 2018. Effects of source and level of dietary energy supplementation on in vitro digestibility and methane production from tall fescue-based diets. *J. Anim. Feed Sci. Technol.*, 242: 41-47. <https://doi.org/10.1016/j.anifeedsci.2018.05.010>.
- Tylutki, T. P and D. G. Fox. 1997. Application of the cornell nutrient management planning system: Optimizing herd nutrition. In: *Proceedings of cornell nutrition conference for feed manufacturers*. New York: Cornell University.
- Upeksha, I. G. N. D., N. N. Suryani, Dan N. P. Sarini. 2016. Pengaruh pemberian level energi terhadap pencernaan nutrisi ransum sapi bali bunting 7 bulan. *Peternakan Tropika* Vol. 4. (1): 196-207

- Van Soest, P. J. 1994. Nutritional Ecology of The Ruminant. 2nd ed. Comstock Publishing Associates A Division of Cornell University Press. Ithaca and London.
- Wang, M.Z., H.R. Wang, H.C. Cao, G.X. Li and J. Zhang. 2008. Effect of limiting amino acids on rumen fermentation and microbial community in vitro. *Journal Agriculture Science in China*. Vol. 7. No.12. [https://doi.org/10.1016/s1671-2927\(08\)60412-5](https://doi.org/10.1016/s1671-2927(08)60412-5)
- Wang, L., G. Zhang, Y. Li and Y. Zhang. 2020. Effects of high forage/ concentrate diet on volatile fatty acid production and the microorganisms involved in VFA production in cow rumen. *Animals*, 10(2): 223. <https://doi.org/10.3390/ani10020223>.
- Warly, L., Suyitman, Evitayani and A. Fariani. 2015. Supplementation of solid ex-decanter on performance of cattle fed palm fruit by-product. *Pak. J. Nutr.*, 14(11): 818-821. Open acces. ISSN 1680-5194. <https://doi.org/10.3923/pjn.2015.818.821>.
- Warly, L., Suyitman, Evitayani and A. Fariani. 2017. Nutrient digestibility and apparent bioavailability of minerals in beef cattle fed with different levels of concentrate and oil-palm fronds. *Pak. J. Nutr.*, 16(3): 131-135. Open acces. ISSN 1680-5194. <https://doi.org/10.3923/pjn.2017.131.135>
- Wattanachant, C., I. Dahlan, A. R. Alimon and M. A. Rojion. 1999. Sheep-oil palm integration: Grazing preference, nutritive value, dry matter intake estimation and digestibility of herbage. *Asian-aus. J. Anim. Sci.* 12 (2) : 209-214.
- Widiawati, Y. 2013. Current and Future Mitigation Activities on Methane Emission from Ruminant in Indonesia. Paper in International Workshop on Inventory Data and Mitigation of Carbon and Nitrogen Cycling From Livestock in Indonesia. Jakarta, 24th April 2013
- Widyobroto B. P., S. P. S. Budhi dan A. Agus. 2007. Pengaruh aras undegraded protein dan energi terhadap kinetik fermentasi rumen dan sintesis protein mikroba pada sapi perah. *Jurnal Pengembangan Peternakan Tropis*. Vol 32 (3): 194-200.
- Wilson, J. R. and P. M. Kennedy, 1996. Plant and animal constraints to voluntary feed intake associated with fibre characteristics and particle breakdown and passage in ruminants. *Crop Pasture Sci.*, 47: 199-225
- Wolin, M.J and T.L. Miler. 1988. Microbe-microbe interactions in : The rumen microbial ecosystem. P.N. Hobson, 1988. Elsevier Applied Science pp.343-358

- Yanuartono., S. Indarjulianto, A. Nururrozi, H. Purnamaningsih dan S. Raharjo. 2019. Urea molasses multinutrient block as a feed supplement to cattle. *J. Vet.*, 20(3): 445-451. [https:// doi.org/10.19087/jveteriner.2019.20.3.445](https://doi.org/10.19087/jveteriner.2019.20.3.445)
- Yasothai, R. 2014. Importance of protein on reproduction in dairy cattle. *International Journal of Science, Environment and Technology*, Vol. 3, No 6, 2081 – 2083.
- Zahari,M.W.,O.A. Hassan,H.K. Wong and J.B. Liang. Utilization of oil palm frond - based diets for beef and dairy production in Malaysia. *Asian-Aust. J. Anim. Sci.*. Vol 16, No. 4 : 625-634
- Zain, M., Erpomen dan Kartini. 2007. Amoniasi daun kelapa sawit dengan beberapa taraf urea dan pengaruhnya terhadap kandungan gizi dan pencernaan secara in vitro. *Jurnal Peternakan Indonesia*, Vol. 12, No. 3: 195-200, ISSN: 1907-1760 195
- Zain, M., T. Sutardi, Suryahadi and N. Ramli. 2008. Effect of defaunation and supplementation methionine hydroxyl analogue and branched chain amino acid in growing sheep diet based on palm press fiber ammoniated. *Pakistan Journal of Nutrition*. Vol. 7 No. 6: 813-816
- Zhang, H.L., Y. Chen, X.L. Xu and Y.X. Yang. 2013. Effects of branched-chain amino acids on in vitro ruminal fermentation of wheat straw. *Asian- Aust. J. Anim. Sci.*, Vol. 26, No. 4:523-528.
- Zakiatulyaqina ., I. Suswantob , R.B. Lestaria , D Setiawana dan A.M.S Munirb. 2017. Income Over Feed Cost dan R-C rasio usaha ternak sapi melalui pemanfaatan limbah sawit. *Jurnal Ilmiah Peternakan Terpadu* Vol. 5 (1): 18 - 22

