

- Adibmoradi, M., Navidshad, B., Seifdavati, and J., Royan, M. 2006. Effect of dietary garlic meal on histological structure of small intestine in broiler chickens. *Journal Poult Sci.* 43: 378-383.
- Ali, P. R., Machfud, Sukardi, Noor, E., & Purnomo, D. (2021). The Challenges in Indonesia Poultry Industry Business. *Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management Singapore*, 1(1), 5433–5443
- Siahaan, M. R., and Andi Hairil Alimuddin, H. (2015). Identifikasi Metabolit Sekunder Ekstrak Landak Laut (*Diadema setosum*) Dan Uji Aktivitas Antibakteri *Escherichia coli* dan *Staphylococcus aureus*. *Jurnal Kimia Khatulistiwa.* 4 (4): 53-60.
- Armoni, M., Quon, M. J., Maor, G., Avigad, S., Shapiro, D. N., Harel, C., & Karnieli, E. (2002). PAX3/forkhead homolog in rhabdomyosarcoma oncoprotein activates glucose transporter 4 gene expression in vivo and in vitro. *The Journal of Clinical Endocrinology & Metabolism*, 87(11), 5312-5324.
- Association of Official Analytical Chemist. 1990. *Official Methods of Analysis*. Association of Official Analytical Chemists, Inc. Washington DC.
- Atmomarsono, S. U., and Kartasudjana, R. 2008. *Ilmu Dasar Ternak Unggas*. Penebar Swadaya. Jakarta.
- Awad, W. A., Ghareeb, K., Abdel-Raheem, S., & Bohm, J. (2009). Effects of Dietary Inclusion of Probiotic and Synbiotic on Growth Performance, Organ Weights, and Intestinal Histomorphology of Broiler Chickens. *The Journal of Poultry Science*, 88(1), 49–55.
- Badan Pusat Statistik. 2023. *Produksi Daging Ayam Ras Pedaging* [Shttps://www.bps.go.id/id/statistics-table/2/NDg4IzI=/produksi-daging-ayam-ras-pedaging-menurut-provinsi.html](https://www.bps.go.id/id/statistics-table/2/NDg4IzI=/produksi-daging-ayam-ras-pedaging-menurut-provinsi.html)
- Baumans, V. (2004). Use of Animals in Experimental Research: An Ethical Dilemma?. *Gene Therapy.* 11 (1): 64-66.
- Baye, A., Sompie, F. N., Bagau, B., and Regar, M. N. 2015. Penggunaan Tepung Limbah Pengalengan Ikan Dalam Ransum Terhadap Performa

- Bazinet RP, Laye S. 2014. Polyunsaturated fatty acids and their metabolites in brain function and disease. *Nature Reviews Neuroscience*. 15: 771-785
- Blatama, D., Salsabila, N., & Saragih, H. T. (2023). Goloba kusi (*Hornstedtia scottiana* [F. Muell.] K. Schum.) Fruit as a Feed Additive to Improve the Histological Structures and Growth Performance of Broiler. *Veterinary World*, 16(2), 329–340.
- Borsa, P., Arlyza, I. S., Hoareau, T. B., and Shen, K. N. 2018. Diagnostic description and geographic distribution of four new cryptic species of the blue-spotted maskray species complex (Myliobatoidei: Dasyatidae; *Neotrygon* sp.) based on DNA sequences. *Journal of Oceanology and Limnology*. 36: 827-841.
- Calder, P. C. (2010). Omega-3 Fatty Acids and Inflammatory Processes. *Nutrients*, 2(3), 355-374.
- Chee, K. M., Gong, J. X., Rees, D. M. G., Meydani, M., Ausman, L., Johnson, J., Siguel, E. N., & Schaefer, E. J. (1990). Fatty acid content of marine oil capsules. *Lipids*, 25(9), 523-528. <https://doi.org/10.1007/BF02537158>
- Cheled-Shoval, S. L., Amit-Romach, E., Barbakov, M., & Uni, Z. (2011). The Effect of in Ovo Administration of Mannan Oligosaccharide on Small Intestine Development During the Pre- And Posthatch Periods in Chickens. *Poultry Science*, 90(10), 2301–2310.
- Cho, S., Ryu, C., Yang, J., Mbiriri, D.T., Choi, C.W., Chae, J.I., Kim, Y.H., Shim, K.S., Kim, Y.J. and Choi, N.J., 2013. Effect of Conjugated Linoleic Acid Feeding on the Growth Performance and Meat Fatty Acid Profiles in Broiler: Meta-Analysis. *Asian-Australasian journal of animal sciences*. 26 (7): 995.
- Choi, J., Kong, B., Bowker, B. C., Zhuang, H., & Kim, W. K. (2023). Nutritional Strategies to Improve Meat Quality and Composition in the Challenging Conditions of Broiler Production: A Review. *In Animals*, 13(8), 1–20.
- Colombino, E., Karimi, M., Ton Nu, M. A., Tilatti, A. A., Bellezza Oddon, S., Calini, F., Bergamino, C., Fiorilla, E., Gariglio, M., Gai, F., Capucchio, M. T., Schiavone, A., Gasco, L., & Biasato, I. (2023). Effects of Feeding a Thermomechanical, Enzyme-facilitated, Coprocessed Yeast and Soybean

- Costantini, L., Molinari, R., Farinon, B., and Merendino, N. 2017. Impact of omega-3 fatty acids on the gut microbiota. *International journal of Molecular Sciences*. 18 (12): 2645.
- De Oliveira, M.C., da Silva, D.M., Dias D.M.B. 2013. Effect of feed restriction on organs and intestinal mucosa of growing rabbits. *Revista Brasileira de Zootecnia*. 42(7): 530-534.
- Denbow, D. M. 2015. Gastrointestinal Anatomy and Physiology. In *Sturkie Avian Physiology*. Academic Press. Pp. 337-336
- Dibner, J. J., & Richards, J. D. (2004). The Digestive System: Challenges and Opportunities. *Journal of Applied Poultry Research*, 13(1), 86–93.
- Duan, A. Y., Ju, A. Q., Zhang, Y. N., Qin, Y. J., Xue, L. G., Ma, X., Luan, W. M., & Yang, S. B. (2021). The Effects of In Ovo Injection of Synbiotics on the Early Growth Performance and Intestinal Health of Chicks. *Frontiers in Veterinary Science*, 8(1), 1–11.
- Durkin, L. A., Childs, C. E., and Calder, P. C. 2021. Omega-3 polyunsaturated fatty acids and the intestinal epithelium: A review. *Foods*. 10 (1): 199.
- Ebeid, T., Eid, Y., Saleh, A., & Abd El-Hamid, H. (2008). Ovarian Follicular Development, Lipid Peroxidation, Antioxidative Status and Immune Response in Laying Hens Fed Fish Oil-Supplemented Diets to Produce N-3-Enriched Eggs. *Animal*, 2(1), 84-91.
- Elnasharty, M.A.I., Abou-Ghanema, Sayed-Ahmed A, Elnour AA. 2013. Mucosal-submucosal changes in rabbit duodenum during development. *World Academy of Science, Engineering and Technology* 76: 500-508.
- Ensminger, M. E. 1992. *Poultry Science*, Danville, Illinois. Amerika Serikat: Interstate Publisher.
- Esterbauer, H., Oberkofler, H., Krempler, F., & Patsch, W. (1999). Human peroxisome proliferator activated receptor gamma coactivator 1 (PPARGC1) gene: cDNA sequence, genomic organization, chromosomal localization, and tissue expression. *Genomics*, 62(1), 98-102.
- Fadilah, R. 2013. *Super Lengkap Beternak Ayam Broiler*. Jakarta Selatan: Agromedia Pustaka.

- Panani, A.H., Fajri N., Saldo W. L. 2018. Pengukuran minyak ikan dalam ransum ayam kampung terhadap profil lemak darah. *Jurnal Ilmu dan Teknologi Peternakan Tropis*. 6(1): 14-19.
- Farzana, N., Habib, M., Ali, M. H., Hashem, M. A., & Ali, M. S. (2018). Comparison of Meat Yield and Quality Characteristics Between Indigenous Chicken and Commercial Broiler. *Bangladesh Veterinarian*, 34(2), 61–70
- Fatmaningsih, R., Riyanti, & Nova, K. (2016). Performa Ayam Pedaging Pada Sistem Brooding Konvensional dan Thermos. *Jurnal Ilmiah Peternakan Terpadu*, 4(3), 222–229.
- Froese, R. and Pauly, D. 2016. Fishbase, World Wide Web Electronic Publication. <https://www.fishbase.se/>
- Gaad A.H. *et al.* 2016. Effect of linoleic acid supplementation on growth of broiler. *IOSR Journal of Agriculture and Veterinary Science*. 9(8): 77- 80
- Gaad AH, Barham GS, Shah AH, Mughal GA, Pirzado SA, Khaskheli GB, Magsi AS, Soomro AA. 2016. Effect of linoleic acid supplementation on growth of broiler. *IOSR Journal of Agriculture and Veterinary Science*, 9(8): 77-80
- Gaad, A. H., Barham, G. S., Shah, A. H., Ali, G., and Soomro, A. A. 2016. Effect of linoleic acid supplementation on growth of broiler. *IOSR Journal of Agriculture and Veterinary Science*. 9 (08): 77-80.
- Heath, B.R., Gong, W., Taner, H.F., Broses, L., Okuyama, K., Cheng, W., Jin, M., Fitzsimonds, Z.R., Manousidaki, A., Wu, Y., Zhang, S., Wen, H., Chinn, S.B., Bartee, E., Xie, Y., Moon, J.J., & Lei, Y.L. (2023). Saturated fatty acids dampen the immunogenicity of cancer by suppressing STING. *Cell Reports*, 42, 112303. <https://doi.org/10.1016/j.celrep.2023.112303>
- Herlina, B., Novita, R., and Karyono, T. 2015. Pengaruh jenis dan waktu pemberian ransum terhadap performans pertumbuhan dan produksi ayam broiler. *Jurnal Sain Peternakan Indonesia*. 10 (2): 107-113.
- Hermansyah, R. F., Taryono, T., Zairion, Z., Adrianto, L., Zulfikar, A., Booth, H., and Ichsan, M. 2022. Karakteristik biologi ikan pari kekeh (*Rhynchobatus* sp.) sebagai tangkapan sampingan di perairan aceh jaya. *BAWAL: Widya Riset Perikanan Tangkap*. 14 (2): 95-103.
- Huang, Q., Wen, C., Yan, W., Sun, C., Gu, S., Zheng, J., and Yang, N. 2022.

- Comparative analysis of the characteristics of digestive organs in broiler chickens with different feed efficiencies. *Poultry Science*. 101 (12):102184.
- Ibrahim, S. 2008. Hubungan Ukuran-Ukuran Usus Halus Dengan Berat Badan Broiler. *Agripet*: 8 (2): 42-46.
- Ichwan, W. 2004. *Membuat Pakan Ayam Ras Pedaging*. Agromedia Pustaka: Jakarta
- Iji, P. A., Hughes, R. J., Choct, M., and Tivey, D. R. 2001. Intestinal structure and function of broiler chickens on wheat-based diets supplemented with a microbial enzyme. *Asian-Australasian Journal of Animal Sciences*. 14 (1): 54-60.
- Joesidawati, M. I. 2022. Extraction of stingray liver oil (*Dasyatis* sp.) with alkaline digestion method. *In IOP Conference Series: Earth and Environmental Science*. 1036 (1): 1-5.
- Kalish BT, Fallon EM, Puder M. 2012. A tutorial on fatty acid biology. *JPEN J. Parenter Enteral Nutr*. 36: 380-388.
- Kebir, M. V. O. E., Barnathan, G., Gaydou, E. M., Siau, Y., and Miralles, J. 2007. Fatty acids in liver, muscle and gonad of three tropical rays including non-methylene-interrupted dienoic fatty acids. *Lipids*. 42 (6): 525-535.
- Kim, J. W. 2010. The endocrine regulation of chicken growth. *Asian Australasian Journal Animal Science*. 23(12):1668-1676.
- King, D. B., and King, C. R. 1976. Thyroidal influence on gastrocnemius and sartorius muscle growth in young white leghorn cockerels. *General and Comparative Endocrinology*. 29 (4): 473-479.
- Lam, Y. Y., Hatzinikolas, G., Weir, J. M., Janovska, A., McAinch, A. J., Game, P., & Wittert, G. A. (2011). Insulin-stimulated glucose uptake and pathways regulating energy metabolism in skeletal muscle cells: the effects of subcutaneous and visceral fat, and long-chain saturated, n-3 and n-6 polyunsaturated fatty acids. *Biochimica et Biophysica Acta (BBA)-Molecular and Cell Biology of Lipids*, 1811(7-8), 468-475.
- Le Néchet, S., Dubois, N., Gouygou, J. P., and Bergé, J. P. 2007. Lipid composition of the liver oil of the ray, *Himantura bleekeri*. *Food Chemistry*, 104 (2), 559-

- Luchtman DW, Song C. 2013. Cognitive enhancement by omega-3 fatty acids from childhood to old age: findings from animal and clinical studies. *Neuropharmacology*. 64: 550-565.
- Lukas, R., Gigliotti, J. C., Smith, B. J., Altman, S., and Tou, J. C. 2011. Consumption of different sources of omega-3 polyunsaturated fatty acids by growing female rats affects long bone mass and microarchitecture. *Bone*, 49 (3): 455-462.
- Lusiana, E. 2022. *Buku Ajar Toksikologi*. Palembang: Bening Media Publishing. Malang: UB Press.
- Manafe, M. E. (2022). Substitusi Krokot (*Portulaca oleracea* L.) dalam Ransum terhadap Kandungan Kolesterol Daging, Darah dan Trigliserida pada Ayam Broiler. *Jurnal AgroSainTa: Widyaiswara Mandiri Membangun Bangsa*, 6(1), 9-14.
- Maulidya, V., and Rijai, L. 2017. Identifikasi metabolit sekunder, uji toksisitas, dan uji antioksidan ekstrak kulit batang terap (*Artocarpus odoratissimus blanco*). In *Proceeding of Mulawarman Pharmaceuticals Conferences*. 5: 100-111.
- Metličar, V., Kranjc, K., & Albreht, A. (2021). Utilization of Plant-Based Wastes for a Sustainable Preparation of Xanthophyll Esters via Acid Anhydrides Using  $\beta$ -Pinene as a Bio-Derived Solvent. *ACS Sustainable Chemistry & Engineering*, 9(31), 10651-10661.
- Minich, D. M., Vonk, R. J., & Verkade, H. J. (1997). Intestinal absorption of essential fatty acids under physiological and essential fatty acid-deficient conditions. *Journal of lipid research*, 38(9), 1709-1721.
- Muharlieni, Sudjarwo, E dan Hamiyanti, A. A. 2017. *Ilmu Produksi Ternak Unggas*. National. Academic of Science. Washington DC.
- Nur Mahendra, M. Y., Kamaludeen, J., & Pertiwi, H. (2023). Omega-6: Its Pharmacology, Effect on the Broiler Production, and Health. *Veterinary medicine international*, 2023(1), 3220344.
- Nutrient Requirements of Poultry. 1994. *Nutrien Requirement of Poultry*, 9<sup>th</sup> Payte, G. S., Purnamasari, L., Olarve, J. P., De Leon3, N. J. P., & Dela Cruz, J. F. (2022). Correlation Between Body Weight Day Old Chick (DOC) and Body

- Weight Each Week from Commercial Farms in Province of Rizal, Philippines. *Jurnal Ilmu Produksi Dan Teknologi Hasil Peternakan*, 10(3), 126–131.
- Pertiwi, D. D.R., R. Murwani dan T. Yudiarti. 2017. Bobot relatif saluran pencernaan ayam broiler yang diberi tambahan air rebusan kunyit dalam air minum. *J. Pet. Ind.* 19(2): 60-64.
- Peternakan dan Kesehatan Ternak. 2022. *Livestock and Animal Health Statistic*. [https://satudata.pertanian.go.id/assets/docs/publikasi/Statistik\\_Peternakan\\_dan\\_Kesehatan\\_Hewan\\_2022\\_compressed.pdf](https://satudata.pertanian.go.id/assets/docs/publikasi/Statistik_Peternakan_dan_Kesehatan_Hewan_2022_compressed.pdf)
- Qurniawan, A., Arief, I. I., and Afnan, R. 2016. Performans produksi ayam pedaging pada lingkungan pemeliharaan dengan ketinggian yang berbeda di Sulawesi Selatan. *Jurnal Veteriner*. 17 (4): 622-633.
- Rajput N, Muhammad N, Yan R, Zhong X, Wang T. 2013. Effect of dietary supplementation of curcumin on growth performance, intestinal morphology and nutrients utilization broiler chicks. *Journal Japan Poultry Science Association*. 50: 44-52
- Ramadhanti, A. R., Puspita, N. O. J., Refalta, C. F., Kurnianto, H., and Saragih, H. T. S. 2021. Performance of male layer fed ration containing green algae (*Spirogyra jaoensis*) extract. *Tropical Animal Science Journal*. 44 (1): 100-107.
- Rasyaf, M. 2003. *Beternak Ayam Petelur*. Jakarta: Penebar Swadaya
- \_\_\_\_\_. 2008. *Panduan Beternak Ayam Pedaging*. Jakarta: Penebar Swadaya.
- Rasyid, A. 2003. Asam lemak omega-3 dari minyak ikan. *Jurnal Oseana*. 28 (3): 11-16.
- Ravindran, V., & Abdollahi, M. R. (2021). Nutrition and Digestive Physiology of the Broiler Chick: State of the Art and Outlook. *In Animals*, 11(10), 1–23.
- Resnawati, H., and Bintang, I. 2014. Kebutuhan pakan ayam kampung pada periode pertumbuhan. *Sumber*. 1 (38): 0-74.
- Rusmana D, Piliang WG, Setiyono A, Budijanto B. 2008. The lemuru fish oil and the suplemen of vitamin E in the diet of broiler chicken as an immunomodulator. *Journal Animal Production*. 10(2): 110–116.
- Rusmana, D., & Natawiharja, D. (2008). Pengaruh pemberian ransum mengandung

minyak ikan kemuru dan vitamin E terhadap kadar lemak dan kolesterol daging ayam broiler. *Jurnal Ilmu Ternak Universitas Padjadjaran*, 8(1).

- Rusmana, D., Piliang W.G., Setiyono, A., and Budijanto, B. 2008. The lemuru fish oil and the suplemen of vitamin e in the diet of broiler chicken as animmunomodulator. *Journal Animal Production*. 10 (2):110–116.
- Sandercock, D. A., Nute, G. R., & Hocking, P. M. (2009). Quantifying the Effects of Genetic Selection and Genetic Variation for Body Size, Carcass Composition, and Meat Quality in the Domestic Fowl (*Gallus domesticus*). *Poultry Science*, 88(1), 923–931.
- Saragih, H. T. S. S. G., Muhamad, A. A. K., Alfianto, A., Viniwidihastuti, F., Untari, L. F., Lesmana, I., and Rohmah, Z. 2019. Effects of spirogyra jaoensis as a dietary supplement on growth, pectoralis muscle performance, and small intestine morphology of broiler chickens. *Veterinary World*, 12(8), 1233.
- Saragih, H. T., Muhamad, A. A. K., Alfianto, A., Viniwidihastuti, F., Untari, L. F., Lesmana, I., Widyatmoko, H., & Rohmah, Z. (2019). Effects of Spirogyra jaoensis as a Dietary Supplement on Growth, Pectoralis Muscle Performance, and Small Intestine Morphology of Broiler Chickens. *Veterinary World*, 12(8), 1233–1239.
- Saragih, H. T., Muhamad, A. A. K., Alfianto, A., Viniwidihastuti, F., Untari, L. F., Lesmana, I., Widyatmoko, H., and Rohmah, Z. 2019. Effects of Spirogyra jaoensis as a dietary supplement on growth, pectoralis muscle performance, and small intestine morphology of broiler chickens. *Veterinary World*. 12 (8): 1233.
- Sathees, D., Vidanarachchi, J. K., and Himali, S. M. C. 2019. Enrichment of omega-3 fatty acids using urea complexation method to enhance the nutritive value of stingray fish (*Dasyatis Sphen F.*) liver oil.
- Satimah, S., Yuniyanto, V. D., & Wahyono, F. (2019). Bobot Relatif dan Panjang Usus Halus Ayam Broiler yang Diberi Ransum Menggunakan Cangkang Telur Mikropartikel dengan Supplementasi Probiotik *Lactobacillus* sp. *Jurnal Sain Peternakan Indonesia*, 14(4), 396-403.
- Sellami, M., Rebah, F. B., Gargouri, Y., and Miled, N. 2018. Lipid composition and

antioxidant activity of liver oils from ray species living in tunisian coasts. *Arabian Journal of Chemistry*. 11 (2): 233-239.

Serini, S., Zinzi, A., Ottes Vasconcelos, R., Fasano, E., Riillo, M. G., Celleno, L., & Calviello, G. (2016). Role of  $\beta$ -catenin signaling in the anti-invasive effect of the omega-3 fatty acid DHA in human melanoma cells. *Journal of Dermatological Treatment*, 27(3), 264-271.

Setiawan, H., Jingga, M. E., & Saragih, H. T. (2018). The Effect of Cashew Leaf Extract on Small Intestine Morphology and Growth Performance of Jawa Super Chicken. *Veterinary World*, 11(8), 1047–1054.

Setiawan, H., Jingga, M. E., and Saragih, H. T. 2018. The effect of cashew leaf extract on small intestine morphology and growth performance of jawa super chicken. *Veterinary World*. 11(8): 1047-1054.

Sherwood L, Klandorf H, Yancey P. 2013. *Animal Physiology: From Genes to Organism*. 2nd ed. Publisher by Brooks Cole, Cengage Learning.

Siahaan, M. R., and Andi Hairil Alimuddin, H. (2015). Identifikasi Metabolit Sekunder Ekstrak Landak Laut (*Diadema setosum*) Dan Uji Aktivitas

Siregar, A.P. (1980). *Teknik Berternak Ayam Pedaging di Indonesia*. Merdie Group: Jakarta

Sjofjan, O. dan Djunaidi, I. H. 2016. Pengaruh beberapa jenis pakan komersial terhadap kinerja produksi kuantitatif dan kualitatif ayam pedaging. *Buletin Peternakan*. 40 (3): 187.

Soeparno. 1994. *Ilmu dan Teknologi Daging Cetakan Kedua*. Yogyakarta: Gadjah Mada University Press.

Sudarmono, A.S. 2003. *Pemeliharaan ayam ras petelur*. Yogyakarta: Penerbit Kanisius, 17.

Sudibya, S. 2008. Transfer omega-3 melalui kapsulisasi dan l-karnitin pengaruhnya terhadap kandungan asam lemak daging dan sate kambing. *Sains Peternakan: Jurnal Penelitian Ilmu Peternakan*. 6 (1): 18-25.

Sudjarwo, E., and Hamiyanti, A. A. 2017. *Ilmu Produksi Ternak Unggas*. Malang: Universitas Brawijaya Press.

Sugiharto, S. (2016). Role of Nutraceuticals in Gut Health and Growth Performance

- Sukarsa, D. R. (2004). A Study of Activity of Omega-3 Fatty Acid of Some Marine Fish in Mice as the Experimental Animals. *Jurnal Pengolahan Hasil Perikanan Indonesia*, 7(1).
- Sukhotnik, I., Slijper, N., Pollak, Y., Chemodanov, E., Shaoul, R., Coran, A. G., and Mogilner, J. G. (2011). Parenteral omega-3 fatty acids (Omegaven) modulate intestinal recovery after intestinal ischemia-reperfusion in a rat model. *Journal of Pediatric Surgery*. 46 (7): 1353-1360.
- Supomo. 2020. *Manfaat Tanaman Herbal dalam Meningkatkan Kualitas Ayam Pedaging*. Makassar: Nas Media Pustaka.
- Suwarda and Darmaji. 2022. *Manajemen Usaha Ternak Ayam Broiler*. Malang: CV Literasi Nusantara Abadi.
- Tahuk, P. K., Dethan, A. A., & Sio, S. (2018). The Composition of Saturated and Unsaturated Fatty Acids and Cholesterol in Meat of Bali Bull Fattened Using Greenlot System in Small Holder Farming. *Jurnal Kedokteran Hewan*, 12(3), 66-70.
- Tamalluddin, F. 2014. *Panduan Lengkap Ayam Broiler*. Penebar Swadaya Grup: Jakarta.
- \_\_\_\_\_. 2016. *Panduan Lengkap Ayam Broiler*. Penebar Swadaya Grup: Jakarta.
- Tillman, A. D., Hartadi, H., Reksohadiprodjo, S., Prawirokusumo dan Lebdoesoekojo, S. 1986. *Ilmu Makanan Ternak Dasar*. Gajah Mada University Press: Yogyakarta
- Tirajoh, S., Tiro, B. M., Palobo, F., and Lestari, R. H. 2020. Pemanfaatan daun kelor (*Moringa oleifera*) terhadap kualitas pertumbuhan ayam kampung unggul balitbangtan di Jayapura, Papua. *Jurnal Ilmu Peternakan dan Veteriner Tropis (Journal of Tropical Animal and Veterinary Science)*.10 (2): 119
- Tirtadanu, T., Suprpto, S., and Suwarso, S. 2019. Komposisi, Sebaran, Kepadatan Stok dan Biomasa Pari di Laut Jawa. *Prosiding Pusat Riset Perikanan*. 1(1): 15-22.

- Tompkins, Y. H., Chen, C., Sweeney, K. M., Kim, M., Voy, B. H., Wilson, J. L., and Kim, W. K. 2022. The effects of maternal fish oil supplementation rich in n-3 PUFA on offspring-broiler growth performance, body composition and bone microstructure. *Plos one*. 17 (8): 1-20.
- Tresnati, J., and Djawad, I. 2012. Effect of lead on gill and liver of blue spotted ray (*Dasyatis kuhlii*). *Journal of Cell and Animal Biology*. 6 (17): 250-256.
- Ueda, T., Hokari, R., Higashiyama, M., Yasutake, Y., Maruta, K., Kurihara, C., & Miura, S. (2015). Beneficial effect of an omega-6 PUFA-rich diet in non-steroidal anti-inflammatory drug-induced mucosal damage in the murine small intestine. *World Journal of Gastroenterology*, 21(1), 177.
- Uni, Z., Smirnov, A. and Sklan, D. 2003. Pre and posthatch development of goblet cells in the broiler small intestine: Effect of delayed access to feed. *Journal Poultry Science*. 82: 320-327.
- Vaughan, R. A., Garcia-Smith, R., Bisoffi, M., Conn, C. A., & Trujillo, K. A. (2012). Conjugated linoleic acid or omega 3 fatty acids increase mitochondrial biosynthesis and metabolism in skeletal muscle cells. *Lipids in health and disease*, 11, 1-10.
- Vega, R. B., Huss, J. M., & Kelly, D. P. (2000). The coactivator PGC-1 cooperates with peroxisome proliferator-activated receptor  $\alpha$  in transcriptional control of nuclear genes encoding mitochondrial fatty acid oxidation enzymes. *Molecular and cellular biology*, 20(5), 1868-1876.
- Wahju, J. 2004. *Ilmu Nutrisi Unggas*. Gadjah Mada University Press: Yogyakarta
- Watkins, B. A., Li, Y., Lippman, H. E., and Feng, S. 2003. Modulatory effect of omega-3 polyunsaturated fatty acids on osteoblast function and bone metabolism. *Prostaglandins, leukotrienes and essential fatty acids*. 68 (6): 387-398.
- Widiyanto, W. N., Ibrahim, R., and Anggo, A. D. 2015. Pengaruh suhu pengolahan dengan metode steam jacket sederhana terhadap kualitas minyak hati ikan pari mondol. *Jurnal Pengolahan Hasil Perikanan Indonesia*. 18(1): 11-18.
- Widodo, E. 2018. *Ilmu Nutrisi Unggas*. Malang: Universitas Brawijaya Press.
- Xie, Y., Yang, W., Tang, F., Chen, X., and Ren, L. 2015. Antibacterial activities of flavonoids: structure-activity relationship and mechanism. *Current Medicinal Chemistry*, 22(1), 132-149



- Xing, R. L., Yang, H. Y., Wang, X. Q., Yu, H. H., Liu, S., Chen, X. L., and Li, P. A. 2018. Effect of enzymatically hydrolyzed scallop visceral protein powder used as a replacement of fish meal on the growth performance, immune responses, intestinal microbiota and intestinal morphology of broiler chickens. *Livestock Science*. 207: 15-24.
- Yamauchi, K., Zhou, Z., Ibardoza, E., Isshiki, Y., Nakahiro, Y., 1991. Technical Bulletin of Faculty of Agriculture Kagawa University. Kagawa Daigaku Nogakubu Gakujutsu Hokoku. *Poultry Production* 11:74-75.
- Yulma, Y. E., Muryani, R., and Mahfudz, L. D. 2016. Performans ayam broiler yang diberi ransum mengandung rumput laut *Gracilaria verrucosa* terfermentasi (A performance broilers were given rations of fermented containing seaweed *Gracilaria Verrucosa*). *Animal Agriculture Journal*. 3 (2): 130-137.
- Zainuddin, D. 2006. Teknik penyusunan ransum dan kebutuhan gizi ayam lokal. Materi Pelatihan Teknologi Budidaya Ayam Lokal dan Itik. Kerjasama Dinas Peternakan Provinsi Jawa Barat dengan Balai Penelitian Ternak, 10-28.
- Zarate R, El Jaber-Vazdekis N, Tejera N, Perez JA, Rodriguez C. 2017. Significance of long chain polyunsaturated fatty acids in human health. *Clinical and Translational Medicine*. 6(1): 25.
- Zhang, J. Y., Wang, X. B., Hu, J., and Kim, I. H. 2020. Effects of dietary supplementation with graded levels of omega-3 fatty acids on growth performance, nutrients digestibility, blood profile, faecal microbial in weaning pigs. *Journal of Applied Animal Research*. 48 (1): 390-396.
- Zuidhof, M.J., Schneider, B.L., Carney, V.L., Korver, D.R. and Robinson, F.E., 2014. Growth, efficiency, and yield of commercial broilers from 1957, 1978, and 2005. *Poultry science*. 93(12): 2970-2982.