

DAFTAR PUSTAKA

- Ahammad, M. U., M. S. R. Swapon, T. Yeasmin, and M. S. Ali. 2003. Replacement of sesame oil cake by duckweed (*Lemna minor*) in broiler diet. *Pakistan Journal of Biological Science*. 6 (16): 1450–1453.
- Amam, A. 2022. Sebuah evaluasi keberhasilan usaha ternak broiler sistem kemitraan inti plasma. *Jurnal Pangan*. 31(3): 259–270.
- Amam, A. dan P. A. Harsita. 2019. Pengembangan usaha ternak sapi perah: evaluasi konteks kerentanan dan dinamika kelompok. *Jurnal Ilmiah Ilmu-Ilmu Peternakan*. 22 (1): 23–34.
- Amrullah, I. K. 2004. *Nutrisi Ayam Broiler*. Cetakan ke-2. Lembaga Satu Gunung Budi, Bogor.
- Anggorodi, R. 1994. *Ilmu Makanan Ternak Umum*. PT Gramedia, Jakarta.
- Ansal, M. D., A. Dhawan, and V. I. Kaur. 2010. Duckweed based bio-remediation of village ponds: An ecologically and economically viable integrated approach for rural development through aquaculture. *Livestock Research for Rural Development*. 22 (7): Article #129.
- Anonimus. 2009. *Lemna minuta*. Flora of Northern Ireland. National Museums Northern Ireland. <http://www.habitas.org.uk/flora/index.html>. Diakses pada 29 September 2023.
- AOAC. 1990. *Official Methods of Analysis of the AOAC*. AOAC Inc. Arlington. Virginia.
- Austic, R. E. and Nesheim. 1990. *Poultry Production*, 13th ed. Lea and Febiger. Philadelphia. United States. 29–30.
- Badan Pusat Statistik. 2023. *Statistik Indonesia 2023*. <https://www.bps.go.id/publication/2023/02/28/18018f9896f09f03580a614b/statistik-indonesia-2023.html>. Diakses pada 17 September 2023.
- Baek, G. Y., M. Saeed, dan H.-K. Choi. 2021. Duckweeds: Their utilization, metabolites and cultivation. *Applied Biological Chemistry*. 64 (73): 1–15.
- Banamtuan, A. N. 2019. *Strain dan Karakteristik Ayam Broiler di Indonesia*. Skripsi. Universitas Nusa Cendana, Kupang.
- Barr, B., Y. L. Hsieh, dan B. W. Ganem. 1996. Identification of two functionally different classes of exocellulases. *Biochemistry*. 35 (2): 586–592.
- Bedford, M. R., G. L. Campbell, dan H. L. Classen. 1991. The effect of pelleting, salt and pentosanase on the viscosity of intestinal contents and the performance of broiler fed rye. *Poultry Science*. 70: 1571–1577.

- Bersamin, A., K. Heneman, C. Hathaway, dan S. Zidenberg-Cherr. 2008. Nutritional and Health Info Sheet: Iron and Iron Deficiency Anemia. ANR Publication 8141. University of California. California, United States.
- Bhanthumnavin, K. dan M. G. McGarry. 1971. *Wolffia arrhiza* as a possible source of inexpensive protein. *Nature*. 232: 495.
- Bizeray D., I. Estevez, C. Leterrier, dan J. M. Faure. 2002. Effects of increasing environmental complexity on the physical activity of broiler chickens. *Applied Animal Behaviour Science*. 79 (1): 27–41.
- Bog, M., K.-J. Appenroth, dan K. S. Sree. 2019. Duckweed (*Lemnaceae*): its molecular taxonomy. *Frontiers in Sustainable Food Systems*. 3 (117): 1–7.
- Boling-Frankenbach, S.D., C. M. Peter, M. W. Douglas, J. L. Snow, C. M. Parsons, dan D. H. Baker. 2001. Efficacy of phytase for increasing protein efficiency ratio values of feed ingredients. *Poultry Science*. 80: 1578–1584.
- Brett, C. T. dan K. W. Waldron. 1996. *Physiology and Biochemistry of Plant Cell Walls*. (2nd ed). Chapman Hall, London.
- Cepriadi, C., E. Maharani, dan N. Maureen. 2010. Analisis perbandingan pola kerjasama kemitraan peternak ayam broiler di Kota Pekanbaru (Studi kasus PT. Ramah Tamah Indah). *Jurnal Peternakan*. 7(1): 20–28.
- Chaiyasing, R., P. Srinontong, W. Aengwanich, S. Promsatit, D. D. Cahyadi, dan J. Wandee. 2024. Effects of different feeding frequencies on broiler chickens' growth performance and intestinal villus development. *Trends In Sciences*. 21(2): 7353.
- Cheng, J.J. dan A. M. Stomp. 2009. Growing duckweed to recover nutrients from wastewaters and for production of fuel ethanol and animal feed. *Clean Soil Air Water*. 37 (1): 17–26.
- Choct, M. 2001. Enzyme Supplementation of Poultry Diets Based on Viscous Cereals. Page 406 in *Enzymes in Farm Animal Nutrition*. M.R. Bedford dan G.G. Partridge, eds. Cab hub. Oxfordshire.
- Cronquist, A. 1981. *An Integrated System of Classification of Flowering Plants*. Columbia University Press, New York.
- Darmawan, A. 2008. Pengaruh Pemberian Biji Jarak Pagar Terhadap Organ dalam Ayam Broiler. Skripsi. Fakultas Peternakan, Institut Pertanian Bogor. Bogor.
- De Groote, G. 1974. A comparison of a new net energy system with the metabolizable energy system in broiler diet formulation performance and profitability. *British Poultry Science*. 15:75–95.
- Demann, J., F. Petersen, G. Dusel, M. Bog, R. Devlamynck, A. Ulbrich, H.-W. Olf, dan H. Westendarp. 2023. Nutritional value of duckweed as protein feed for

broiler chickens—digestibility of crude protein, amino acids and phosphorus. *Animals*. 13 (130): 1–11.

Dahlke, F., A. M. L. Ribeiro, A. M. Kessler, A. R. Lima, dan A. Maiorka. 2003. Effects of corn particle size and physical form of the diet on the gastrointestinal structures of broiler chickens. *Revista Brasileira de Ciência Avícola*. 5 (1): 61–67.

Edwards, C. A., I. T. Johnson, dan W. W. Read. 1988. Do viscous polysaccharides slow absorption by inhibiting diffusion or convection? *European Journal of Clinical Nutrition*. 42: 306.

Elfiandra. 2007. Pemberian Warna Lampu Penerangan yang Berbeda Terhadap Pertumbuhan Badan Ayam Broiler. Skripsi. Fakultas Peternakan Institut Pertanian Bogor, Bogor.

Ensminger, M. E. 1980. *Poultry Science (Animal Agriculture Series)*. 2nd Ed. The Interstate Printers and Publisher. Denville, Illinois.

Erian, V., Zainuddin dan U. Balqis. 2018. Gambaran luas permukaan vili usus ikan lele lokal (*clarias batrachus*) jantan dewasa. *Jurnal Ilmiah Mahasiswa Veteriner*. 2(3): 283–287.

Fisinin, V. I., L. A. Il'ina, E. A. Ilydyrym, I. N. Nikonov, V. A. Filippova, G. Yu. Laptev, N. I. Novikova, A. A. Grozina, T. N. Lenkova, V. A. Manukyan, dan I. A. Egorov. 2016. Broiler chicken cecal microbiocenoses depending on mixed fodder. *Mikrobiologiya*. 85 (4): 472–480.

Fitro, R., D. Sudrajat, dan E. Dihansih. 2015. Performa ayam pedaging yang diberi ransum komersial mengandung tanaman ampas kurma sebagai pengganti jagung. *Jurnal Peternakan Nusantara*. 1(1): 1–8.

Geremu M., Y. B. Tola, dan A. Sualeh. 2016. Extraction and determination of total polyphenols and antioxidant capacity of red coffee (*Coffea arabica* L.) pulp of wet processing plants. *Chemical and Biological Technologies in Agriculture*. 3: 25-30.

Gentle, M. J. 1979. Sensory Control of Food Intake: Food Intake Regulation in Poultry. K. N. (Eds. Boorman & B. M. Freeman). *British Poultry Science*, Ltd., Edinburgh, Scotland.

Giannenas I, C. P. Papaneophytou, E. Tsalie, I. Pappas, E. Triantafillou, dan G. A. Kontopidis. 2014. Dietary supplementation of benzoic acid and essential oil compounds affects buffering capacity of the feeds, performance of turkey poults and their antioxidant status, pH in the digestive tract, intestinal microbiota and morphology. *Asian-Australasian Journal of Animal Sciences*. 27(2): 225–36.

Gonzalez-Alvarado, J. M., E. Jimenez-Moreno, D. Gonzalez-Sanchez, R. Lazaro, dan G. G. Mateos. 2010. Effect of inclusion of oat hulls and sugar beet pulp in

the diet on productive performance and digestive traits of broilers from 1 to 42 days of age. *Animal Feed Science and Technology*. 162: 37–46.

Gwaze, F. R. dan M. Mwale. 2015. The prospect of duckweed in pig nutrition: A Review. *Journal of Agricultural Science*. 7(2): 189–199.

Haustein, A. T., R. H. Gillman, P. W. Skillicorn, V. Guevara, F. Diaz, V. Vergara, A. Gastanaduy, dan J. B. Gillman. 1992. Compensatory growth in broiler chicks fed on *Lemna gibba*. *British Journal of Nutrition*. 68 (2): 329–335.

Haustein, A. T., R. H. Gilman, P. Skillicorn, V. Vergara, V. Guevera, dan A. Gastañaduy. 1990. Duckweed, a useful strategy for feeding chickens: performance of layers fed with sewage grown lemnaeae species. *Poultry Science*. 69: 1835–1844.

Haustein, A. T., R. H. Gilman, P. W. Skillicorn, H. Hannan, D. Díaz, V. Guevara, V. Vergara, A. Gastañaduy, dan J.B. Gilman. 1994. Performance of broiler chickens fed diets containing duckweed (*Lemna gibba*). *Journal of Agricultural Science*. 122 (2): 285–289.

Kementrian Pertanian. 2023. Penyusunan Laporan Tahunan Ditjen Tanaman Pangan Tahun 2023. Jakarta.

Ketaren, P. P. 2010. Kebutuhan gizi ternak unggas di Indonesia. *Wartazoa*. 20 (4): 172–180.

Körner, S., J. E. Vermaat, dan S. Veenstra. 2003. The capacity of duckweed to treat waste water. *Journal of Environmental Quality*. 32 (5): 1583–1590.

Landesman, L., N. C. Parker, C. B Fedler, dan M. Konikoff. 2005. Modeling duckweed growth in wastewater treatment systems. *Livestock Research for Rural Development*. 17 (6): Art. #61.

Landolt, E. 2000. Contribution on the Lemnaceae of Ecuador. *Fragmenta Floristica et Geobotanica*, 45(1/2): 221–237.

Leng R. A., J. H. Stambolie, dan R. Bell. 1995: Duckweed - a potential high-protein feed resource for domestic animals and fish. *Livestock Research for Rural Development*. 7(1): 1–11.

Lenhard, L. dan S. Mozes. 2003. Morphological and functional changes of the small intestine in growth stunded-broilers. *Acta Veterinaria Brno*. 72: 353–358

Lesson, S. dan J. D. Summers. 1991. *Commercial Poultry Nutrition*. University Books. Guelph, Canada.

Lilburn, M. S., G. W. Barbour, R. Nemasetoni, C. Coy, M. Werling, dan A. G. Yersin, 1997. Protein quality and calcium availability from extruded and autoclaved turkey hatchery residue. *Poultry Science*. 76: 841–848.

- Longo, F. A., J. F. M. Menten, A. A. Pedroso, A. N. Figueiredo, A. M. C. Racanicci, dan J. O. B. Sorbara. 2007. Performance and carcass composition of broilers fed different carbohydrate and protein sources in the prestarter phase. *Journal of Applied Poultry Research*. 16 (2): 171–177.
- Melinda, Y. S. dan F. A. Syuhada. 2023. Teknik budidaya dan pengaplikasian tanaman *Lemna minor* sebagai pakan alternatif ternak ayam broiler probiotik dan ikan gurami. *Jurnal Agribisnis*. 1(1): 25–34.
- Miles, R. D., G. D. Batcher, P. R. Henry, dan R. C. Little. 2006. Effect of antibiotics growth promoters on broiler performance, intestinal growth parameters, and quantitative morphology. *Journal Poultry Science*. 85: 476–485.
- Moran Jr. E. T. 1982. Comparative nutrition of the fowl and swine. In: *Gastrointestinal Systems*. Moran, E. T. (Editor). University of Guelph, Guelph, Canada.
- Muchtadi, T. R. dan Sugiyono. 1992. Ilmu Pengetahuan Bahan Pangan. Departemen Pendidikan dan Kebudayaan. Direktorat Jendral Pendidikan Tinggi. Pusat Antar Universitas. Institut Pertanian Bogor. Bogor.
- Muzi, K., N. Supartini, dan H. Darmawan. 2014. Tingkat konsumsi, konversi dan income over feed cost pada pakan ayam kampung dengan penambahan enzim papain. *Jurnal Fakultas Pertanian Tribuana Tungadewi*. 2 (2): 1–10.
- Natsir, W. N. I., R. S. Rahayu, M. A. Darusalam, dan M. Azhar. 2020. Palatabilitas maggot sebagai pakan sumber protein untuk ternak unggas. *Jurnal Agrisistem*. 16 (1): 27–32.
- Nir I., R. Hillel, dan I. Ptichi. 1995. Effect of particle size on performance: 3. Grinding pelleting interactions. *Poultry Science*. 74: 771–783.
- Nuryati, T. 2019. Analisis performans ayam broiler pada kandang tertutup dan kandang terbuka. *Jurnal Peternakan Nusantara*. 5(2): 77–86.
- Ouhida I., J.F. Pérez, dan J. Gasa. 2002. Soybean (*Glycine max*) cell wall composition and availability to feed enzymes. *Journal of Agricultural and Food Chemistry*. 50 (7): 1933–1938.
- Petersen, F., J. Demann, D. Restemeyer, A. Ulbrich, H.-W. Olf, H. Westendarp, dan K.-J. Appenroth. 2021. Influence of the nitrate-n to ammonium-n ratio on relative growth rate and crude protein content in the duckweeds *Lemna minor* and *Wolffiella hyalina*. *Plants (Basel)*. 10 (8): 1741.
- Pérez, S. dan D. Samain. 2010. Structure and engineering of celluloses. *Advances in Carbohydrate Chemistry and Biochemistry*. 64: 25–116.
- Pond, W. G., D. C. Church, dan K. R. Pond. 1995. *Basic Animal Nutrition and Feeding*. 4th Ed. John Wiley and Sons, New York, USA.

- Preston, C. D. dan J. M. Croft. 1997. *Aquatic Plants in Britain and Ireland*. Harley Books, Colchester.
- Riber, A. B., H. A. van de Weerd, I. C. de Jong, dan S. Steinfeldt. 2018. Environmental Enrichment for Broiler Chickens: A Review. *Poultry Science*. 97: 378–396.
- Rocha, A. G., P. Dilkin, R. M. Neto, C. Schaefer, dan C. A. Mallmann. 2022. Growth performance of broiler chickens fed on feeds with varying mixing homogeneity. *Veterinary and Animal Science*. 17: 1–10.
- Rogel, A. M., D. Balnave, W. L. Bryden, dan E. F. Annison. 1987. Improvement of raw potato starch digestion in chickens by feeding oat hulls and other fibrous feedstuffs. *Australian Journal of Agricultural Research*. 38: 629–637.
- Sahara, E., E. Raudhaty, dan F. Maharany. 2012. Performa ayam broiler dengan penambahan enzim fitase dalam ransum. *Jurnal Peternakan Sriwijaya (JPS)*. 1 (1): 34–40.
- Salam, S., A. Fatahilah, D. Sunarti, dan Isroli. 2013. Berat Karkas dan lemak abdominal ayam broiler yang diberi tepung jintan hitam (*Nigella sativa*) dalam ransum selama musim panas. *Sains Peternakan*. 11 (2): 84–90.
- Salih, M. E., H. L. Classen, and G. L. Campbell. 1991. Response of chickens fed on hull-less barley to dietary β -glucanase at different ages. *Animal Feed Science and Technology*. 33: 139–149.
- Samanya, M. dan K. Yamauchi. 2002. Histological alterations of intestinal villi in chickens fed dried *Bacillus subtilis* var, natto. *Comparative Biochemistry and Physiology*. 133: 95–104.
- Sari K. A., B. Sukamto, dan B. Dwiloka. 2014. Efisiensi penggunaan protein pada ayam broiler dengan pemberian pakan mengandung tepung daun kayambang (*Salvinia molesta*). *Agripet*. 14 (2): 76–83
- Satimah, S., V. D. Yuniarto, dan F. Wahyono. 2019. Bobot relatif dan panjang usus halus ayam broiler yang diberi ransum menggunakan cangkang telur mikropartikel dengan suplementasi probiotik *Lactobacillus sp.* *Jurnal Sain Peternakan Indonesia*. 14 (4): 396–403.
- Sell, J. L. 1996. Physiological limitations and potential for improvement in gastrointestinal tract function of poultry. *Journal of Applied Poultry Research*. 5: 96–101.
- Sklan, D. S., S. Heifets dan O. Halevy. 2003. Heavier chick a hatch improves marketing body weight by enhancing skeletal muscle growth. *Poultry Science*. 82: 1778–1786.
- SNI 8173.3: 2015, Pub. L. No. SNI 8173.3: 2015.

- Soejono, M. 1990. Petunjuk Laboratorium Analisis dan Evaluasi Pakan. Fakultas Peternakan Universitas Gadjah Mada, Yogyakarta.
- Solangi, A. A., G. M. Baloch, P. K. Wagan, B. Chachar, dan A. Memon. 2003. Effect of different level of dietary protein on growth of broiler. *Journal of Animal and Veterinary Advances*. 2 (5): 301–304.
- Sońta, M., A. Rekiel, dan M. Batorska. 2019. Use of duckweed (*Lemna L.*) in sustainable livestock production and aquaculture—A review. *Annals of Animal Science*. 19 (2): 257–271.
- Stanley, D., R. J. Hughes, and R. J. Moore. 2014. Microbiota of the chicken gastrointestinal tract: influence on health, productivity and disease. *Applied Microbiology and Biotechnology*. 98: 4301–4310.
- Suciani, K. W. Parimartha, N. L. G. Sumardani, I. G. N. G. Bidura, Kayana, I.G.N., dan S. A. Lindawati. 2011. Penambahan multi enzim dan ragi tape dalam ransum berserat tinggi (pod-kakao) untuk menurunkan kolesterol daging ayam broiler. *Jurnal Veteriner*. 12 (1): 69–76.
- Sugito, W. Manalu, D. A. Astuti, E. Handharyani, dan Chairul. 2007. Morfometrik usus dan performan ayam broiler yang diberi cekaman panas dan ekstrak n-heksana kulit batang 'jaloh' (*Salix tetrasperma* Rozb). *Media Peternakan*. 30: 198–206.
- Sujana, E., S. Darana, dan I. Setiawan. 2011. Implementasi Teknologi Semi Closed–House System Pada Performan Ayam Broiler di Test Farm Sustainable Livestock Techno Park, kampus Fakultas Peternakan Universitas Padjadjaran, Jatinangor. In *Seminar Nasional Teknologi Peternakan dan Veteriner* (pp. 362–366).
- Syamsuhaidi. 1996. Penggunaan *Duckweed* (Family Lemnaceae) sebagai Pakan Serat Sumber Protein dalam Ransum Ayam Pedaging. Disertasi Doktor Program Studi Ilmu Ternak. Institut Pertanian Bogor, Bogor.
- Tejeda, O.J. dan W. Kim. 2021. Role of Dietary Fiber in Poultry Nutrition. *Animals*. 11 (2): 461
- Tillman, A. D., H. Hartadi, S. Reksohadiprodjo, S. Prawirokusumo, dan S. Lebdoesoekojo. 1991. Ilmu Makanan Ternak Dasar. Cetakan kelima. Gadjah Mada University Press, Yogyakarta.
- Varastegani A. dan I. Dahlan. 2014. Influence of dietary fiber levels on feed utilization and growth performance in poultry. *Journal of Animal Production Advances*. 4 (6): 422–429.
- Velichkova, K., I. Sirakov, E. Valkova, S. Stoyanova, dan G. Kostadinova. 2017. Bioaccumulation and protein content of *Lemna minuta* Kunth. and *Lemna valdiviana* Phil. in Bulgarian water reservoirs. *Scientific Papers. Series E. Land Reclamation, Earth Observation & Surveying, Environmental Engineering*. 4: 204–107.

- Visek, W. J. 1978. The mode of growth promotion by antibiotics. *Journal of Animal Science*. 46: 1447–1469.
- Wahju, J. 1992. Ilmu Nutrisi Unggas. Cetakan ketiga. Gadjah Mada University Press, Yogyakarta.
- Widana I. P. V., I. W. Sukanata, dan I. G. N. Kayana. 2019. analisis kelayakan finansial usaha peternakan ayam broiler dengan sistem kandang closed house (Studi Kasus di PT. Ciomas Adisatwa, Desa Tuwed, Jembrana, Bali). *Ejournal Peternakan Tropika*. 7(2): 676–694.
- Wijayanti, R. P. 2011. Pengaruh Suhu Kandang yang Berbeda Terhadap Performan Ayam Ras Pedaging Periode Starter. Skripsi. Fakultas Peternakan. Universitas Brawijaya, Malang.
- Winarno, F. G. 1997. Kimia Pangan dan Gizi. PT Gramedia Pustaka Utama, Jakarta.
- Wissowzsky. 1876. Pewarnaan H&E. Tersedia pada <http://tvmouse.ucdavis.edu/JAXWorkshop/Syllabus/STAINS.HTM>
- Yao, J., Y. Zhao, Q. Wang, Z. Zhou, X. Hu, X. Duan, dan C. An. 2006. Biochemical compositions and digestive enzyme activities during the embryonic development of prawn, *Macrobrachium rosenbergii*. *Aquaculture*. 253 (1–4): 573–582.