

## DAFTAR PUSTAKA

- Abbasi, F., J. Liu, H. Zhang, X. Shen, and X. Luo. 2018. Effects of feeding corn naturally contaminated with aflatoxin on growth performance, apparent ileal digestibility, serum hormones levels and gene expression of Na<sup>+</sup>, K<sup>+</sup> -ATPase in ducklings. *Asian-Australas J Anim Sci.* 00:01–07.
- Abdulbaqi, N. J., B. I. Dheeb, and R. Irshad. 2018. Expression of biotransformation and antioxidant genes in the liver of albino mice after exposure to aflatoxin B<sub>1</sub> and an antioxidant sourced from turmeric (*Curcuma longa*). *Jordan J. Bio. Sci.* 11:93–98.
- Abdulla, N. R., A. Nabilah, M. Zamri, A. B. Sabow, K. Y. Kareem, S. Nurhazirah, F. H. Ling, A. Q. Sazili, and T. C. Loh. 2017. Physico-chemical properties of breast muscle in broiler chickens fed probiotics, antibiotics or antibiotic – probiotic mix. *J. App. Anim. Res.* 45(1): 64-70
- Aboutalebi, N. 2018. Toxic effects of aflatoxin B<sub>1</sub> on duodenum tissue. *J. Am. Sci.* 9(3s):115-117.
- Acar, N., G. F. Barbato, and P. H. Patterson. 2001. The effect of feeding excess methionine on live performance, carcass traits, and ascitic mortality. *Poult. Sci.* 80:1585–1589.
- Adegoke, G. O. and P. Letuma. 2013. Strategies for the prevention and reduction of mycotoxins in developing countries. *Intech.* 123-136.
- Adekoya, I., P. Njobeh, A. Obadina, C. Chilaka, S. Okoth, M. D. Boevre, and S. D. Saegar. 2017. Awareness and prevalence of mycotoxin contamination in selected Nigerian fermented foods. *Toxins.* 9:1–16.
- Afzal, M., and S. Zahid. 2004. Effects of addition of a mycotoxin detoxifier in poultry feed containing different levels of aflatoxins on the performance of broilers. *Asian-Aust. J. Anim. Sci.* 17(7):990–994.
- Ahsan, U., O. Cengiz, I. Raza, E. Kuter, M. F. A. Chacher, Z. Iqbal, S. Umar, and S. Çakir. 2016. Sodium butyrate in chicken nutrition: The dynamics of performance, gut microbiota, gut morphology, and immunity. *Worlds. Poult. Sci. J.* 72:265–275.
- Aini, N. 2012. Aflatoxin: contamination its method analysis in food. *J. Kefarmasian Indonesia.* 2:54–61.
- Aisyah, S., Safika, and F. Jamin. 2015. Determination of aflatoxin B<sub>1</sub> in peanut food products by Enzyme-Linked Immunosorbent Assay (ELISA). *J. Kedokt. Hewan* 9:38–41.
- Akbar, N., M. Aasima, R. Faneshwar, and K. Vijay. 2017. Determinants of broiler chicken meat quality and factors affecting them: a review. *J. Food Sci. Technol.* 54:2997–3009.

- Akinola, O. S., A. O. Onakomaiya, J. A. Agunbiade, and A. O. Oso. 2015. Growth performance, apparent nutrient digestibility, intestinal morphology and carcass traits of broiler chickens fed dry, wet and fermented-wet feed. *Liv. Sci.* 177: 103-109.
- Akinola, S. A., C. N. Ateba, and M. Mwanza. 2019. Polyphasic assessment of aflatoxin production potential in selected aspergilli. *Toxins.* 11(692): 1-21.
- Akowuah, J. O., L. D. Mensah, C. Chan, and A. Roskilly. 2015. Effects of practices of maize farmers and traders in Ghana on contamination of maize by aflatoxins: Case study of Ejura-Sekyeredumase Municipality. *African J. Microbiol. Res.* 9: 1658–1666.
- Al-daraji, H. J. 2012. The protective effect of liquorice against carcass traits changes induced by aflatoxin in broilers. *J. Anim. Sci.* 1(1):18–23.
- Al-Wadai, A. S., M. R. Al-Othman, M. A. Mahmoud, and A. R. M. A. El-Aziz. 2013. Molecular characterization of *Aspergillus flavus* and aflatoxin contamination of wheat grains from Saudi Arabia. *Genet. Mol. Res.* 12: 3335–3352.
- Albrecht, A., M. Hebel, U. Herbert, D. Miskel, B. Saremi, and J. Kreyenschmidt. 2019. Assessment of meat quality and shelf life from broilers fed with different sources and concentrations of methionine. *J. Food Qual.*:1–10.
- Ali, N. 2019. Aflatoxins in rice: Worldwide occurrence and public health perspectives. *Toxicol. Reports.* 6:1188–1197.
- Ali, S., G. Kang, and S. T. Joo. 2008. A review: influences of pre-slaughter stress on poultry meat quality. *Asian-Aust. J. Anim. Sci.* 21:912–916.
- Ali, N., Sardjono, A. Yamashita, and T. Yoshizawa. 1998. Natural co-occurrence of aflatoxins and Fusarium mycotoxins (fumonisins, deoxynivalenol, nivalenol and zearalenone) in corn from Indonesia. *Food Addit. Contam.* 15:377–384.
- Allameh, A., M. Farahani, and A. Zarghi. 2000. Kinetic studies of aflatoxin B<sub>1</sub>-glutathione conjugate formation in liver and kidneys of adult and weanling rats. *Mech. Ageing Dev.* 115:73–83.
- Alsuhaibani, A. M. A. 2018. Effects of storage periods and temperature on mold prevalence and aflatoxin contamination in nuts. *Pakistan J. Nutr.* 17:219–227.
- Alvarado, A. M., R. Zamora-Sanabria, and F. Granados-Chinchilla. 2012. A focus on aflatoxins in feedstuffs: levels of contamination, prevalence, control strategies, and impacts on animal health. *Intech*: 1–39.
- Amiri, M., M. Gholami-Ahangaran, M. Jafarian-Dehkordi, and S. Branch. 2017. Modulating effect of Mycoad® on performance, mucosal and systemic immunity in chicken. *Slov. Vet. Res.* 54(1): 29–35.

- Anas, M. Al, L. M. Yusiati, C. T. Noviandi, and A. Agus. 2020a. Survey of aflatoxin B<sub>1</sub> contamination in broiler feed from small-scale farms in Special Region of Yogyakarta, Indonesia. *Livest. Res. Rural Dev.* 2(4).
- Anas, M. Al, L. M. Yusiati, C. T. Noviandi, and A. Agus. 2020b. Effect of methionine supplementation to lower aflatoxicosis B<sub>1</sub> on intestinal morphology in broilers. *Livest. Res. Rural Dev.* 2(3).
- Andi, M. A. 2012. Effects of additional DL-methionine in broiler starter diet on blood lipids and abdominal fat. *African J. Biotechnol.* 11:7579–7581.
- Andretta, I., M. Kipper, C. R. Lehnen, and P. A. Lovatto. 2012. Meta-analysis of the relationship of mycotoxins with biochemical and hematological parameters in broilers. *Poult. Sci.* 91:376–82.
- Anuoluwapo, O., S. Oladapo, C. Uchechukwu, O. Joel, A. Obio, B. Oluwamayowa, and F. Adedayo. 2017. Acute aflatoxin B<sub>1</sub> – induced hepatotoxicity alters gene expression and disrupts lipid and lipoprotein metabolism in rats. *Toxicol. Reports.* 4:408–414
- AOAC. 2005. Official Methods of Analysis of AOAC International. AOAC International.
- Applegate, T. J., G. Schatzmayr, K. Prickett, C. Troche, and Z. Jiang. 2009. Effect of aflatoxin culture on intestinal function and nutrient loss in laying hens. *Poult. Science* 88:1235–1241.
- Arafat, R. Y., S. H. Khan, A. Sciences, and M. Road. 2017. Evaluation of humic acid as an aflatoxin binder in broiler chickens. *Ann. Anim. Sci* 17:241–255.
- Aryantha, I. N. P., and A. T. Lunggani. 2007. Suppression on the aflatoxin-b<sub>1</sub> production and the growth of *Aspergillus flavus* by lactic acid bacteria (*Lactobacillus delbrueckii*, *Lactobacillus fermentum* and *Lactobacillus plantarum*). *Biotechnology* 6:257–262.
- Ayeni, A. 2015. Extension education strategy for minimizing aflatoxin impact on sub-Saharan African agriculture and food systems. *World Mycotoxin J.* 8:253–257.
- Ayo, E. M., A. Matemu, G. H. Laswai, and M. E. Kimanya. 2018. Socioeconomic characteristics influencing level of awareness of aflatoxin contamination of feeds among livestock farmers in Meru District of Tanzania. *Hindawi Sci.*:1–11.
- Azizpour, A., and N. Moghadam. 2015. Assessment of serum biochemical parameters and pathological changes in broilers with chronic aflatoxicosis fed glucomannan-containing yeast product (Mycosorb) and sodium bentonite. *Bull Vet. Inst. Pulawy.* 59: 205–211.

- Bahri, S., R. Maryam, and R. Widiastuti. 2005a. Aflatoxin contamination in feeds and feed ingredients from Lampung and East Java provinces. *J. Ilmu Ternak dan Vet.* 10:236 – 241.
- Bahri, S., R. Widiastuti, and Y. Mustikaningsih. 2005b. The effect of aflatoxins B<sub>1</sub> (AFB<sub>1</sub>) on chick embryo. *J. Ilmu Ternak dan Vet.* 10:160–168.
- Baker, G. A. 2003. Food safety and fear: factors affecting consumer response to food safety risk. *Int Food Agribus Manag.* 6:1–11.
- Bai, Y., F. Lan, W. Yang, F. Zhang, K. Yang, Z. Li, P. Gao, and S. Wang. 2015. sRNA profiling in *Aspergillus flavus* reveals differentially expressed miRNA-like RNAs response to water activity and temperature. *Fungal Genet. Biol.* 81: 113-9.
- Balendiran, G. K., R. Dabur, and D. Fraser. 2004. The role of glutathione in cancer. *Cell Biochem. Funct.* 22:343–352.
- Balogh, K., B. Kövesi, E. Zándoki, S. Kulcsár, Z. Ancsin, M. Erdélyi, C. Dobolyi, I. B. Vidács, K. Inotai, A. Szekeres, M. Mézes, and J. Kukolya. 2019. Effect of sterigmatocystin or aflatoxin contaminated feed on lipid peroxidation and glutathione redox system and expression of glutathione redox system regulatory genes in broiler chicken. *Antioxidant.* 8:1–12.
- Bang-yuan, W. U., C. U. I Heng-min, P. Xi, F. Jing, C. Wei, and L. Xiao-dong. 2012. Effect of methionine deficiency on the thymus and the subsets and proliferation of peripheral blood t-cell, and serum il-2 contents in broilers. *J. Integr. Agri.* 11(6):1009-1019.
- Barati, M., M. Chamani, S. N. Mousavi, S. Abdollah, M. Taj, and A. Ebrahimi. 2018. Effects of biological and mineral compounds in aflatoxin-contaminated diets on blood parameters and immune response of broiler chickens. *J. Appl. Anim. Res.* 46:707–713.
- Basmacioglu, H., H. Oguz, M. Ergul, R. Col, and Y. O. Birdane. 2005. Effect of dietary esterified glucomannan on performance, serum biochemistry and haematology in broilers exposed to aflatoxin. *Czech J. Anim. Sci.* 2005:31–39.
- Battilani, P., P. Toscano, A. Moretti, and M. C. Leggieri. 2016. Aflatoxin B<sub>1</sub> contamination in maize in Europe increases due to climate change. *Scientific Report.* 6:1–7.
- Bbosa, G. S., D. Kitya, J. Odda, and J. Ogwal-okeng. 2013. Aflatoxins metabolism, effects on epigenetic mechanisms and their role in carcinogenesis. *Health (Irvine. Calif).* 5:14–34.
- Beauclercq, S., C. Hennequet-antier, C. Praud, E. Godet, A. Collin, S. Tesseraud, S. Métayer-coustard, M. Bourin, M. Moroldo, F. Martins, S. Lagarrigue, E. Le Bihan-duval, and C. Berri. 2017. Muscle transcriptome analysis reveals

molecular pathways and biomarkers involved in extreme ultimate pH and meat defect occurrence in chicken. *Scientific Report*. 7:1–13.

Bedard, L. L., and T. E. Massey. 2006. Aflatoxin B<sub>1</sub>-induced DNA damage and its repair. *Cancer Lett.* 241:174–183.

Benavidesa, M. A., M. C. Bosland, C. P. da Silva, C. T. G. Sares, M. S. Oliveira, R. Kemp, R. B. dos Reis, V. R. Martins, S. V. Sampaio, K. I. Bland, W. E. Grizzle, and J. S. dos Santos. 2014. L -Methionine inhibits growth of human pancreatic cancer cells. *Anticancer Drugs* 25:200–203.

Benkerroum, N. 2020. Aflatoxins: producing-molds, structure, health issues and incidence in Southeast Asian and Sub-Saharan African countries. *Int. J. Environ. Res. Public Health* 171215():1-40.

Bennett, J. W., and L. S. Lee. 1979. Mycotoxins-their biosynthesis in fungi: aflatoxins and other bisfuranoids. *J. Food Prot.* 42:805–809.

Bhagavan, N. V., and C.E. Ha. 2015. Protein and Amino Acid Metabolism. *Essentials of Medical Biochemistry leading.* 227–268.

Bianchi, G., M. Brizi, B. Rossi, M. Ronchi, and G. Gabriele and Marchesini. 2000. Synthesis of glutathione in response to methionine load in control subjects and in patients with cirrhosis. *Metabolism.* 49:1434–1439.

Bianco, G., R. Russo, S. Marzocco, S. Velotto, G. Autore, and L. Severino. 2012. Toxicon modulation of macrophage activity by aflatoxins B<sub>1</sub> and B<sub>2</sub> and their metabolites aflatoxins M<sub>1</sub> and M<sub>2</sub>. *Toxicon.* 59:644–650.

Biggs, P., and C. M. Parsons. 2008. The effects of several organic acids on growth performance, nutrient digestibilities, and cecal microbial populations in young chicks. *Poult. Sci.* 87:2581–2589.

Bin, P., R. Huang, and X. Zhou. 2017. Oxidation resistance of the sulfur amino acids : methionine and cysteine. *Biomed Res. Int.* 2017:1–6.

Bintvihok, A., and S. Kositchaenkul. 2006. Effect of dietary calcium propionate on performance, hepatic enzyme activities and aflatoxin residues in broilers fed a diet containing low levels of aflatoxin B<sub>1</sub>. *Toxicon* 47:41–46.

Biomin. 2019. Biomin World Mycotoxin Survey. Biomin. Austria.

Blount, W. 1961. Turkey “X” disease. *J. Br. Turkey Fed.* 9.

Bodreddigari, S., L. K. Jones, P. A. Egner, J. D. Groopman, C. H. Sutter, B. D. Roebuck, F. P. Guengerich, T. W. Kensler, and T. R. Sutter. 2008. Protection against aflatoxin B<sub>1</sub>-induced cytotoxicity by expression of the cloned aflatoxin B<sub>1</sub>-aldehyde reductases rat AKR7A1 and human AKR7A3. *Chem. Res. Toxicol.* 21: 1134–1142.

- Bowker, B., and H. Zhuang. 2015. Relationship between water-holding capacity and protein denaturation in broiler breast meat. *Poult Sci.* 94:1657–1664.
- BPS. 2013. Badan Pusat Statistik: Data Konsumsi Kalori Indonesia. Jakarta.
- Brown-borg, H. M., S. Rakoczy, J. A. Wonderlich, and V. Armstrong. 2014. Altered dietary methionine differentially impacts glutathione and methionine metabolism in long-living growth hormone-deficient Ames dwarf and wild-type mice. *Longevity & Healthspan.* 3(10):1–16.
- Bryden, W. L. 2007. Mycotoxins in the food chain: Human health implications. *Asia Pac. J. Clin. Nutr.* 16:95–101.
- Bryden, W. L. 2012. Mycotoxin contamination of the feed supply chain: Implications for animal productivity and feed security. *Anim. Feed Sci. Technol.* 173:134–158.
- Bunchasak, C. 2009. Role of dietary methionine in poultry production. *J. Poult. Sci.* 46:169–179.
- Burcham, P. C. 2014. *An Introduction to Toxicology.* Springer.
- Candlish, A. A. G., M. S. Wibowo, and J. E. Smith. 1997. Immunoassay identification of *Aspergillus flavus* using monoclonal antibodies raised to the whole cell extracts. *Biotechnol. Tech.* 11:21–24.
- CAST. 2003. *Mycotoxins: Risks in Plant, Animal and Human Systems.* Council for Agricultural Science and Technology, Ames, IA, USA.
- Chang, S. B., M. M. A. Kader, E. L. Wick, and G. N. Wogan. 1963. Aflatoxin B<sub>2</sub>: Chemical identity and biological activity. *Science.* 80(142):1192–1193.
- Chatterjee, C., and D. L. Sparks. 2011. Hepatic lipase, high density lipoproteins, and hypertriglyceridemia. *Am. J. Pathol.* 178:1429–1433.
- Chen, Y. P., X. Chen, H. Zhang, and Y. M. Zhou. 2013. Effects of dietary concentrations of methionine on growth performance and oxidative status of broiler chickens with different hatching weight. *Br. Poult. Sci.* 54:537–537.
- Chen, X., N. Horn, and T. J. Applegate. 2014a. Efficiency of hydrated sodium calcium aluminosilicate to ameliorate the adverse effects of graded levels of aflatoxin B<sub>1</sub> in broiler chicks. *Poult. Sci.* 93:2037–2037.
- Chen, X., N. Horn, P. F. Cotter, and T. J. Applegate. 2014b. Growth, serum biochemistry, complement activity, and liver gene expression responses of Pekin ducklings to graded levels of cultured aflatoxin B<sub>1</sub>. *Poult. Sci.* 93:2028–36.
- Chen, X., R. Murdoch, Q. Zhang, D. J. Shafer, and T. J. Applegate. 2016a. Effects of dietary protein concentration on performance and nutrient digestibility in Pekin ducks during aflatoxicosis. *Poult. Sci.* 95:834–841.

- Chen, X., K. Naehrer, and T. J. Applegate. 2016b. Interactive effects of dietary protein concentration and aflatoxin B<sub>1</sub> on performance, nutrient digestibility, and gut health in broiler chicks. *Poult. Sci.* 95:1312–1325.
- Cheng, Y., T. Shen, V. Fei, and B. Chen. 2001. Effects of aflatoxin and carotenoids on growth performance and immune response in mule ducklings. *Comp. Biochem. Physiol. Part C* 128:19–26.
- Conde-Aguilera, J. A., C. Cobo-Ortega, S. Tesseraud, M. Lessire, Y. Mercier, and J. van Milgen. 2013. Changes in body composition in broilers by a sulfur amino acid deficiency during growth. *Poult. Sci.* 92:1266–1275.
- Cooper, A. J. L. and M. H. Hanigan, 2010. Enzymes involved in processing glutathione conjugates. *Comprehensive Toxicology.* 4:323–366.
- Corzo, A., M. T. Kidd, W. A. D. Dozier-III, L. A. Shack, and S. C. Burgess. 2006. Protein expression of pectoralis major muscle in chickens in response to dietary methionine status. *Br. J. Nutr.:*703–708.
- Cravens, R. L., G. R. Goss, F. Chi, E. D. De Boer, S. W. Davis, S. M. Hendrix, J. a Richardson, and S. L. Johnston. 2013. The effects of necrotic enteritis, aflatoxin B<sub>1</sub>, and virginiamycin on growth performance, necrotic enteritis lesion scores, and mortality in young broilers. *Poult. Sci.* 92:1997–2004.
- Crawford, J. M., B. C. R. Dancy, E. A. Hill, D. W. Udway, and C. A. Townsend. 2006. Identification of a starter unit acyl-carrier protein transacylase domain in an iterative type I polyketide synthase. *Proc. Natl. Acad. Sci. U. S. A.* 103:16728–16733.
- CRS. 2018. Aflatoxin Management for Smallholder Farmers of Maize and Groundnuts. *Cathol. Reli. Serv.*
- Patterson, D. S. P.. 1973. Review section: metabolism as a factor in determining the toxic action of the aflatoxins in different animal species. *Food Cosm.Tox.* 11(2):287–294.
- Damayanti, E., L. Istiqomah, J. E. Saragih, T. Purwoko, and Sardjono. 2017. Characterization of lactic acid bacteria as poultry probiotic candidates with aflatoxin B<sub>1</sub> binding activities. *IOP Sci. Conf.* 8:68–74.
- Daneshyar, F., N. Afzali, and H. Farhangfar. 2014. Effects of different levels of date pits in broilers' feed contaminated with aflatoxin B<sub>1</sub> on broilers' performance and carcass characteristic. *African J. Biotech.* 13:185–193.
- Ddbner, J. J., and F. J. Ivey. 1989. Hepatic protein and amino-acid metabolism in poultry. *Poult. Sci.* 69:1188–1194.
- Denli, M., J. C. Blandon, M. E. Guynot, S. Salado, and J. F. Perez. 2009. Effects of dietary AflaDetox on performance, serum biochemistry, histopathological changes, and aflatoxin residues in broilers exposed to aflatoxin B<sub>1</sub>. *Poult. Sci.* 88:1444–1451.

- Denli, M., F. Okan, and F. Doran. 2005. Effect of dietary conjugated linoleic acid (CLA) on carcass quality, serum lipid variables and histopathological changes of broiler chickens infected with aflatoxin B<sub>1</sub>. *South African J. Anim. Sci.* 35(2):109–116.
- Dersjant-Li, Y., M. W. A. Verstegen, and W. J. J. Gerrits. 2003. The impact of low concentrations of aflatoxin, deoxynivalenol or fumonisin in diets on growing pigs and poultry. *Nutr. Res. Rev.* 16:223–239.
- Dewantari, M. 2006. Phenotypic plasticity in reproductive character of Mojosari, Tegal, and Tegal-Mojosari ducks as a response to aflatoxin in diets. *Maj. Ilm. Peternak.* 9.
- Dharmaputra, O. 2002. Review on aflatoxin in Indonesian food and feedstuffs and their products. *Biotropia (Bogor).* 19:26–46.
- Dharmaputra, O., S. Ambarwati, and I. Retnowati. 2011. The occurrence of insects and fungi, and aflatoxin B<sub>1</sub> contamination of stored sorghum In Demak and Wonogiri regencies, Central Java. *Biotropia (Bogor).* 18:102–122.
- Dharmaputra, O., S. Ambarwati, I. Retnowati, and A. Windyarani. 2013. *Aspergillus flavus* population and aflatoxin B<sub>1</sub> content in processed peanut products in municipality of Bogor, West Java, Indonesia. *Biotropia (Bogor).* 20:81–88.
- Diaz, G. J., E. Calabrese, and R. Blain. 2008. Aflatoxicosis in chickens (*Gallus gallus*): an example of hormesis? *Poult. Sci.* 87:727–732.
- Diaz, G. J., and H. W. Murcia. 2011. Biotransformation of Aflatoxin B<sub>1</sub> and Its relationship with the differential toxicological response to aflatoxin in commercial poultry species. *Aflatoxins – Biochemistry and Molecular Biology.* 3–20.
- Diaz, G. J., and H. W. Murcia. 2019. An unusually high production of hepatic aflatoxin B<sub>1</sub>-dihydrodiol, the possible explanation for the high susceptibility of ducks to aflatoxin B<sub>1</sub>. *Sci. Rep.* 9:18–21.
- Diaz, G. J., H. W. Murcia, and S. M. Cepeda. 2010a. Cytochrome P450 enzymes involved in the metabolism of aflatoxin B<sub>1</sub> in chickens and quail. *Poult. Sci.* 89:2461–2469.
- Diaz, G. J., H. W. Murcia, and S. M. Cepeda. 2010b. Bioactivation of aflatoxin B<sub>1</sub> by turkey liver microsomes: responsible cytochrome P450 enzymes. *Br. Poult. Sci.* 51:828–837.
- Diaz, G. J., H. W. Murcia, S. M. Cepeda, J. Herman. 2010c. The role of selected cytochrome P450 enzymes on the bioactivation of aflatoxin B<sub>1</sub> by duck liver microsomes. *Avian Pathology.* 39(4): 279-285.
- Dohnal, V., Q. Wu, and K. Kuc. 2014. Metabolism of aflatoxins: key enzymes and interindividual as well as interspecies differences. *Arch Toxicol.* 88:1635–1644.

- Dosman, D.M., Adamowicz, W.L., Hrudehy, S.E., 2001. Socioeconomic determinants of health and food safety-related risk perceptions. *Risk Analysis*. 21:307–317
- Dražbo, A., K. Kozłowski, I. Chwastowska-Siwiecka, A. Sobczak, P. Kwiatkowski, and A. Lemme. 2015. Effect of different dietary levels of DL-methionine and the calcium salt of DL- 2-hydroxy-4-[methyl] butanoic acid on the growth performance, carcass yield and meat quality of broiler chickens. *Eur. Poult. Sci.* 79:2–15.
- Egal, S., A. Hounsa, Y. Y. Gong, P. C. Turner, C. P. Wild, A. J. Hall, K. Hell, and K. F. Cardwell. 2005. Dietary exposure to aflatoxin from maize and groundnut in young children from Benin and Togo, West Africa. *Int. J. Food Microbiol.* 104:215–224.
- El-Haleem, M. R. A., and D. A. Mohamed. 2011. The effects of experimental aflatoxicosis on the pancreas of adult male albino rats and the role of ginger supplementation: a histological and biochemical study. *The Egyptian J. Hist.* 34:423–435.
- El-Katcha, M. I., M. A. Soltan, S. A. El-Shobokshy, and A. Shokry. 2017. Protective Effect of Chemical and Biological Mycotoxin Binder on Growth Performance, Serum Biochemistry and Carcass Traits in Broiler Chicks Fed on Aflatoxin Contaminated Diet. *AJVS*. 55(1):180–197.
- Eraslan, G., M. A. An, and E. Yarsan. 2005a. The effects of aflatoxins on oxidative stress in broiler chickens. *Turk J Vet Anim Sci.* 29:701–707.
- Eraslan, G., D. Essiz, M. Akdogan, F. Sahindokuyucu, L. Altintas, and S. E. Hismiogullari. 2005b. Effects of dietary aflatoxin and sodium bentonite on some hormones in broiler chickens. *Bull. Vet. Inst. Pulawy.* 49:93–96.
- Eriksson, S., J. R. Prigge, E. A. Talago, E. S. J. Arnér, and E. E. Schmidt. 2015. Dietary methionine can sustain cytosolic redox homeostasis in the mouse liver. *Nat. Commun.* 6:1–9.
- Eskola, M., G. Kos, C. T. Elliott, J. Hajšlová, S. Mayar, and R. Krska. 2019. Worldwide contamination of food-crops with mycotoxins: Validity of the widely cited 'FAO estimate' of 25%. *Crit. Rev. Food Sci. Nutr.* 0:1–17.
- Ezekiel, C. N., B. Warth, I. M. Ogara, W. A. Abia, V. C. Ezekiel, J. Atehnkeng, M. Sulyok, P. C. Turner, G. O. Tayo, R. Krska, and R. Bandyopadhyay. 2014. Mycotoxin exposure in rural residents in northern Nigeria : A pilot study using multi-urinary biomarkers. *Environ. Int.* 66:138–145.
- Fan, Y., L. Liu, L. Zhao, X. Wang, D. Wang, C. Huang, J. Zhang, C. Ji, and Q. Ma. 2018. Influence of *Bacillus subtilis* ANSB060 on growth, digestive enzyme and aflatoxin residue in Yellow River carp fed diets contaminated with aflatoxin. *Food Chem. Toxic.* 113:108–114.

- Fan, Y., L. Zhao, Q. Ma, X. Li, H. Shi, T. Zhou, J. Zhang, and C. Ji. 2013. Effects of *Bacillus subtilis* ANSB060 on growth performance, meat quality and aflatoxin residues in broilers fed moldy peanut meal naturally contaminated with aflatoxins. *Food Chem. Toxicol.* 59:748–53.
- Fani Makki, O., A. Omid, N. Afzali, H. Sarir, M. Frouzanmehr, and A. Shibak. 2014. Efficacy of *Silybum marianum* seeds in ameliorating the toxic effects of aflatoxin B<sub>1</sub> in broilers. *Iran. J. Toxicol.* 8:977–982.
- FASS. 2010. Guide for the Care and Use of Agricultural Animals in Research and Teaching. Guide for the Care and Use of Agricultural Animals in Research and Teaching Federation of Animal Science Societies.
- Feng, W. H., K. S. Xue, L. Tang, P. L. Williams, and J. S. Wang. 2017. Aflatoxin B<sub>1</sub>-induced developmental and DNA damage in *Caenorhabditis elegans*. *Toxins.* 9:1–12.
- Fiala, J. L. A., P. A. Egner, N. Wiriyanchan, M. Ruchirawat, K. H. Kensler, N. Wogan, J. D. Groopman, R. G. Croy, and J. M. Essigmann. 2011. Sulforaphane-mediated reduction of aflatoxin B<sub>1</sub>-N<sup>7</sup>-guanine in rat liver DNA: impacts of strain and sex. *Tox. Sci.* 121(1):57–62.
- Filho, S. T. S., O. M. Junqueira, A. C. De Laurentiz, S. Filardi, S. Rubio, K. F. Duarte, and R. da S. de Laurentiz. 2016. Effects of mycotoxin adsorbents in aflatoxin B<sub>1</sub> - and fumonisin B<sub>1</sub> -contaminated broiler diet on performance and blood metabolite. *Rev. Bras. Zootec.* 45:250–256.
- Fleming, S. E., S. E. Fleming, and B. N. Ames. 1994. Intestinal cell proliferation is influenced by intakes of protein and energy, aflatoxin, and whole-body radiation. *Nutr. Cancer.* 22:1:11–30.
- Fletcher, D. L. 2002. Poultry meat quality. *World's Poult. Sci. J.* 58:131–145.
- Flores-Flores, M. E., E. Lizarraga, A. López de Cerain, and E. González-Peñas. 2015. Presence of mycotoxins in animal milk: A review. *Food Control* 53:163–176.
- Focker, M., H. J. van der Fels-Klerx, and A. G. J. M. Oude Lansink. 2019. Optimization of the aflatoxin monitoring costs along the maize supply chain. *Risk Anal.* 39:2227–2236.
- Fouad, A. M., and H. K. El-Senousey. 2014. Nutritional factors affecting abdominal fat deposition in poultry: A review. *Asian-Australasian J. Anim. Sci.* 27:1057–1068.
- Fouad, A. M., D. Ruan, H. K. El-senousey, W. Chen, S. Jiang, and C. Zheng. 2019. Harmful effects and control strategies of aflatoxin B<sub>1</sub> produced by *Aspergillus flavus* and *Aspergillus parasiticus* strains on poultry : review. *Toxins.* 1:1–21.
- Fountain, J. C., P. Bajaj, M. Pandey, S. N. Nayak, L. Yang, V. Kumar, A. S. Jayale, A. Chitikineni, W. Zhuang, B. T. Scully, R. D. Lee, R. C. Kemerait, R. K.

- Varshney, and B. Guo. 2016. Oxidative stress and carbon metabolism influence *Aspergillus flavus* transcriptome composition and secondary metabolite production. *Sci. Rep.* 6:1–12.
- Fowler, J., W. Li, and C. Bailey. 2015. Effects of a calcium bentonite clay in diets containing aflatoxin when measuring liver residues of aflatoxin B<sub>1</sub> in starter broiler chicks. *Toxins.* 7:3455–3464.
- Galarza-seeber, R., J. D. Latorre, L. R. Bielke, V. A. Kuttappan, and G. Tellez. 2016. Leaky gut and mycotoxins: aflatoxin B<sub>1</sub> does not increase gut permeability in broiler chickens. *Front Vet Sci.* 3:1–8.
- Gallagher, E. P., K. L. Kunze, P. L. Stapleton, and D. L. Eaton. 1996. The kinetics of aflatoxin B<sub>1</sub> oxidation by human cDNA-expressed and human liver microsomal cytochromes P450 1A2 and 3A4. *Toxicol. Appl. Pharmacol.* 141:595–606.
- Gashgari, R. M., Y. M. Shebany, and Y. A. Gherbawy. 2010. Molecular characterization of mycobiota and aflatoxin contamination of retail wheat flours from Jeddah markets. *Foodborne Pathog. Dis.* 7:1047–1054.
- Gholami-ahangaran, M., N. Rangraz, and S. Azizi. 2016. Evaluation of turmeric (*Curcuma longa*) effect on biochemical and pathological parameters of liver and kidney in chicken aflatoxicosis. *Pharm. Biol.* 54:780–787.
- Gieseke, K. E., and CDCP. 2004. Outbreak of Aflatoxin Poisoning - Eastern and Central Provinces, Kenya, January - July 2004. *Public Heal. Fac. Publ.* 3:790–793.
- Giovati, L., W. Magliani, T. Ciociola, C. Santinoli, S. Conti, and L. Polonelli. 2015. AFM<sub>1</sub> in milk: Physical, biological, and prophylactic methods to mitigate contamination. *Toxins.* 7:4330–4349.
- Godet, M., and F. Munaut. 2010. Molecular strategy for identification in *Aspergillus section* Flavi. *FEMS Microbiol. Lett.* 304:157–168.
- Goulart, C. C., F. G. P. Costa, J. H. V. da Silva, J. G. de Souza, V. P. Rodrigues, C. F. S. de Oliveira. Requirements of digestible methionine + cystine for broiler chickens at 1 to 42 days of age. *R. Bras. Zootec.* 40(4):797-803.
- Gould, R. L., and R. Pazdro. 2019. Impact of supplementary amino acids, micronutrients, and overall diet on glutathione homeostasis. *Nutrients.* 11(1056):1-21.
- Gowda, N. K. S., D. R. Ledoux, G. E. Rottinghaus, A. J. Bermudez, and Y. C. Chen. 2008. Efficacy of turmeric (*Curcuma longa*), containing a known level of curcumin, and a hydrated sodium calcium aluminosilicate to ameliorate the adverse effects of aflatoxin in broiler chicks. *Poult. Sci.* 87:1125–1130.

- Gowda, N. K.S, H. V. L. N. Swamy and P. Mahajan. 2013. Recent advances for control, counteraction and amelioration of potential aflatoxins in animal feeds. *Intech*. 6:129-140.
- Grenier, B., and T. Applegate. 2013. Modulation of intestinal functions following mycotoxin ingestion: meta-analysis of published experiments in animals. *Toxins*. 5:396–430.
- Gross-steinmeyer, K., and D. L. Eaton. 2012. Dietary modulation of the biotransformation and genotoxicity of aflatoxin B<sub>1</sub>. *Toxicology*. 299:69–79.
- Guchi, E. 2015. Stakeholders' perception about aflatoxin contamination in groundnut (*Arachis hypogaea* L.) along the value chain actors in Eastern Ethiopia. *Int. J. Food Contam.* 2:1–7.
- Guilford, F. T., and J. Hope. 2014. Deficient glutathione in the pathophysiology of mycotoxin-related illness. *Toxins*. 6:608–623.
- Gunning, V. 2012. The role of Glutathione Transferases in TNT Detoxification. M.Sc Thesis. Department of Biology, University of York.
- Halimatuddini, H., Y. Marlida, M. Zain, and E. Elihasridas. 2019. Stability of beef cattle concentrate with different types of packaging on nutrition, rancidity, and aflatoxin content. *J. Peternak. Indonesia. Indonesian J. Anim. Sci.* 21:266–273.
- Han Y. and D. H. Baker. 1993. Effects of excess methionine or lysine for broilers fed a corn-soybean meal diet. *Poult. Sci.* 72:1070-1074.
- Handajani, N. S., and T. Purwoko. 2008. The activity of galanga (*Alpinia galanga*) rhizome extract against the growth of filamentous fungi *Aspergillus spp.* that produce aflatoxin and *Fusarium moniliforme*. *Biodiversitas* 9:161–164.
- Hayat, M., E. Saepudin, Y. Einaga, and T. A. Ivandini. 2017. CdS nanoparticle-based biosensor development for aflatoxin determination. *Int. J. Technol.* 8:1–58.
- Heinz, G., and P. Hautzinger. 2007. Meat processing technology for small to medium scale producers. FAO Regional Office for Asia and the Pacific (RAP), Bangkok.
- Hinton, D. M., M. J. Myers, R. A. Raybourne, S. Francke-carroll, R. E. Sotomayor, J. Shaddock, A. Warbritton, and M. W. Chou. 2003. Immunotoxicity of aflatoxin B<sub>1</sub> in rats: effects on lymphocytes and the inflammatory response in a chronic intermittent dosing study. *Toxicol. Sci.* 73:362–377.
- Hodgson, E. 2010. A Textbook of Modern Toxicology 4th Edition (E Hodgson, Ed.). John Wiley & Sons, Inc.
- Huarte, M. 2015. The emerging role of lncRNAs in cancer. *Nat. Med.* 21:1253–1261.

- Hussain, Z., M. Z. Khan, A. Khan, I. Javed, M. K. Saleemi, S. Mahmood, and M. R. Asi. 2010. Residues of aflatoxin B<sub>1</sub> in broiler meat: effect of age and dietary aflatoxin B<sub>1</sub> levels. *Food Chem. Toxicol.* 48:3304–3307.
- IARC. 2012. Chemical agents and related occupations. IARC Monographs on the Evaluation of Carcinogenic Risks to humans. 225-248.
- Indresh, H. C., G. Devegowda, S. W. Ruban, and M. C. Shivakumar. 2013. Effects of high grade bentonite on performance, organ weights and serum biochemistry during aflatoxicosis in broilers. *Vet. World* 6(6):313–317.
- Istiqomah, L., E. Damayanti, D. Arisnandhy, F. Setyabudi, and M. Anwar. 2019. *Saccharomyces cerevisiae* B18 as antifungal and aflatoxin binder in vitro. AIP Conf. Proc. 2099.
- Istiqomah, L., E. Damayanti, H. Julendra, A. E. Suryani, A. A. Sakti, and A. S. Anggraeni. 2017. Effect of methionine and lactic acid bacteria as aflatoxin binder on broiler performance. AIP Conf. Proc. 1854.
- Jahanian, E., A. H. Mahdavi, S. Asgary, and R. Jahanian. 2016. Effect of dietary supplementation of mannanoligosaccharides on growth performance, ileal microbial counts, and jejunal morphology in broiler chicks exposed to aflatoxins. *Livest. Sci.* 190:123–130.
- Jahanian, E., A. H. Mahdavi, S. Asgary, and R. Jahanian. 2017. Effects of dietary inclusion of silymarin on performance, intestinal morphology and ileal bacterial count in aflatoxin-challenged broiler chicks. *J. Anim. Physiol. Anim. Nutr.* 101(5):1–12.
- Jamali, M., M. Karimipour, M. Shams-ghahfarokhi, and A. Amani. 2013. Expression of aflatoxin genes aflO (omtB) and aflQ (ordA) differentiates levels of aflatoxin production by *Aspergillus flavus* strains from soils of pistachio orchards. *Res. Microbiol.* 164:293–299.
- Jankowski, J., M. Kubińska, and Z. Zduńczyk. 2014. Nutritional and immunomodulatory function of methionine in poultry diets – a review\*\*. *Ann. Anim. Sci.* 14:17–31.
- Jankowski, J., B. Tykałowski, K. Ognik, A. Koncicki, M. Kubińska, and Z. Zduńczyk. 2018. The effect of different dietary levels of DL-methionine and DL-hydroxy analogue on the antioxidant status of young turkeys infected with the haemorrhagic enteritis virus. *BMC Vet. Res.* 14:1–8.
- Jansen van Rensburg, C., C. E. Van Rensburg, J. B. Van Ryssen, N. H. Casey, and G. E. Rottinghaus. 2006. In vitro and in vivo assessment of humic acid as an aflatoxin binder in broiler chickens. *Poult Sci* 85:1576–1583
- Johnson, W. W., Y. Ueng, M. Widersten, B. Mannervik, J. D. Hayes, P. J. Sherratt, B. Ketterer, and F. P. Guengerich. 1997. Conjugation of highly reactive aflatoxin B<sub>1</sub> exo-8,9-epoxide catalyzed by rat and human glutathione transferases : estimation of kinetic parameters. *Biochemistry.* 36:3056–3060.

- Jolly, C. M., B. Bayard, R. T. Awuah, S. C. Fialor, and J. T. Williams. 2009. Examining the structure of awareness and perceptions of groundnut aflatoxin among Ghanaian health and agricultural professionals and its influence on their actions. *J. Socio-Economics J.* 38:280–287.
- Kalpana, S., M. Aggarwal, G. Srinivasa Rao, and J. K. Malik. 2012. Effects of aflatoxin B<sub>1</sub> on tissue residues of enrofloxacin and its metabolite ciprofloxacin in broiler chickens. *Environ. Toxicol. Pharmacol.* 33:121–126.
- Kamala, A., C. Shirima, B. Jani, M. Bakari, H. Sillo, N. Rusibamayila, S. De Saeger, M. Kimanya, Y. Gong, A. Simba, and the investigation Team. 2018. Outbreak of an acute aflatoxicosis in Tanzania during 2016. *World Mycotoxin J.* 11:311–320.
- Kamika, I., K. Ngbolua, and M. Tekere. 2016. Occurrence of aflatoxin contamination in maize throughout the supply chain in the Democratic Republic of Congo. *Food Control* 69:292–296.
- Kang'ethe, E. K., H. Korhonen, K. A. Marimba, G. Nduhiu, J. K. Mungatu, S. A. Okoth, V. Joutsjoki, and L. W. Wamae. 2017. Management and mitigation of health risks associated with the occurrence of mycotoxins along the maize value chain in two counties in Kenya. *Food Qual. Saf.* 1:268–274.
- Karimy, M. F., B. Sutrisno, A. Agus, A. E. Suryani, L. Istiqomah, and E. Damayanti. 2017. Aflatoxin effect on erythrocyte profile and histopathology of broilers given different additives. *IOP Conf. Ser. Earth Environ. Sci.* 8:68–74.
- Karunanayaka, D. S., D. D. Jayasena, and C. Jo. 2016. Prevalence of pale, soft, and exudative (PSE) condition in chicken meat used for commercial meat processing and its effect on roasted chicken breast. *J. Anim. Sci. Technol.* 1–8.
- Kementan. 2019. Statistik Peternakan dan Kesehatan Hewan 2019. Direktorat Jenderal Peternakan dan Kesehatan Hewan Kementerian Pertanian RI.
- Kensler, T. W., B. D. Roebuck, G. N. Wogan, and J. D. Groopman. 2011. Aflatoxin: A 50-year odyssey of mechanistic and translational toxicology. *Toxicol. Sci.* 120:1–21.
- Kermanshahi, H., M. R. Akbari, M. Maleki, and M. Behgar. 2007a. Effect of prolonged low level inclusion of aflatoxin B<sub>1</sub> into diet on performance, nutrient digestibility, histopathology and blood enzymes of broiler chickens. *J. Anim. Vet. Adv.* 6:686–692.
- Khan, W. A., M. Z. Khan, A. Khan, Z. Ul, and M. K. Saleemi. 2014. Potential for amelioration of aflatoxin B<sub>1</sub>-induced immunotoxic effects in progeny of white leghorn breeder hens co-exposed to vitamin E. *J. Immuno.* 11(2):116-125
- Khanian, M., M. Karimi-torshizi, and A. Allameh. 2019. Toxicity Alleviation of aflatoxin-related oxidative damage to liver and improvement of growth

performance in broiler chickens consumed *Lactobacillus plantarum* 299v for entire growth period. *Toxicon* 158:57–62.

Kiessling, K.-H. 1986. Biochemical mechanism of action of mycotoxins. *Pure Appl. Chem.* 58:327–338.

Kim, D. H., B. K. An, S. Oh, M. C. Keum, S. Lee, J. S. Um, T. Ayasan, and K. W. Lee. 2019. Effects of different methionine sources on growth performance, meat yield and blood characteristics in broiler chickens. *J. Appl. Anim. Res.* 47:230–235.

Kiraz, S., and T. Şengül. 2005. Relationship between abdominal fat and methionine deficiency in broilers. *Czech J. Anim. Sci.* 50(8):362–368.

Köhle, C., and K. W. Bock. 2007. Coordinate regulation of Phase I and II xenobiotic metabolisms by the Ah receptor and Nrf2. *Biochem. Pharmacol.* 73:1853–1862.

Kokkinakis, D. M., X. Liu, and R. D. Neuner. 2005. Modulation of cell cycle and gene expression in pancreatic tumor cell lines by methionine deprivation (methionine stress): implications to the therapy of pancreatic adenocarcinoma. *Mol Cancer Ther.* 4(9):1338–1349.

Kucukozet, A. O., and M. K. Uslu. 2018. Cooking loss, tenderness, and sensory evaluation of chicken meat roasted after wrapping with edible films. *Food Sci. Technol. Int.* 24:576–584.

Kumar, G. D. S. and M. N. Popat. 2010. Farmers' perceptions, knowledge and management of aflatoxins in groundnuts (*Arachis hypogaea* L.) in India. *Crop Protec.* 29:1534-1541.

Kurniasih, and Y. A. Prakoso. 2019. Recent Update : Effects of aflatoxin in broiler chickens. *J. World's Poultry Res.* 9:68–77.

Kusumaningrum, H. D., Suliantari, A. D. Toha, S. H. Putra, and A. S. Utami. 2010. Contamination of *Aspergillus flavus* and aflatoxin at distribution chain of maize based food product and its influencing factors. *J. Teknol. dan Ind. Pangan* XXI:2–7.

Kusumaningtyas, E., Masrianti, and F. Fitriya. 2019. *Rhizopus oligosporus* activity in crude extract and powder form to reduce *Aspergillus flavus* and aflatoxin contamination in corn. *J. Ilmu Ternak dan Vet.* 24:173.

Kusumaningtyas, E., R. Widiastuti, and R. Maryam. 2006. Reduction of aflatoxin B<sub>1</sub> in chicken feed by using *Saccharomyces cerevisiae*, *Rhizopus oligosporus*, and their combination. *Mycopathologia.* 162:307–311.

Laack, R. L. J. M. van. 1999. Quality Attributes of Muscle Foods. Chapter 21: The role of proteins in water-holding capacity of meat. Plenum Publishers, New York.

- Lai, A., G. Dong, D. Song, T. Yang and X. Zhang. 2018. Responses to dietary levels of methionine in broilers medicated or vaccinated against coccidia under *Eimeria tenella*-challenged condition. *BMC Vet. Res.* 14(140):1-11.
- Larsson, S. C., E. Giovannucci, and A. Wolk. 2007. Methionine and vitamin B6 intake and risk of pancreatic cancer: a prospective study of swedish women and men. *Gastroenterology* 132:113–118.
- Lee, H. S., J. Lindahl, H. M. Thanh, T. N. Khanh, L. T. T. Hien, and D. Grace. 2017. A survey of aflatoxin B<sub>1</sub> in maize and awareness of aflatoxins in Vietnam. *Abstract. World Mycotoxin J.* 10:195–202.
- Lee, N. A., N. C. Rachaputi, G. C. Wright, S. Krosch, K. Norman, J. Anderson, S. Ambarwati, I. Retnowati, O. S. Dharmaputra, and I. R. Kennedy. 2005. Validation of analytical parameters of a competitive direct ELISA for aflatoxin B<sub>1</sub> in peanuts. *Food Agric. Immunol.* 16:149–163.
- Lee, N. A., and S. Rachmawati. 2006. A rapid ELISA for screening aflatoxin B<sub>1</sub> in animal feed and feed ingredients in Indonesia. *Food Agric. Immunol.* 17:91–104.
- Lestariana, W. 1997. Effect of Meniran (*Phyllanthus niruri* L.) herbs-herzane extracts against the toxic effect of aflatoxin B<sub>1</sub> in the liver of *Rattus norvegicus* rats. *Berkala Ilmu Kedokteran* 29:61–67.
- Lewis, L., M. Onsongo, H. Njapau, H. Schurz-Rogers, G. Lubber, S. Kieszak, J. Nyamongo, L. Backer, A. M. Dahiye, A. Misore, K. DeCock, C. Rubin, J. Nyikal, C. Njuguna, A. Langat, I. K. Kilei, C. Tetteh, S. Likimani, J. Oduor, D. Nzioki, B. W. Kamau, J. Onsongo, L. Slutsker, C. Mutura, P. Mensah, F. Kessel, D. L. Park, S. Trujillo, A. Funk, K. E. Geiseker, E. Azziz-Baumgartner, and N. Gupta. 2005. Aflatoxin contamination of commercial maize products during an outbreak of acute aflatoxicosis in eastern and central Kenya. *Environ. Health Perspect.* 113:1763–1767.
- Liew, W., and S. Mohd-redzwan. 2018. Mycotoxin: Its impact on gut health and microbiota. *Front. Cell. Infec. Micro.* 8:1-17.
- Lisangan, M. M., G. N. Cepeda, and M. K. Roreng. 2020. Antifungal activity of kebar grass (*Biophytum petersianum* Klotszch) stem ethanol extract on the growth of aflatoxigenic *Aspergillus flavus* in corn and peanut-based media. *J. Teknol.* 82:1–7.
- Lisangan, M. M., R. Syarief, W. Rahayu, and O. Dharmaputra. 2015. Antiaflatoxin B<sub>1</sub> activity of Kebar Grass (*Biophytum petersianum*) leaf extract on *Aspergillus flavus*. *Agritech* 35:9–17.
- Liu, N., K. Ding, J. Q. Wang, S. C. Jia, J. P. Wang, and T. S. Xu. 2017a. Detoxification, metabolism, and glutathione pathway activity of aflatoxin B<sub>1</sub> by dietary lactic acid bacteria in broiler chickens. *J. Anim. Sci.* 95:4399–4406.

- Liu, N., K. D. J. Wang, and Q. D. K. Gu. 2017b. Effects of lactic acid bacteria and smectite after aflatoxin B<sub>1</sub> challenge on the growth performance, nutrient digestibility and blood parameters of broilers. *J. Anim. Phys. Anim. Nutr.* 102(4):1–9.
- Liu, N., J. Q. Wang, S. C. Jia, Y. K. Chen, and J. P. Wang. 2018a. Effect of yeast cell wall on the growth performance and gut health of broilers challenged with aflatoxin B<sub>1</sub> and necrotic enteritis. *Poult. Sci.* 97:477–484.
- Liu, N., J. Q. Wang, Z. Y. Liu, Y. K. Chen, and J. P. Wang. 2018b. Effect of cysteamine hydrochloride supplementation on the growth performance, enterotoxic status, and glutathione turnover of broilers fed aflatoxin B<sub>1</sub> contaminated diets. *Poult. Sci.* 97:3594–3600.
- Liu, N., J. Q. Wang, Z. Y. Liu, Y. C. Wang, and J. P. Wang. 2018c. Comparison of probiotics and clay detoxifier on the growth performance and enterotoxic markers of broilers fed diets contaminated with aflatoxin B<sub>1</sub>. *J. Appl. Poult. Res.* 3(1):341-348.
- Liu, Y., and F. Wu. 2010. Global burden of Aflatoxin-induced hepatocellular carcinoma: A risk assessment. *Environ. Health Perspect.* 118:818–824.
- Liu, J. B., H. L. Yan, S. C. Cao, Y. D. Hu, and H. F. Zhang. 2020. Effects of absorbents on growth performance, blood profiles and liver gene expression in broilers fed diets naturally contaminated with aflatoxin. *Asian-Australasian J. Anim. Sci.* 33:294–304.
- Liu, C., Z. Zuo, P. Zhu, Z. Zheng, and X. Peng. 2017c. Sodium selenite prevents suppression of mucosal humoral response by AFB<sub>1</sub> in broiler's cecal tonsil. *Oncotarget.* 8(33):54215–54226.
- Longnecker, D. S. 2002. Abnormal methyl metabolism in pancreatic toxicity and diabetes. *J. Nutr.* 132:2372–2376.
- Lozano, M. C., and G. J. Diaz. 2007. Microsomal and cytosolic biotransformation of aflatoxin B<sub>1</sub> in four poultry species. *Br. Poult. Sci.* 47:734–741.
- Lu, S. C. 1999. Regulation of hepatic glutathione synthesis: current concepts and controversies. *FASEB J.* 13:1169–1183.
- Lu, S. C. 2009. Regulation of glutathione synthesis. *Mol. Aspects Med.* 30:42–59.
- Lu, S. C. 2013. Glutathione synthesis. *Biochim. Biophys. Acta* 1830:3143–3153.
- Lubulwa, G. A. S., P. Siriacha, P. J. Markwell, and J. I. Pitt. 2015. Estimating the burden of market loss due to aflatoxins in maize: Methods and estimates for Thailand. *World Mycotoxin J.* 8:459–467.
- Luchese, R. H., and W. F. Harrigan. 1993. Biosynthesis of aflatoxin-the role of nutritional factors. *J. Appl. Bacteriol.* 74:5–14.

- Lushchak, V. 2011. Glutathione homeostasis and functions: potential targets for medical interventions. *Journal of Amino Acids*. 2012:1-26.
- Lv, Z. P., Y. Z. Peng, B. B. Zhang, H. Fan, D. Liu, and Y. M. Guo. 2018. Glucose and lipid metabolism disorders in the chickens with dexamethasone-induced oxidative stress. *J. Anim. Physiol. Anim. Nutr.* 102:e706–e717.
- Ma, Q. G., X. Gao, T. Zhou, L. H. Zhao, Y. Fan, X. Y. Li, Y. P. Lei, C. Ji, and J. Y. Zhang. 2012. Protective effect of *Bacillus subtilis* ANSB060 on egg quality, biochemical and histopathological changes in layers exposed to aflatoxin B<sub>1</sub>. *Poult. Sci.* 91:2852–7.
- Magembe, K. S., M. W. Mwatawala, D. P. Mamiro, and E. E. Chingonikaya. 2016. Assessment of awareness of mycotoxins infections in stored maize (*Zea mays* L) and groundnut (*Arachis hypogea* L) in Kilosa District, Tanzania. *Int. J. Food Contam.* 3:2–8.
- Maggon, K. K., S. K. Gupta, and T. A. Venkitasubramanian. 1977. Biosynthesis of aflatoxins. *Bacteriol. Rev.* 41:822–855.
- Magnoli, A. P., M. P. Monge, R. D. Miazzo, L. R. Cavaglieri, C. E. Magnoli, C. I. Merkis, L. Cristofolini, M. Dalcero, and S. M. Chiacchiera. 2011. Effect of low levels of aflatoxin B<sub>1</sub> on performance, biochemical parameters, and aflatoxin B<sub>1</sub> in broiler liver tissues in the presence of monensin and sodium bentonite. *Poult. Sci.* 90:48–58.
- Magnoli, A. P., V. L. Poloni, and L. Cavaglieri. 2019. Impact of mycotoxin contamination in the animal feed industry. *Curr. Opin. Food Sci.* 29:99–108.
- Magnoli, A. P., M. C. Rodriguez, M. L. G. Pereyra, and V. L. Poloni. 2017. Use of yeast (*Pichia kudriavzevii*) as a novel feed additive to ameliorate the effects of aflatoxin B<sub>1</sub> on broiler chicken performance. *Mycotoxin Res.* 33:273–283.
- Khaled, A. W. A. Moselhy, M. A. Ibrahim, and A. R. Mahmoud. R. R. A. El-WahAb. 2019. The effect of Aflatoxin B<sub>1</sub> contamination on the antioxidant status of broilers' liver and breast muscle. *Adv. Anim. Vet. Sci.* 7:492–497.
- Makhlouf, J., A. Carvajal-Campos, A. Querin, S. Tadrict, O. Puel, S. Lorber, I. P. Oswald, M. Hamze, J. D. Bailly, and S. Bailly. 2019. Morphologic, molecular and metabolic characterization of *Aspergillus* section Flavi in spices marketed in Lebanon. *Sci. Rep.* 9:1–11.
- Marchese, S., A. Polo, A. Ariano, S. Velotto, and S. Costantini. 2018. Aflatoxin B<sub>1</sub> and M<sub>1</sub>: biological properties and their involvement in cancer development. *Toxins.* 10:1–19.
- Marchioro, A., A. O. Mallmann, A. Diel, P. Dilkin, R. H. Rauber, F. J. H. Blazquez, C. A. Mallmann, A. Marchioro, A. E. A. O. Mallmann, A. A. Diel, A. P. Dilkin, A. R. H. Rauber, B. F. J. H. Blazquez, and C. M. G. A. Oliveira. 2013. Effects of aflatoxins on performance and exocrine pancreas of broiler chickens effects

of aflatoxins on performance and exocrine pancreas of broiler chickens. *Avian Dis.* 57:280–284.

Marechera, G., and J. Ndwiga. 2014. Farmer perceptions of aflatoxin management strategies in lower Eastern Kenya. *J. Agric. Ext. Rural Dev.* 6:382–392.

Maritha, I. D., Supranowo, and D. Lyrawati. 2006. Expression of cytosolic aspartate-specific cysteine protease-3 (caspase-3) in the liver tissue of *Rattus norvegicus* (wistar) following subchronic administration of aflatoxin-B<sub>1</sub> (AFB<sub>1</sub>). *J. Kedokt. Brawijaya* 12:107–112.

Matumba, L., M. Monjerezi, H. Kankwamba, S. M. C. Njoroge, P. Ndilowe, H. Kabuli, D. Kambewa, H. Njapau. 2015. Knowledge, attitude, and practices concerning presence of molds in foods among members of the general public in Malawi. *Mycotoxin Res.* 32(1):27-36.

Matur, E., E. Ergul, I. Akyazi, E. Eraslan, and Z. T. Cirakli. 2010. The effects of *Saccharomyces cerevisiae* extract on the weight of some organs, liver, and pancreatic digestive enzyme activity in breeder hens fed diets contaminated with aflatoxins. *Poult. Sci.* 89:2213–2220.

McGeough, E. J., P. O’Kiely, K. J. Hart, a. P. Moloney, T. M. Boland, and D. a. Kenny. 2010. Methane emissions, feed intake, performance, digestibility, and rumen fermentation of finishing beef cattle offered whole-crop wheat silages differing in grain content. *J. Anim. Sci.* 88:2703–2716.

Medina, A., A. Rodriguez, and N. Magan. 2014. Effect of climate change on *Aspergillus flavus* and aflatoxin B<sub>1</sub> production. *Front. Microbiol.* 5:1–7.

Melendez-Hevia, E., and P. De Paz-Lugo. 2008. Branch-point stoichiometry can generate weak links in metabolism: the case of glycine biosynthesis. *J. Biosci* 33:771–780.

Merrick, B. A., J. S. Chang, D. P. Phadke, M. A. Bostrom, R. R. Shah, X. Wang, O. Gordon, and G. M. Wright. 2018. HAfTs are novel lncRNA transcripts from aflatoxin exposure. *PLoS One* 13:1–25.

Miazzo, R., M. F. Peralta, C. Magnoli, M. Salvano, S. Ferrero, S. M. Chiacchiera, E. C. Q. Carvalho, C. a R. Rosa, and a Dalcero. 2005. Efficacy of sodium bentonite as a detoxifier of broiler feed contaminated with aflatoxin and fumonisin. *Poult. Sci.* 84:1–8.

Michalczyk, M., Ł. Monika, Ż. Zdanowska-s, and J. Niemiec. 2014. Comparison of selected quality attributes of chicken meat as affected by rearing systems. *Pol. J. Food Nutr. Sci.* 64(2):121–126.

Milicevic, D., R. Petronijevic, Z. Petrovic, J. Đjinovic-Stojanoic, J. Jovanovic, T. Baltic, and S. Jankovic. 2019. Impact of climate change on aflatoxin M<sub>1</sub> contamination of raw milk with special focus on climate conditions in Serbia. *J Sci Food Agric* 99:5202–5210.

- Mirzaaghatabar, F., A.A. Saki, P. Zamani, H. Aliarabi and H.R. H. Matin. 2011. Effect of different levels of diet methionine and metabolisable energy on broiler performance and immune system. 22 (2): 93-103.
- Mitchell, N. J., E. Bowers, C. Hurburgh, and F. Wu. 2016. Potential economic losses to the US corn industry from aflatoxin contamination. Food Add. Cont. 33(3): 540-550.
- Mochamad, L., and B. Hermanto. 2017. High-performance liquid chromatography ultraviolet-photodiode array detection method for aflatoxin B<sub>1</sub> in cattle feed supplements. Vet. World 10:932–938.
- Mohaghegh, A., M. Chamani, M. Shivazad, A. Asghar, and N. Afzali. 2017. Effect of esterified glucomannan on broilers exposed to natural mycotoxin-contaminated diets. Journal of Applied Animal Research. 45(1):285-291.
- Mohamed, A. M., and N. S. Metwally. 2009. Antiaflatoxic activities of some plant aqueous extracts against aflatoxin-B<sub>1</sub> induced renal and cardiac damage. J. Pharmacol. Toxicol. 4:1–16.
- Morand, C., L. Rios, C. Moundras, C. Besson, C. Remesy, and C. Demigne. 1997. Influence of methionine availability on glutathione synthesis and delivery by the liver. J. Nutr. Biochem. 8:246–255.
- Muhammad, I., X. Sun, H. Wang, W. Li, X. Wang, P. Cheng, S. Li, X. Zhang, and S. Hamid. 2017. Curcumin successfully inhibited the computationally identified CYP2A6 enzyme-mediated bioactivation of aflatoxin B<sub>1</sub> in arbor acres broiler. Front. Pharmacol. 8:1–11.
- Murcia, H. W., G. J. Díaz, and S. M. Cepeda. 2011. Enzymatic activity in turkey, duck, quail, and chicken liver microsomes against four human cytochrome P450 prototype substrates and aflatoxin B<sub>1</sub>. J. Xenobiotics 1:17–21.
- Nazarizadeh, H., and J. Pourreza. 2019. Evaluation of three mycotoxin binders to prevent the adverse effects of aflatoxin B<sub>1</sub> in growing broilers. J. Appl. Anim. Res. 47:135–139.
- Neeff, D. V., D. R. Ledoux, G. E. Rottinghaus, A. J. Bermudez, A. Dakovic, R. A. Murarolli, and C. a. F. Oliveira. 2013. In vitro and in vivo efficacy of a hydrated sodium calcium aluminosilicate to bind and reduce aflatoxin residues in tissues of broiler chicks fed aflatoxin B<sub>1</sub>. Poult. Sci. 92:131–137.
- Negash, D. 2018. A Review of aflatoxin: occurrence, prevention, and gaps in both food and feed safety. Nov. Tech. Nutr. Food Sci. 1:1-10.
- Newsholme, P. 2003. Glutamine and glutamate as vital metabolites. Brazilian J. Med. Biol. Res. 36:153–163.
- Ngoma, S., B. Tiisekwa, D. Mwaseba, and M. Kimanya. 2016. Awareness of aflatoxin health risks among parents with children aged between 6-23 months in Central Tanzania. Int. J. Nutr. Food Sci. 5:429–436.

- Noctor, G., A. M. Arisi, L. Jouanin, K. J. Kunert, H. Rennenberg, and C. H. Foyer. 1998. Glutathione: biosynthesis, metabolism and relationship to stress tolerance explored in transformed plants. *J. Exp. Bot.* 49:623–647.
- Norlia, M., S. Jinap, M. A. R. Nor-Khaizura, S. Radu, N. I. P. Samsudin, and F. A. Azri. 2019. *Aspergillus* section Flavi and aflatoxins: occurrence, detection, and identification in raw peanuts and peanut-based products along the supply chain. *Front. Microbiol.* 10:1–17.
- Noviandi, C. T., E. Razzazi-Fazeli, A. Agus, J. Böhm, H. W. Hulan, S. Wedhastri, Y. M. S. Maryudhani, Nuryono, Sardjono, and J. Leibetseder. 2001. Natural occurrence of aflatoxin B1 in some Indonesian food and feed products in Yogyakarta in year 1998-1999. *Mycotoxin Res.* 17:174–177.
- NRC. 1994. *Nutrient Requirements of Poultry: Ninth Revised Edition*. National Academy Press.
- Nugraha, A., K. Khotimah, and I. M. C. M. Rietjens. 2018. Risk assessment of aflatoxin B<sub>1</sub> exposure from maize and peanut consumption in Indonesia using the margin of exposure and liver cancer risk estimation approaches. *Food Chem. Toxicol.* 113:134–144.
- Nurtjahja, K., C. F. Zuhra, H. Sembiring, A. Bungsu, J. Simanullang, J. E. Silalahi, B. N. L. Gultom, and S. Sartini. 2019. Fungal contamination spices from Indonesia with emphasis on *Aspergillus flavus*. *Czech J. Food Sci.* 37:338–344.
- Nuryono, A. Agus, S. Wedhastri, Y. B. Maryudani, F. Setyabudi, J. Böhm, and E. Razzazi-Fazeli. 2009. A limited survey of aflatoxin M1 in milk from Indonesia by ELISA. *Food Control* 20:721–724.
- Nuryono, A. Agus, S. Wedhastri, Y. M. S. Maryudhani, D. Pranowo, Yuniyanto, and E. Razzazi-Fazeli. 2012. Adsorption of aflatoxin B1 in corn on natural zeolite and bentonite. *Indones. J. Chem.* 12:279–286.
- Obrian, G. R., D. R. Georgianna, J. R. Wilkinson, J. Yu, H. K. Abbas, D. Bhatnagar, T. E. Cleveland, W. Nierman, and G. A. Payne. 2007. The effect of elevated temperature on gene transcription and aflatoxin biosynthesis. *Mycologia.* 99:232–239.
- Okoth, S. 2016. Improving the evidence base on aflatoxin contamination and exposure in Africa: strengthening the agriculture-nutrition nexus. CTA Working Paper. Afrika.
- Omar, M., H. E.-D. 2013. Mycotoxins-induced oxidative stress and disease. *Intech.* 63–92.
- Ortatatli, M., and H. Oguz. 2001. Ameliorative effects of dietary clinoptilolite on pathological changes in broiler chickens during aflatoxicosis. *Res. Vet. Sci.* 2001, 71:59–66.

- Osborne, D. J., and P. B. Hamilton. 1981. Decreased pancreatic digestive enzymes during aflatoxicosis. *Poult. Sci.* 60:1818–1821.
- Özen, H., M. Karaman, Y. Çig, M. Tuzcu, K. Özcan, and D. Erdag. 2009. Effectiveness of melatonin on aflatoxicosis in chicks. *Res. Vet. Sci.* 86:485–489.
- Pantaya, D., D. P. Morgavi, M. Silberberg, F. Chaucheyras-Durand, C. Martin, Suryahadi, K. G. Wiryawan, and H. Boudra. 2016. Bioavailability of aflatoxin B<sub>1</sub> and ochratoxin A, but not fumonisin B<sub>1</sub> or deoxynivalenol, is increased in starch-induced low ruminal pH in nonlactating dairy cows. *J. Dairy Sci.* 99:9759–9767.
- Pasha, T. N., M. U. Farooq, F. M. Khattak, M. A. Jabbar, and A. D. Khan. 2007. Effectiveness of sodium bentonite and two commercial products as aflatoxin absorbents in diets for broiler chickens. *Anim. Feed Sci. Technol.* 132:103–110.
- Pelicano, E., P. de Souza, H. de Souza, A. Oba, E. Norkus, L. Kodawara, and T. de Lima. 2003. Effect of Different Probiotics on Broiler Carcass and Meat Quality. *Brazilian J. Poult. Sci.* 5:207–214.
- Pelley, J. W. 2012. Amino Acid and Heme Metabolism. Elsevier's Integrated Review Biochemistry (Second Edition). Elsevier. 99–107.
- Peng, X., S. Bai, X. Ding, Q. Zeng, K. Zhang, J. Fang, X. Peng, S. Bai, X. Ding, Q. Zeng, K. Zhang, and J. Fang. 2015. Pathological changes in the immune organs of broiler chickens fed on corn naturally contaminated with aflatoxins B<sub>1</sub> and B<sub>2</sub>. *Avian Pathol.* 44:192–199.
- Philadelphia, M., M. Osaka, and P. Chow. 2004. Effect of diet on aflatoxin B<sub>1</sub>-DNA binding and aflatoxin B<sub>1</sub>-induced glutathione S-transferase placental form positive hepatic foci in the rat. 36:351–357.
- Pierron, A., I. Alassane-kpembé, and I. P. Oswald. 2016. Impact of mycotoxin on immune response and consequences for pig health. *Anim. Nutr.* 2:63–68.
- Pizzolitto, R. P., M. R. Armando, M. A. Salvano, A. M. Dalcero, and C. A. Rosa. 2013. Evaluation of *Saccharomyces cerevisiae* as an antiaflatoxicogenic agent in broiler feedstuffs. *Poult. Sci.* 92:1655-1663.
- Poloni, V., A. Magnoli, A. Fochesato, A. Cristofolini, M. Caverzan, C. Merkis, M. Montenegro, and L. Cavaglieri. 2019. *Saccharomyces cerevisiae* RC016-based feed additive reduces liver toxicity, residual aflatoxin B<sub>1</sub> levels and positively influences intestinal morphology in broiler chickens fed chronic aflatoxin B<sub>1</sub>-contaminated diets. *Anim. Nutr.* 6(1): 31-38.
- Prakoso, Y. A., C. S. Rini, A. Aliviameita, S. Isrina, O. Salasia, A. Fadhli, D. Ikram, B. Walalangi, K. P. Utama, M. Fajar, A. Huda, and N. Ayu. 2018. The Role of *Sauropus androgynus* (L) Merr. leaf powder in the broiler chickens fed a diet naturally contaminated with aflatoxin. *Hindawi J. Toxicol.* 01-18.

- Pranowo, D., Nuryono, A. Agus, S. Wedhastri, E. V. Reiter, E. Razzazi-Fazeli, and J. Zentek. 2013. A limited survey of aflatoxin B<sub>1</sub> contamination in Indonesian palm kernel cake and copra meal sampled from batches. *Mycotoxin Res.* 29:135–139.
- Prasetyo, L. H., and T. Susanti. 2010. Effect of genotypes and aflatoxin levels in the diets on early laying characteristics of local ducks. *J. Ilmu Ternak dan Vet.* 15:215–219.
- Pratiwi, C., W. Rahayu, H. N. Lioe, D. Herawati, W. Broto, and S. Ambarwati. 2015. The effect of temperature and relative humidity for *Aspergillus flavus* BIO 2237 growth and aflatoxin production on soybeans. *Int. Food Res. J.* 22:82–87.
- Prihantoro, E. A. B., E. Saepudin, and T. A. Ivandini. 2017. Purification of aflatoxin B<sub>1</sub> antibody for the development of aflatoxin biosensor. *AIP Conf. Proc.* 1862.
- Probst, C., R. Bandyopadhyay, and P. J. Cotty. 2014. Diversity of aflatoxin-producing fungi and their impact on food safety in Sub-Saharan Africa. *Int. J. Food Microbiol.* 174:113–122.
- Probst, C., H. Njapau, and P. J. Cotty. 2007. Outbreak of an acute aflatoxicosis in Kenya in 2004: Identification of the causal agent. *Appl. Environ. Microbiol.* 73:2762–2764.
- Puolanne, E., and M. Halonen. 2010. Theoretical aspects of water-holding in meat. *Meat Sci.* 86(1):151-165.
- Purnamasari, L., A. Agus, and C. T. Noviandi. 2016. Assessment of crude aflatoxin B<sub>1</sub> production based on local *Aspergillus flavus* mold isolate in corn and corn+ground peanut media. *Bul. Peternak.* 40:133–137.
- Purwijantiningsih, E., R. Dewanti, and C. Nurwitri. 2005. Inhibition of aflatoxin production of *Aspergillus flavus* by moulds and yeasts isolated from ragi tempe. *Biota* 10:146–153.
- Qiao, M., D. L. Fletcher, D. P. Smith, and J. K. Northcutt. 2001. The Effect of broiler breast meat color on pH, moisture, water-holding capacity, and emulsification capacity. *Poult. Sci.* 80:676–680.
- Rachmawati, S., Z. Arifin, and P. Zahari. 1999. Sambiloto (*Andrographis paniculata* Nees) for reducing aflatoxins contamination in commercial chicken feed. *J. Ilmu Ternak dan Vet.* 4:65–70.
- Rachmawati, S., P. M. W, and H. Munawar. 2013. Development of indirect dipstick ELISA for aflatoxin B<sub>1</sub> detection in feed and corn. *Biosfera* 30:73–81.
- Rahayu, E. S., S. Raharjo, and A. A. Rahmianna. 2003. Aflatoxin contamination during corn production in East Java. *Agritech* 23:174–183.

- Rahmawati, S. 2005. Aflatoxin in Animal Feed in Indonesia: The Regulation on The Toxic Content and The Development of Detection Technique. *Wartazoa* 15:26–37.
- Rahmianna, A. A., E. Ginting, and E. Yusnawan. 2007. B<sub>1</sub> Aflatoxin Contamination on peanut at various stages of the delivery chains in Banjarnegara, Central Java. *Penelit. Pertan. Tanam. Pangan* 26:137–144.
- Rahmianna, A. A., and E. Yusnawan. 2015. Monitoring of aflatoxin contamination at market food chain in East Java. *J. Exp. Biol. Agric. Sci.* 3:346–352.
- Rajput, S. A., L. Sun, N. Zhang, M. M. Khalil, X. Gao, Z. Ling, L. Zhu, F. A. Khan, J. Zhang, and Q. Desheng. 2017. Ameliorative effects of grape seed proanthocyanidin liver histopathology and aflatoxin residues in broilers exposed to aflatoxin B<sub>1</sub>. *Toxins*. 9:371.
- Ramadhaningtyas, D. P., N. Aryana, Y. Aristiawan, and D. Styarini. 2017. Optimization of chromatographic conditions for determination of aflatoxin B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> by using liquid chromatography-mass spectrometry. *AIP Conf. Proc.* 1904.
- Raney, K. D., D. J. Meyer, B. Ketterer, T. M. Harris, and F. P. Guengerich. 1992. Glutathione conjugation of aflatoxin B<sub>1</sub> exo- and endo-epoxides by rat and human glutathione S-transferase. *Chem. Res. Toxicol* 5:470–478.
- Rauber, R. H., P. Dilkin, L. Z. Giacomini, C. Araújo de Almeida, and C. Mallmann. 2007. Performance of turkey poult fed different doses of aflatoxins in the diet. *Poult. Sci.* 86:1620–1624.
- Ravindran, V., M. Abdollahi, and S. Bootwala. 2014. Nutrient analysis, apparent metabolisable energy and ileal amino acid digestibility of full fat soybean for broilers. *Anim. Feed Sci. Tech.* 197:233-240.
- Rawal, S., and R. A. Coulombe. 2011. Metabolism of aflatoxin B<sub>1</sub> in turkey liver microsomes: The relative roles of cytochromes P450 1A5 and 3A37. *Toxicol. Appl. Pharmacol.* 254:349–354.
- Rawal, S., J. E. Kim, and R. Coulombe. 2010. Aflatoxin B<sub>1</sub> in poultry: toxicology, metabolism and prevention. *Res. Vet. Sci.* 89:325–331.
- Razzazi-Fazeli, E., C. T. Noviandi, S. Porasuphatana, A. Agus, and J. Böhm. 2004. A survey of aflatoxin B<sub>1</sub> and total aflatoxin contamination in baby food, peanut and corn products sold at retail in Indonesia analysed by ELISA and HPLC. *Mycotoxin Res.* 20:51–58.
- Reddy, K. R. N., H. K. Abbas, C. A. Abel, W. T. Shier, C. A. F. Oliveira, and C. R. Raghavender. 2009. Mycotoxin contamination of commercially important agricultural commodities. *Toxin Rev.* 28:154–168.

- Reed, M. C., R. L. Thomas, J. Pavisic, S. J. James, C. M. Ulrich, and H. F. Nijhout. 2008. A mathematical model of glutathione metabolism. *Theor. Biol. Med. Model.* 5:1–16.
- Reiter, E. V., M. F. Dutton, A. Agus, E. Nordkvist, M. F. Mwanza, P. B. Njobeh, D. Prawano, P. Häggblom, E. Razzazi-Fazeli, J. Zentek, and M. G. Andersson. 2011. Uncertainty from sampling in measurements of aflatoxins in animal feedingstuffs: application of the Eurachem/CITAC guidelines. *Analyst* 136:4059–4069.
- Richard, J. L. 2008. Discovery of aflatoxins and significant historical features. *Toxin Rev.* 27:171–201.
- Rohman, A., and Triwahyudi. 2008. Simultaneous determinations of aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, and G<sub>2</sub> using HPLC with photodiode-array (PDA) detector in some foods obtained from Yogyakarta, Indonesia. *Agritech* 28:109–112.
- Rotimi, O. A., S. O. Rotimi, J. M. Goodrich, I. B. Adelani, E. Agbonihale, and G. Talabi. 2019. Time-course effects of acute aflatoxin B<sub>1</sub> exposure on hepatic mitochondrial lipids and oxidative stress in rats. *Front. Pharmacol.* 10:1–10.
- Rubak, Y. T. 2011. The intensity of aflatoxin B<sub>1</sub> contamination on corn in Kupang District, East Nusa Tenggara. *Agritech* 31:168–170.
- Rubin LL, A. M. L. Ribeiro, C. W. Canal, I. C. Silva, L. Trevizan, L. K. Vogt, R. A. Pereira, and L. Lacerda. 2007. Influence of sulfur amino acid levels in diets of broiler chickens submitted to immune stress. *Brazilian J. Poult. Sci.* 9(1):53–59.
- Rushing, B. R., and M. I. Selim. 2019. Aflatoxin B<sub>1</sub>: a review on metabolism, toxicity, occurrence in food, occupational exposure, and detoxification methods. *Food Chem. Toxicol.* 124:81–100.
- Safika, F. Jamin, and S. Aisyah. 2015. Detection of aflatoxin B<sub>1</sub> in processed foods corn by enzyme-linked immunosorbent assay (ELISA). *J. Med. Vet.* 9:2014–2016.
- Salem, R., N. El-habashi, S. E. Fadl, O. A. Sakr, and Z. I. Elbially. 2018. Effect of probiotic supplement on aflatoxicosis and gene expression in the liver of broiler chicken. *Environ. Toxicol. Pharm.* 60:118–127.
- Samuel, A. O., O. Olubukola, and A. O. Matthew. 2009. Hematological and immunological effect on chicken exposed to aflatoxin. *Vet. World* 2:5–7.
- Sardjono. 2008. The Growth Kinetics of *Aspergillus oryzae* KKB4 on solid state culture system and the activity of crude extracellular enzyme on reducing aflatoxin B<sub>1</sub>. *Agritech* 28:145–149.
- Sardjono. 2010. The effect of phytic acid, zinc and soybean extract on the growth and aflatoxin B<sub>1</sub> production by *Aspergillus flavus*. *Agritech* 30:1–4.

- Sardjono, E. S. Rahayu, S. Raharjo, and K. R. Kuswanto. 2004. Indigenous proteolytic *Aspergillus* isolated from Koji and its ability to degrade aflatoxin B<sub>1</sub>. *Agritech* 24:139–145.
- Scherer, C. S. and D. H. Baker. 2000. Excess dietary methionine markedly increases the vitamin B-6 requirement of young chicks. *J. Nutr.* 130: 3055–3058.
- Seyyedini, S., and M. N. Nazem. 2017a. Histomorphometric study of the effect of methionine on small intestine parameters in rat: an applied histologic study. *Folia Morphol* 76:620–629.
- Shan, Y. 2012. The Toxic Effects of Aflatoxin B1: Intech. 1–23.
- Shannon, T. A., D. R. Ledoux, G. E. Rottinghaus, D. P. Shaw, A. Dakovi, M. Markovi, and S. E. T. Al. 2017. The efficacy of raw and concentrated bentonite clay in reducing the toxic effects of aflatoxin in broiler chicks. *Poult. Sci.* 96(6):1651-1658
- Shen, Q. W., and M. Du. 2005. Role of AMP-activated protein kinase in the glycolysis of postmortem muscle. *J. Sci. Food Agri.* 85:2401–2406.
- Shen, Y. B., P. Ferket, I. Park, R. D. Malheiros, and S. W. Kim. 2015. Effects of feed grade L-methionine on intestinal redox status, intestinal development, and growth performance of young chickens compared with conventional DL-methionine. *J. Anim. Sci.* 93(6):2977–2986.
- Shen, W. J., J. Hu, Z. Hu, F. B. Kraemer, and S. Azhar. 2014. Scavenger receptor class B type I (SR-BI): a versatile receptor with multiple functions and actions. *Metabolism.* 63:875–886.
- Shi, J., J. He, J. Lin, X. Sun, F. Sun, C. Ou, and C. Jiang. 2016. Distinct response of the hepatic transcriptome to Aflatoxin B<sub>1</sub> induced hepatocellular carcinogenesis and resistance in rats. *Sci. Rep.* 6:1–9.
- Shi, H., Y. Xu, X. Yi, D. Fang, and X. Hou. 2019. Current research progress on long noncoding RNAs associated with hepatocellular carcinoma. *Anal. Cell. Pathol.* 1-8.
- Shi, Y. H., Z. R. Xub, J. L. Feng, and C. Z. Wang. 2006. Efficacy of modified montmorillonite nanocomposite to reduce the toxicity of aflatoxin in broiler chicks. *Anim. Feed Sci. Technol.* 129:138–148.
- Shih, A. Y., H. Erb, X. Sun, S. Toda, P. W. Kalivas, and T. H. Murphy. 2006. Cystine/glutamate exchange modulates glutathione supply for neuroprotection from oxidative stress and cell proliferation. *J. of Neuro.* 26(41):10514–10523.
- Shupe, T., and S. Sell. 2004. Low hepatic glutathione S-transferase and increased hepatic DNA adduction contribute to increased tumorigenicity of aflatoxin B<sub>1</sub> in newborn and partially hepatectomized mice. *Toxicol. Lett.* 148:1–9.

- Sibut, V., C. Hennequet-antier, E. Le Bihan-duval, S. Marthey, M. J. Duclos, and C. Berri. 2011. Identification of differentially expressed genes in chickens differing in muscle glycogen content and meat quality. *BMC Genomics*. 16(12):112.
- Şimşek, N., L. Ergun, E. Ergun, B. Alabay, and D. Essiz. 2007a. The effects of experimental aflatoxicosis on the exocrine pancreas in quails (*Coturnix coturnix japonica*). *Arch. Toxicol.* 81:583–588.
- Şimşek, N., L. Ergün, E. Ergün, B. Alabay, and A. Özen. 2007b. Ultrastructure of pancreatic alpha and beta cells in young quails (*Coturnix coturnix japonica*) fed aflatoxin. *Dtsch. Tierarztl. Wochenschr.* 114:465–469.
- Soemantri, A. S., Miskiyah, Juniawati, and W. Diyono. 2019. Rapid testing of aflatoxin by using image processing and artificial neural network. *IOP Conf. Ser. Earth Environ. Sci.* 309.
- Sohn, M. J., S. J. Yoo, D. B. Oh, O. Kwon, S. Y. Lee, A. A. Sibirny, and H. A. Kang. 2014. Novel cysteine-centered sulfur metabolic pathway in the thermotolerant methylotrophic yeast *Hansenula polymorpha*. *PLoS One* 9:1–10.
- Solis-cruz, B., D. Hernandez-patlan, V. M. Petrone, K. P. Pontin, J. D. Latorre, E. Beyssac, X. Hernandez-velasco, R. Merino-guzman, C. Owens, B. M. Hargis, R. Lopez-arellano, and G. Tellez-isaias. 2019. Evaluation of cellulosic polymers and curcumin to reduce aflatoxin B<sub>1</sub> toxic effects on performance, biochemical, and immunological parameters of broiler chickens. *Eval. Cellul. Polym.* 11:1–20.
- Sookoian, S., and C. J. Pirola. 2012. Alanine and aspartate aminotransferase and glutamine-cycling pathway: Their roles in pathogenesis of metabolic syndrome. *World J. Gastroenterol.* 18:3775–3781.
- Sotomayor, R. E., M. Washington, L. Nguyen, R. Nyang'anyi, D. M. Hinton, and M. Chou. 2003. Effects of intermittent exposure to aflatoxin B<sub>1</sub> on DNA and RNA adduct formation in rat liver: dose-response and temporal patterns. *Toxicol. Sci.* 73:329–338.
- Sowley, E. N. K. 2016. Aflatoxins: a silent threat in developing countries. *African J. Biotechnol.* 15:1864–1870.
- Stein, H. H., M.F. Fuller, P.J. Moughan, B. Sève, R. Mosenthin, A.J.M. Jansman, J.A. Fernández, C.F.M. de Lange. 2007. Definition of apparent, true, and standardized ileal digestibility of amino acids in pigs. *Liv. Sci.* 109:282-285.
- Stepman, F. 2018. Scaling-up the impact of aflatoxin research in Africa: the role of social sciences. *Toxins*. 10.
- Sugri, I., M. Osiru, M. Abudulai, M. Abubakar, Y. Asieku, S. Lamini and M. Zakaria. 2017. Integrated peanut aflatoxin management for increase income and nutrition in Northern Ghana. *Cogent Food & Agriculture*. 3: 1312046

- Sukmawati, D., M. H. Andrianto, Z. Arman, N. I. Ratnaningtyas, S. N. Al Husna, H. A. El-Enshasy, D. Dailin, and A. A. Kenawy. 2020. Antagonistic activity of phylloplane yeasts from *Moringa oleifera* Lam. leaves against *Aspergillus flavus* UNJCC F-30 from chicken feed. *Indian Phytopathol.* 73:79–88.
- Sukmawati, D., A. Setyaningsih, T. Handayanik, S. Rahayu, Y. Rustam, M. Moersilah, P. Wahyudi, and S. N. A. Husna. 2018. Isolation and characterization of aflatoxigenic *Aspergillus spp.* from maize of livestock feed from Bogor. *IOP Conf. Ser. Mater. Sci. Eng.* 434.
- Sumantri, I., A. Agus, B. Irawan, H. Habibah, N. Faizah, and K. J. Wulandari. 2017. Aflatoxins contamination in feed and products of Alabio duck (*Anas platyrinchos* Borneo) collected from south kalimantan, Indonesia. *Bul. Peternak.* 41:163.
- Sumantri, I., H. Herliani, A. N. Rajibi, and R. Edriantina. 2019a. Effects of zeolite inclusion in aflatoxin B<sub>1</sub>-contaminated diet on the performance of laying duck. *J. Indones. Trop. Anim. Agric.* 44:277–285.
- Sumantri, I., H. Herliani, M. Yuliani, and Nuryono. 2018. Effects of zeolite in aflatoxin B<sub>1</sub> contaminated diet on aflatoxin residues and liver histopathology of laying duck. *IOP Conf. Ser. Earth Environ. Sci.* 207.
- Sumantri, I., T. W. Murti, J. Böhm, and A. Agus. 2013. The binding capacity and stability of several natural aflatoxin adsorbents on aflatoxin B<sub>1</sub> contaminated feed in a rumen in vitro assay. *Bul. Peternak.* 36:156.
- Sumantri, I., T. W. Murti, A. F. B. Van Der Poel, J. Böhm, and A. Agus. 2012. Carry-over of aflatoxin B<sub>1</sub>-feed into aflatoxin M<sub>1</sub>-milk in dairy cows treated with natural sources of aflatoxin and bentonite. *J. Indones. Trop. Anim. Agric.* 37:271–277.
- Sumantri, I., F. Purwanti, Nuryono, and A. Agus. 2019b. Estimation of aflatoxin M<sub>1</sub> exposure through consumption of various dairy milk products in Yogyakarta, Indonesia. *J. Vet.* 20:58–64.
- Sumantri, I., A. Sulaiman, N. Gulo, and P. Wahyuni. 2019c. Effects of curcumin supplementation in aflatoxin B<sub>1</sub>-contaminated diet on the performance and egg quality of laying duck. *IOP Conf. Ser. Earth Environ. Sci.* 387:6–10.
- Sumner, P. E., and D. Lee. 2012. Reducing aflatoxin in corn during harvest and storage. Atlanta, GA: The University of Georgia, Georgia College of Agriculture and Environmental Sciences.
- Susanto, A., E. B. Laconi, D. A. Astuti, and S. Bahri. 2014. In Vitro testing to aflatoxin binding by glucomannan yeast product and glucomannan extract from *Amorphophallus oncophyllus*. *Media Peternakan.* 37:101–107.
- Susanto, A., E. B. Laconi, D. A. Astuti, and S. Bahri. 2015. Efficacy of glucomannan-containing yeast and glucomannan extracted from

- Amorphophallus oncophyllus* against aflatoxins in broiler chicken. *Int. J. Poult. Sci.* 14:633–638.
- Suwarno, W. B., P. Hannok, N. Palacios-Rojas, G. Windham, J. Crossa, and K. V. Pixley. 2019. Provitamin A carotenoids in grain reduce aflatoxin contamination of maize while combating vitamin A deficiency. *Front. Plant Sci.* 10:1–12.
- Tanos, R., I. A. Murray, P. B. Smith, A. Patterson, and G. H. Perdew. 2012. Role of the Ah receptor in homeostatic control of fatty acid synthesis in the liver. *Toxicol. Sci.* 129(2):371–379.
- Tanpong, S., S. Wongtangintham, K. Pimpukdee, B. Tengjaroenkul, and J. Khajarern. 2017. Efficacy of hydrate sodium calcium aluminosilicate and yeast cell wall to ameliorate the toxic effects of aflatoxin in ducks. *Anim. Prod. Sci.* 57:1637–1644.
- Taylor, P., X. A. Zhan, J. X. Li, Z. R. Xu, and R. Q. Zhao. 2006. Effects of methionine and betaine supplementation on growth performance, carcass composition and metabolism of lipids in male broilers. *Br. Poult. Sci.* 47(5):37–41.
- Tejada-Castañeda, Z. I., E. Avila-Gonzalez, M. T. Casaubon-Huguenin, R. a Cervantes-Olivares, C. Vásquez-Peláez, E. M. Hernández-Baumgarten, and E. Moreno-Martínez. 2008. Biotransformation of aflatoxin-contaminated chick feed. *Poult. Sci.* 87:1569–76.
- Tretter, L., R. Répássy, and V. Adam-Vizi. 2003. Endogenous glutamate contributes to the maintenance of glutathione level under oxidative stress in isolated nerve terminals. *Neurochem. Int.* 42:393–400.
- Udomkun, P., A. Nimo, M. Nagle, R. Bandyopadhyay, J. Müller, and B. Vanlauwe. 2017a. Mycotoxins in Sub-Saharan Africa: Present situation, socio-economic impact, awareness, and outlook. *Food Control.* 72:110–122
- Udomkun, P., A. Nimo, M. Nagle, J. Müller, B. Vanlauwe, and R. Bandyopadhyay. 2017b. Innovative technologies to manage aflatoxins in foods and feeds and the profitability of application: a review. *Food Control.* 76:127–138.
- Ueno, H., R. Shimizu, T. Okuno, H. Ogino, T. Arakawa, K. Murano, and K. Nakamuro. 2018. Effect of seleno- L -methionine on oxidative stress in the pancreatic islets of a short-term induced diabetic mouse model in insufficient selenium status. *Biol. Pharm. Bull.* 41:80–85.
- Valchev, I., N. Grozeva, D. Kanakov, and Y. Nikolov. 2015. Histopathological pancreatic changes in broiler chickens with experimental aflatoxicosis. *Agric. Sci. Technol.* 7:319–323.
- Valdivia, A. G., A. Martínez, F. J. Damián, T. Quezada, R. Ortíz, C. Martínez, J. Llamas, M. L. Rodríguez, L. Yamamoto, F. Jaramillo, M. G. Loarca-Piña, and J. L. Reyes. 2001. Efficacy of N-acetylcysteine to reduce the effects of aflatoxin B<sub>1</sub> intoxication in broiler chickens. *Poult. Sci.* 80:727–734.

- Verma, R. J. 2004. Aflatoxin cause DNA damage. *Int. J. Hum. Genet.* 4:231–236.
- Verma, J., B. K. Swain, and T. S. Johri. 2002. Effect of various levels of aflatoxin and ochratoxin A and combinations thereof on. *J. Sci. Food Agric.* 1417:1412–1417.
- Villers, P., Navarro, S., and DeBruin, T. 2008. Development of hermetic storage technology in sealed flexible storage structures. CAF 2008 Conference Paper (Chengdu).
- Vitvitsky, V., E. Mosharov, M. Tritt, F. Ataulakhanov, and R. Banerjee. 2003. Redox regulation of homocysteine-dependent glutathione synthesis. *Redox Rep.* 8:57–63.
- Waliyar, F., M. Osiru, B. R. Ntare, K. V. K. Kumar, H. Sudini, A. Traore, and B. Diarra. 2015. Post-harvest management of aflatoxin contamination in groundnut Post-harvest aflatoxin contamination in. *World Mycotoxin J.* 8:245–252.
- Wan, X. L., Z. B. Yang, W. R. Yang, S. Z. Jiang, G. G. Zhang, S. L. Johnston, and F. Chi. 2013. Toxicity of increasing aflatoxin B1 concentrations from contaminated corn with or without clay adsorbent supplementation in ducklings. *Poult. Sci.* 92:1244–1253.
- Wang, R. S., H. Chen, L. Sheen, C. Lii, and W. E. T. Al. 1997. Biochemical and molecular roles of nutrients methionine and cysteine affect glutathione level, glutathione-related enzyme activities and the expression of glutathione S-transferase. *J. Nutr.* 127: 2135–2141.
- Wang, S.-T., H.-W. Chen, L.-Y. Sheen, and C.-K. Lii. 1997. Methionine and cysteine affect glutathione level, glutathione-related enzyme activities and the expression of glutathione S-transferase isozymes in rat hepatocytes. *J. Nutr.* 127:2135–2141.
- Wang, J.-S., and J. D. Groopman. 1999. DNA damage by mycotoxins.pdf. *Mutat. Res.* 424:167–181.
- Wang, H., I. Muhammad, W. Li, X. Sun, P. Cheng, and X. Zhang. 2018a. Sensitivity of Arbor Acres broilers and chemoprevention of aflatoxin B<sub>1</sub>-induced liver injury by curcumin, a natural potent inducer of phase-II enzymes and Nrf2. *Environ. Toxicol. Pharmacol.* 59:94–104.
- Wang, F., Z. Zuo, K. Chen, C. Gao, and Z. Yang. 2018b. Histopathological injuries, ultrastructural changes, and depressed TLR expression in the small intestine of broiler chickens with aflatoxin B<sub>1</sub>. *Toxins* 10(4):131.
- Wedhastri, S., and Y. Anastasia. 2018. Aflatoxin M<sub>1</sub> in fresh dairy milk from small individual farms in Indonesia. *J. Ilmu Ternak dan Vet.* 23:143.

- Wen, C., X. Y. Jiang, L. R. Ding, T. Wang, and Y. M. Zhou. 2017. Effects of dietary methionine on growth performance, meat quality and oxidative status of breast muscle in fast- and slow-growing broilers. *Poult. Sci.* 96:1707–1714.
- WHO. 2018. Aflatoxins. *World Heal. Organ.* 1–5.
- Widiastuti, R. 2014. Residue of aflatoxin and its metabolites on various animal products and its prevention aflatoxins. *Wartazoa* 24:179–190.
- Widiyani, T., and M. Sagi. 2001. Effects of aflatoxin B<sub>1</sub> on growth and development of embryos and fetuses skeletal in mice (*Mus musculus* L.). *Teknosains* 14:409–424.
- Wijaya, H., N. I. Wardayanie, R. Widjajanti, and R. F. Silitonga. 2018. Detection of aflatoxin M<sub>1</sub> in powdered milk and sweetened condensed milk products in several cities in Java with HPLC-fluorescence method. *IOP Conf. Ser. Earth Environ. Sci.* 102.
- Wild, C. P. 2007. Aflatoxin exposure in developing countries: the critical interface of agriculture and health. *Food Nutr. Bull.* 28:372–380.
- Williams, J. H., T. D. Phillips, P. E. Jolly, J. K. Stiles, C. M. Jolly, and D. Aggarwal. 2004. Human aflatoxicosis in developing countries: A review of toxicology, exposure, potential health consequences, and interventions. *Am. J. Clin. Nutr.* 80:1106–1122.
- Winarno, F. G. 1979. Fermented vegetable protein and related foods of Southeast Asia with special reference to Indonesia. *J. Am. Oil Chem. Soc.* 56:363–366.
- Wong, J. J., and D. P. H. Hsieh. 1976. Mutagenicity of aflatoxins related to their metabolism and carcinogenic potential. *Proc. Natl. Acad. Sci. U. S. A.* 73:2241–2244.
- Woo, L. L., P. A. Egner, C. L. Belanger, R. Wattanawaraporn, L. J. Trudel, R. G. Croy, J. D. Groopman, J. M. Essigmann, and G. N. Wogan. 2011. Aflatoxin B<sub>1</sub>-DNA adduct formation and mutagenicity in livers of neonatal male and female B6C3F1 mice. *Toxicol. Sci.* 122:38–44.
- Wrotek, S., J. Sobocinska, H. M. K. M. Pawlikowska, T. Jedrzejewski, and A. Dzialuk. 2020. New insights into the role of glutathione in the mechanism of fever. *Int. J. Mol. Sci. Rev.* 21:1–15.
- Wu, G., Y.-Z. Fang, S. Yang, J. R. Lupton, and N. D. Turner. 2004. Glutathione metabolism and its implications for health. *J. Nutr.* 134:489–492.
- Wu, F. and P. Khlangwiset. 2010. Health economic impacts and cost-effectiveness of aflatoxin reduction strategies in Africa: case studies in biocontrol and postharvest interventions. *Food Addit. Contam.* 27:496-509.
- Xin, P., H. Han, D. Gao, W. Cui, X. Yang, C. Ying, X. Sun, and L. Hao. 2013. Alleviative effects of resveratrol on nonalcoholic fatty liver disease are

associated with up regulation of hepatic low density lipoprotein receptor and scavenger receptor class B type I gene expressions in rats. *Food Chem. Toxicol.* 52:12–18.

Xing, T., F. Gao, R. K. Tume, G. Zhou, and X. Xu. 2019. Stress effects on meat quality: a mechanistic perspective. *Compre. Reviews Food Sci. Food Safety.* 18:280-302.

Xing, T., X. Xu, N. Jiang, and S. Deng. 2016. Effect of transportation and pre-slaughter water shower spray with resting on AMP-activated protein kinase, glycolysis and meat quality of broilers during summer. *Anim Sci J.* 87(2):299–307.

Yabe, K., and H. Nakajima. 2004. Enzyme reactions and genes in aflatoxin biosynthesis. *Appl. Microbiol. Biotechnol.* 64:745–755.

Yamashita, A., T. Yoshizawa, Y. Aiura, P. C. Sanchez, E. I. Dizon, R. H. Arim, and Sardjono. 1995. Fusarium Mycotoxins (Fumonisin, Nivalenol, and Zearalenone) and Aflatoxins in Corn from Southeast Asia. *Biosci. Biotechnol. Biochem.* 59:1804–1807.

Yang, J., F. Bai, K. Zhang, S. Bai, X. Peng, X. Ding, Y. Li, J. Zhang, and L. Zhao. 2012. Effects of feeding corn naturally contaminated with aflatoxin B1 and B2 on hepatic functions of broilers. *Poult. Sci.* 91:2792–2801.

Yang, K., L. Liang, F. Ran, Y. Liu, Z. Li, H. Lan, and P. Gao. 2016. The DmtA methyltransferase contributes to *Aspergillus flavus* conidiation, sclerotial production, aflatoxin biosynthesis and virulence. *Nat. Publ. Gr.*:1–13.

Yang, Z., and S. F. Liao. 2019. Physiological Effects of dietary amino acids on gut health and functions of swine. *Front. Vet. Sci.* 6:1–13.

Yang, X., W. Liu, H. Lin, H. Zeng, R. Zhang, C. Pu, L. Wang, C. Zheng, Y. Tan, Y. Luo, X. Feng, Y. Tian, G. Xiao, J. Wang, Y. Huang, J. Luo, Z. Qiu, J. A. Chen, L. Wu, L. He, and W. Shu. 2017. Interaction effects of AFB<sub>1</sub> and MC-LR co-exposure with polymorphism of metabolic genes on liver damage: focusing on SLCO1B1 and GSTP1. *Sci. Rep.* 7:1–10.

Yang, Z. B., X. L. Wan, W. R. Yang, S. Z. Jiang, G. G. Zhang, S. L. Johnston, and F. Chi. 2014. Effects of naturally mycotoxin-contaminated corn on nutrient and energy utilization of ducks fed diets with or without Calibrin-A. *Poult. Sci.* 93:2199–2209.

Yarru, L. P., R. S. Settivari, E. Antoniou, D. R. Ledoux, and G. E. Rottinghaus. 2005. Toxicological and gene expression analysis of the impact of aflatoxin B 1 on hepatic function of male broiler chicks. *Poult. Sci.* 88:360–371.

Yarru, L. P., R. S. Settivari, E. Antoniou, D. R. Ledoux, and G. E. Rottinghaus. 2009a. Toxicological and gene expression analysis of the impact of aflatoxin B<sub>1</sub> on hepatic function of male broiler chicks. *Poult. Sci.* 88:360–71.

- Yarru, L. P., R. S. Settivari, N. K. S. Gowda, E. Antoniou, D. R. Ledoux, and G. E. Rottinghaus. 2009b. Effects of turmeric (*Curcuma longa*) on the expression of hepatic genes associated with biotransformation, antioxidant, and immune systems in broiler chicks fed aflatoxin. *Poult. Sci.* 88:2620–2627.
- Yelamanchi, S. D., S. Jayaram, J. K. Thomas, S. Gundimeda, A. A. Khan, A. Singhal, T. S. K. Prasad, A. Pandey, B. L. Somani, and H. Gowda. 2016. A pathway map of glutamate metabolism. *J. Cell Commun. Signal.* 10(1):69–75.
- Yin, H. B., C. H. Chen, A. K. Johnny, M. J. Darre and K. Venkitanarayanan. 2015. Controlling *Aspergillus flavus* and *Aspergillus parasiticus* growth and aflatoxin production in poultry feed using carvacrol and trans-cinnamaldehyde. *Poult. Sci.* 94:2183-2190.
- Yu, J. 2012. Current understanding on aflatoxin biosynthesis and future perspective in reducing aflatoxin contamination. *Toxins.* 4:1024–1057.
- Yu, J., P. Chang, K. C. Ehrlich, J. W. Cary, D. Bhatnagar, T. E. Cleveland, G. A. Payne, J. E. Linz, C. P. Woloshuk, and J. W. Bennett. 2004. Minireview: clustered pathway genes in aflatoxin biosynthesis. *Appl. Environ. Microbiol.* 70:1253–1262.
- Yu, J., N. D. Fedorova, B. G. Montalbano, D. Bhatnagar, T. E. Cleveland, J. W. Bennett, and W. C. Nierman. 2011. Tight control of mycotoxin biosynthesis gene expression in *Aspergillus flavus* by temperature as revealed by RNA-Seq. *FEMS Microbiol. Lett.* 322:145–149.
- Yunianta, A. Agus, Nuryono, dan Zuprizal. 2010. The effect of methionine on glutathione production to eliminate aflatoxin B<sub>1</sub> toxicity. The 5th International Seminar on Tropical Animal Production.
- Yunianta. 2013. Upaya Penurunan Tingkat Cemaran dan Toksisitas Aflatoksin B<sub>1</sub> pada Jagung serta Penggunaannya sebagai Pakan Broiler. Disertasi.
- Yunus, A. W., K. Ghareeb, M. Twaruzek, and J. Böhm. 2011a. Gross intestinal adaptations in relation to broiler performance during chronic aflatoxin exposure. *Poult. Sci.* 90(8):1683-1689
- Yunus, A. W., E. Razzazi-Fazeli, and J. Bohm. 2011b. Aflatoxin B<sub>1</sub> in affecting broiler's performance, immunity, and gastrointestinal tract: A review of history and contemporary issues. *Toxins.* 3:566–590.
- Zhang, N.-Y., M. Qi, X. Gao, L. Zhao, J. Liu, C.-Q. Gu, W.-J. Song, C. S. Krumm, L.-H. Sun, and D.-S. Qi. 2016a. Response of the hepatic transcriptome to aflatoxin B<sub>1</sub> in ducklings. *Toxicon* 111:69–76.
- Zhang, N. Y., M. Qi, L. Zhao, M. K. Zhu, J. Guo, J. Liu, C. Q. Gu, S. A. Rajput, C. S. Krumm, D. S. Qi, and L. H. Sun. 2016b. Curcumin prevents aflatoxin B<sub>1</sub> hepatotoxicity by inhibition of cytochrome P450 isozymes in chick liver. *Toxins.* 8:6–15.

- Zhang, L., Y. Ye, Y. An, Y. Tian, Y. Wang, and H. Tang. 2011. Systems responses of rats to aflatoxin B<sub>1</sub> exposure revealed with metabonomic changes in multiple biological matrices. *J. Proteome Res.* 10:614–623.
- Zhou, J., L. Tang, J. Wang, and J. S. Wang. 2018. Aflatoxin B<sub>1</sub> disrupts gut-microbial metabolisms of short-chain fatty acids, long-chain fatty acids, and bile acids in male F344 rats. *Toxicol. Sci.* 164:453–464.
- Ziglari, T., and A. Allameh. 2013. The significance of glutathione conjugation in aflatoxin metabolism. *Aflatoxins - Recent Advances and Future Prospects.* 267–286.
- Zimmermann, C. E. P., A. K. Machado, F. C. Cadoná, J. A. S. Jaques, K. B. Schlemmer, C. Lautert, I. B. M. Cruz, R. A. Zanette, D. B. R. Leal, and J. M. Santurio. 2014. In-vitro cytotoxicity of aflatoxin B<sub>1</sub> to broiler lymphocytes of broiler chickens. *Rev. Bras. Cienc. Avic.* 16:307–312.
- Zonenberg, Ł., and A. Dražbo. 2018. The effect of increased methionine in broiler chicken diets on the quality of breast muscles at different times of vacuum storage under refrigeration. 14:49–60.
- Zuo, R. Y., J. Chang, Q. Q. Yin, P. Wang, Y. R. Yang, X. Wang, G. Q. Wang, and Q. H. Zheng. 2013. Effect of the combined probiotics with aflatoxin B<sub>1</sub>-degrading enzyme on aflatoxin detoxification, broiler production performance and hepatic enzyme gene expression. *Food Chem. Toxicol.* 59:470–475.
- Zyoud, S. H. 2017. Global toxocariasis research trends from 1932 to 2015: A bibliometric analysis. *Heal. Res. Policy Syst.* 15:1–7.
- Zyoud, S. H. 2019. Global scientific trends on aflatoxin research during 1998-2017: a bibliometric and visualized study. *J. Occup. Med. Toxicol.* 14:1–11.