

REFERENCES

- Abdelghany, A.E. 2003. Partial and complete replacement of fish meal with gambusia meal in diets for red tilapia, *Oreochromis niloticus* x *O. mossambicus*. *Aquaculture Nutrition*, 3: 145-154.
- Adesulu, E.A. and Mustapha, A.K. 2000. Use of housefly maggots as a fish meal replacer in tilapia culture: a recent vogue in Nigeria. In: Fitzsimmons, K. and Filho, J.C. (Eds.) .5th International Symposium on Tilapia Aquaculture, Rio de Janeiro, Brazil.
- Ahmad Faiz, A.N., Khairuddin, I., Jegak, U., Hayrol Azril, M.S. and Jeffrey, L.S. 2010. Aquaculture industry potential and issues: A case from cage culture entrepreneurs: Suggestions for intensification of aquaculture industry. *Journal of Social Science*, 6(2): 206-211.
- Ahmad, M.H., Abdel-Tawwab, M. and Khattab, Y.A.E. 2004. Effect of dietary protein levels on growth performance and feed utilization in Nile tilapia (*Oreochromis niloticus*) with different initial body weights. 6th International Symposium on Tilapia Aquaculture, Manila, Philippine.
- Aida, F.M.N.A., Suhaimi, M., Yazid, M. and Maaruf, A.G. 2009. Mushroom as a potential source of prebiotics: a review. *Trends in Food Science and Technology*, 20: 567-575.
- Ajani, E.K., Nwanna, L.C. and Musa, B.O. 2004. Replacement of fishmeal with maggot meal in the diets of Nile tilapia, *Oreochromis niloticus*. *World Aquaculture*, 35(1): 52-54.
- Al-Hafedh, Y.S. 1999. Effect dietary protein on growth and body composition of Nile tilapia (*Oreochromis niloticus*). *Aquaculture Research*, 30; 385-393.
- Ali, A., Al-Ogaily, S.M., Al-Asgah, N.A., Goddard, J.S. and Ahmed, S.I. 2008. Effect of feeding different protein to energy (P/E) ratios on growth performance and body composition of *Oreochromis niloticus* fingerlings. *Journal of Applied Ichthyology*, 24: 31-37.
- Allaboutfeed, 2012. Research: Insect protein as animal feed. Available at <http://www.allaboutfeed.net/Process-Management/General/2012/9/Research-Insect-protein-as-animal-feed-1064138W/>. Assessed on 9th October 2012.
- Allen, M. and Oftedal, O. 1989. Dietary manipulation of the calcium content of feed crickets. *Journal of Zoo and Wildlife Medicine*, 20(1): 26-33.

- Alvarez, J.S., Llamas-Hernandez, A., Galindo, J., Fraga, I., Garcia, T. and Villarreal, H. 2007. Substitution of fishmeal with soybean meal in practical diets for juvenile white shrimp *Litopenaeus schmitti*. *Aquaculture Research*, 38: 689-695.
- Anderson, J. Jackson, A.J., Matty, A.J. and Capper, B.S. 1984. Effects of dietary carbohydrates and fibre on the tilapia *Oreochromis niloticus* (Linn.). *Aquaculture*, 37: 303-314.
- AOAC (Association of Official Analytical Chemists). 1990. Official Methods of Analysis of the Official Association of Analytical Chemists, Arlington, Virginia, USA.
- APHA. 1992. Standard methods of the examination of water and waste water. American Public Health Association. Washington, D.C., USA.
- Austreng, E. 1981. Digestibility determinations in fish using chromic oxide marker and analysis of contents from different segments of the gastrointestinal tract. *Aquaculture*, 13: 265-275.
- Ayinla, O.A., Kayode, O., Idoniboye-Obu, T.I.E., Oresegun, A. and Adindu, V.E. 1992. Utilization of tadpole meal as a substitute for fish meal in the diet of *Heterobranchus bidorsalis*. NIOMR Technical Paper No. 80.
- Bai, S.C. and Gatlin, D.M. 1994. Effect of L-lysine supplementation of diets with different protein levels and sources on channel catfish *Ictalurus punctatus*. *Aquaculture and Fisheries Management*, 25: 465-474.
- Balarin, J.D. and Halfer, R.D. 1982. The intensive culture of tilapia in tanks, raceways and cages. In Muir, J.F. and Roberts, R.J. (Eds.) *Recent Advances in Aquaculture*. Crom Helm, London. pp: 265-356.
- Balarin, J.D. 1979. *Tilapia: A guide to their biology and culture in Africa*. Stirling, UK: University of Stirling.
- Banjo, A.D., Lawal, O.D. and Songonuga, E.A. 2006. The nutritional value of fourteen species of edible insects in Southwestern Nigeria. *African Journal of Biotechnology*, 5: 298-301.
- Barlow, S. 2000. Fishmeal and fish oil. *The Advocate*, 3(2): 85-88.
- Belal, I.E.H. 2005. A review of some fish nutrition methodologies. *Bioresource Technology*, 96: 395-402.

- Belal, I.E.H. and Al-Dosari, M. 1999. Replacement of fish meal with salicornia meal in feeds for Nile tilapia *Oreochromis niloticus*. Journal of World Aquaculture Society, 30: 285-289.
- Benevenga, N.J. and Steel, R.D. 1984. Adverse effects of excessive consumption of amino acids. Annual Review of Nutrition, 4: 157-181.
- Bondari, K. and Sheppard, D.C. 1987. Soldier fly *Hermetia illucens* L., as feed for channel catfish, *Ictalurus punctatus* (Rafinesque) and blue tilapia, (*Oreochromis aureus*) (Steindachner). Aquaculture and Fisheries Management, 18: 209-220
- Borgeson, T.L., Racz, V.J., Wilkie, D.C., White, L.J. and Drew, M.D. 2006. Effect of replacing fish meal and oil with simple or complex mixtures of vegetable ingredients in diets fed to Nile tilapia (*Oreochromis niloticus*). Aquaculture Nutrition, 12 (2): 141-149.
- Briggs, M.R.P., Brown, J.H. and Fox, C.J. 1994. The effects of dietary lipid and lecithin on the growth, survival, feeding frequency, production and carcass composition of post-larval *Penaeus monodon* Fabricus. Aquaculture and Fisheries Management, 25: 279-294.
- Brunty, J.L., Bucklin, R.A., Davis, J., Baird, C.D. and Noedstedt, R.A. 1997. The influence of feed protein intake on tilapia ammonia production. Aquacultural Engineering, 16: 161-166.
- Buddington, R.K. 1980. Hydrolysis resistant organic matter as a reference for measurement for fish digestive efficiency. Transactions of the American Fisheries Society, 109: 653-656.
- Buckley, J.T. and Groves, T.D.D. 1979. The influence of feed on the body composition of finfish. In: Halver, J.E. and Tiews, K. (Eds.) Fish nutrition and fish feed technology. Proceedings of a symposium, Hamburg, Germany, 20-23 June 1978, pp.335-343.
- Buentello, J.A. and Gatlin, D.M. 2001. Effects of elevated dietary arginine on resistance of channel catfish to exposure to *Edwardsiella ictaluri*. Journal of Aquatic Animal Health, 13: 194-201.
- Bukkens, S.G. F. 1997. The nutritional value of edible insects. Ecology of Food and Nutrition, 36: 287-319.
- Bureau, D.P. and Cho, C.Y. 1999. Phosphorus utilization by rainbow trout (*Oncorhynchus mykiss*): estimation of dissolved phosphorus output. Aquaculture, 179: 127-140.

- Bureau, D.P., Harris, A.M. and Cho, C.Y. 1999. Apparent digestibility of rendered animal protein for rainbow trout (*Onchorhynchus mykiss*). *Aquaculture*, 180(3-4): 345-358.
- Chang, S.T. and Buswell, J.A. 1996. Mushroom nutraceuticals. *World Journal Microbiology Biotechnology*, 12: 473-476.
- Che Musa, C.U. and Nuruddin, A.A. 2005. Trash fish production and national fish feed requirement in Malaysia. Regional workshop on low value and trash fish in the Asia-Pacific Region. 7-9 June 2005. Hanoi, Vietnam.
- Cheng, Z.J. and Hardy, R.W. 2002. Apparent digestibility coefficients and nutritional value of cotton seed meal for rainbow trout (*Onchorhynchus mykiss*). *Aquaculture*, 212 (1-4): 361-372.
- Chervinski, J. 1982. Environmental Physiology on Tilapia. In: Pullin, R.S.V. and Lowe-McConnel, R.H. (Eds.) *The biology and culture of tilapia*, pp. 119-126. Manila, Philippine: ICLARM.
- Cho, C.Y. and Bureau, D.P. 1997. Reduction of waste output from salmonid aquaculture through feeds and feeding. *Progressive Fish Culturist*, 59: 155-160.
- Cho, C.Y., Barley, H.S. and Slinger, S.J. 1974. Partial replacement of herring meal with soy bean meal and other changes in a diet for rainbow trout (*Salmo gairdneri*). *Journal of the Fisheries Research Board of Canada*, 31: 1523-1528.
- Cho, C.Y., Cowey, C.B. and Watanabe, T. 1985. *Finfish Nutrition In Asia: methodological approaches to research and development*. Ottawa: International Development Research Centre.
- Cho, C.Y., Slinger, S.J. and Barley, H.S. 1982. Bioenergetic of salmonids fishes: energy intake, expenditure and productivity. *Comparative Biochemical Physiology (B)*, 73: 25-41.
- Choo, P., Smith, T.K., Cho, C.Y. and Ferguson, H.W. 1991. Dietary excessive of leucine influence on growth and body composition of rainbow trout. *Journal of Nutrition*, 121: 1932-1939.
- Coche, A.G. 1982. Cage culture of tilapias. In: Pullin, R.S.V. and Lowe-McConnel, R.H. (Eds.) pp. 205-246. Manila, Philippines: ICLARM.
- Cowey, C.B., Cho, C.Y., Sivak, J.G., Weierheim, J.A. and Stuart, D.D. 1992. Methionine intake in rainbow trout, relationship to cataract formation and the metabolism of methionine. *Journal of Nutrition*, 122: 1154-1163.

- Coyle, S.D., Mengel, G.J., Tidwell, J.H. and Webster, C.D. 2004. Evaluation of growth, feed utilization and economics of hybrid tilapia, *Oreochromis niloticus* x *Oreochromis aureus*, fed diet containing different protein sources in combination with distillers dried grains with soluble. *Aquaculture Research*, 35 (4): 365-370.
- Crisan, E.V. and Sands, A. 1978. Nutritional value. In: Chang, S.T. and Hayes, W.A. (Eds.) *The Biology and Cultivation of Edible Mushrooms*. London: Academic Press Inc, pp. 137-165.
- Darinya, J., Areechon, N., Srisapoome, P. 2007. Study on identification and antimicrobial sensitivity test of *Streptococcus* spp. Isolated from Nile tilapia (*Oreochromis niloticus*). *Proceedings of 44th Kasetsart University Annual Conference*. 30 Jan – 2 Feb 2006. Bangkok, Thailand.
- De Boer, F. and Bickel, H. 1988. *Livestock feed resources and feed evaluation in Europe*. Amsterdam: Elsevier Science Publisher.
- De Silva, S.S. and Anderson, T.A. 1995. *Fish Nutrition in Aquaculture*. London: Chapman & Hall.
- De Silva, S.S., Gunasekera, R.M. and Atapattu, D. 1989. The dietary protein requirements of young tilapia and an evaluation of the least cost dietary protein levels. *Aquaculture*, 80: 271-284.
- Delgado, C., Wada, N., Rosegrant, M., Meijer, S. and Ahmed, M. 2003. *Outlook for fish to 2020. Supply and Demand in Changing Global Markets*. Washington, DC and Penang: International Food Policy Research Institute and WorldFish Center.
- Department of Fisheries Malaysia, 2010. *Statistic in 2010*. Available at http://www.dof.gov.my/html/themes/moa_dof/document/jadual_pendaratan_marin%aquaculture.pdf. Assessed on 2 October 2012.
- Department of Fisheries Malaysia, 2007a. *Status of Fisheries Sector in Malaysia in 2007*. Available at http://www.dof.gov.my/c/document_library/get_file?uuid=d33bf6ec-8ad8-4186-87cf. Assessed on 23 March 2011.
- Department of Fisheries Malaysia, 2007b. *Laporan Perangkaan Tahunan Perikanan Jilid II*. Available at http://www.dof.gov.my/c/document_library/get_file?uuid=3419e673-0c27-452f-b0d8-ca6ec5e22ee4&groupId=172176. Assessed on 2 October 2012.

- Drew, M.D., Borgeson, T.L. and Thiessen, D.L. 2007. A review of processing of feed ingredients to enhance diet digestibility in finfish: Nutrition Technologies in Animal Feed Science and Technology. *Animal Feed Science and Technology*, 138(2): 118- 136.
- Du, Z.Y., Tian, L.X., Liang, G.Y. and Liu, Y.G. 2009. Effects of dietary energy to protein ratios on growth performances and feed efficiency of juvenile grass carp. *The Open Fish Science Journal*, 2: 25-31.
- El-Saidy, D.M.S.D. and Gaber, M.M.A. 1997. Total replacement of fish meal by soybean meal, with various percentages of L methionine, in diets for Nile tilapia (*Oreochromis niloticus*) fry. *Annals of Agricultural Sciences*, 3: 1223-1238.
- El-Saidy, D.M.S.D. and Gaber, M.M.A. 2002. Complete replacement of fish meal by soybean meal with dietary L – Lysine supplementation for Nile tilapia *Oreochromis niloticus* (L.) fingerlings. *Journal of World Aquaculture Society*, 33(3): 297 – 306.
- El-Saidy, D.M.S.D. and Gaber, M.M.A. 2003. Replacement of fish meal with a mixtures of different plant protein sources in juvenile Nile tilapia, *Oreochromis niloticus* (L.) diets. *Aquaculture Research*, 35(9): 1119-1127.
- El-Sayed, A.F.M. 1999. Alternative dietary protein sources for farmed tilapia, *Oreochromis spp.* *Aquaculture*, 179(1): 149-168.
- El-Sayed, A.F.M. 2004. Protein Nutrition of Farmed Tilapia: Searching for Unconventional Sources. In: Bolivar, R.B., Mair, G.C. and Fitzsimmons, K., (Eds.) ‘New Dimensions on Farmed Tilapia’ Proceedings of the Sixth International Symposium on Tilapia in Aquaculture 12-16 September 2004, pp. 364-378. Manila, Philippines: ISTA Publications.
- El-Sayed, A.F.M. and Teshima, S.I. 1991. Tilapia nutrition in aquaculture. *Reviews in Aquatic Sciences*, 5(3): 247-265.
- Fadiyimu, A.A., Ayodele, A.O., Olowu, O.P.A. and Folorunso, O.R. 2003. Performance of finishing broilers fed graded levels of termites meals as replacement for fish meal. Proceedings of the 28th Annual Conference of the Nigerian Society for Animal Production 2, pp. 211-212. Minna, Nigeria.
- Falk, D. 1985. Pelleting cost center. In: McElhiney, R.R. (Eds.) *Feed Manufacturing Technology III*. American Feed Industry Association. Arlington, VA.
- FAO. 2012. The State of World Fisheries and Aquaculture (SOFIA) 2012. World review fisheries and aquaculture. Rome, Italy: Food and Agriculture Organization of the United Nations.

- FAO, 2012. Technical Consultation Meeting. Assessing the potential of insects as food and feed in assuring food security. Rome, Italy: Food and Agriculture Organizations of the United Nations.
- FAO. 2009. Food and Agriculture Organization of the United Nations. Available at <http://www.fao.org/corp/statistics/en>. Accessed on 28 February 2011.
- FAO. 2007. Fishstat Plus: Universal software for fisheries statistical time series. Version 2.3. 2000. Rome, Italy. FAO. Fisheries Department, Fishery Information, Data and Statistics Unit.
- FAO. 2007. The State of World Fisheries and Aquaculture (SOFIA) 2006. World review fisheries and aquaculture. Rome, Italy: Food and Agriculture Organization of the United Nations.
- FAO. 2000. State of World Fisheries and Aquaculture 2000. Rome, Italy. FAO, Fisheries Department, Fishery Information, Data and Statistics Unit.
- FAO. 1997. Review of the state of world aquaculture. Rome, Italy. FAO Fisheries Circular 886, Rev. 1. Food and Agriculture Organization of the United Nations.
- FAO/WHO. 1991. Protein quality evaluation (Report of Joint FAO/WHO Expert Consultation, FAO Food Nutrition Paper 51). Rome, Italy: FAO/WHO.
- FAO. 1990. CWP Handbook of Fishery Statistical Standards – Section J. Aquaculture. Rome, Italy: FAO Coordinating Working Party on Atlantic Fishery Statistics (CWP).
- Fasakin, E.A., Balogun, A.M. and Ajayi, O.O. 2003. Evaluation of full fat and defatted maggot meals in the feeding of clariid catfish *Clarias gariepinus* fingerlings. *Aquaculture Research*, 34: 733-738.
- Finke, M. 2002. Complete nutrient composition of commercially raised invertebrates used as food for insectivores. *Zoo Biology*, 21: 286-293.
- Finke, M., Winn, D. 2004. Insects and related arthropods: A nutritional primer for rehabilitators. *Journal of Wildlife Rehabilitation*, 27: 14-27.
- Finke, M. 2007. Estimate of chitin in raw whole insects. *Zoo Biology*, 26(2): 105-115.
- Fitzsimmons, K. 1997. Introduction to tilapia nutrition. In: Fitzsimmons, K. (Ed.) *Tilapia Aquaculture: Proceedings of the Fourth International Symposium on Tilapia in Aquaculture*, pp. 9-12. Ithaca, N.Y.

- Fitzsimmons, K. Naim, S. and Alghanim, K. 2010. Tilapia: 2009 State of the Industry. San Diego, United States: The World Aquaculture Society. Available on https://www.was.org/documents/MeetingPresentations/AQ2010/AQ2010_0354.pdf. Assessed on 2 October 2012.
- Fitzsimmons, K. 2000. Future Trends of Tilapia Aquaculture in the Americas. In: Costa-Pierce, B.A. and Rakocy, J.E. (Eds.) Tilapia Aquaculture in the Americas, pp. 252-264. Baton Rouge, Louisiana, United States: The World Aquaculture Society.
- Fontainhas-Fernandes, A., Gomes, E., Reis-Henriques, M.A. and Coimbra, J. 1999. Replacement of fish meal by plant proteins in the diet of Nile tilapia: digestibility and growth performances. *Aquaculture International*, 7: 57-67.
- Fooks, L.J., Fuller, R. and Gibson, G.R. 1999. Prebiotics, probiotics and human gut microbiology. *Int. Dairy Journal*, 9: 53-61.
- Forster, I. 1999. A note on the method of calculating digestibility coefficient of nutrients provided by single ingredients to feeds of aquatic animals. *Aquaculture* 5(2): 143-145.
- Francis, G., Makkar, H.P.S. and Becker, K. 2001. Antinutritional factors present in plant-derived alternate fish feed ingredients and their effects in fish. *Aquaculture*, 199: 197-227.
- Furukawa, A. and Tsukahara, H. 1966. On the acid digestion method for the determination of chromic oxide as an index substance in the study of digestibility of fish feed. *Bulletin of the Japanese Society of Scientific Fisheries*, 32: 502-504.
- Furuya, W.M., Pezzato, L.E., Barros, M.M., Furuya, A.C. and Miranda, E.C. 2004. Use of ideal protein concept for precision formulation of amino acid levels in fish meal free diets for juvenile Nile tilapia (*Oreochromis niloticus* L.). *Aquaculture Research*, 35 (12): 1110-1116.
- Gaber, M.M.A. 1996. Partial and complete replacement of fish meal by poultry by-product and feather meal in diets of Nile tilapia (*Oreochromis niloticus*). *Annals of Agricultural Sciences*, 34(1): 203-214.
- Gabriel, U.U., Akinrotimi, O.A., Bekibele, D.O., Onunkwo, D.N. and Anyanwu, P.E. 2007. Locally produced fish feed: potential for aquaculture development in sub-Saharan Africa. *African Journal of Agricultural Research*, 7: 287-295.
- Garduno-Lugo, M. and Olvera Novoa, M.A. 2008. Potential of the use of peanut (*Arachis hypogaea*) leaf meal as a partial replacement in diets of Nile tilapia (*Oreochromis niloticus* L.). *Aquaculture Research*, 12: 1299-1306.

- Gatlin, D.M. 2002. Nutrition and fish health. In: Halver, J.E. and Hardy, R.W. (Eds.) Fish Nutrition. San Diego, CA: Academic Press, pp. 671-702.
- Gatlin, D.M., Li, P., Wang, X., Burr, G.S., Castille, F. and Lawrence, A.L. 2006. Potential of prebiotics in aquaculture. 8th International symposium on aquaculture nutrition, pp. 371-376.
- Genc, M.A., Yilmaz, E., Genc, E. and Aktas, M. 2007a. Effects of dietary mannan oligosaccharides (MOS) on growth, body composition, intestine and liver histology of the hybrid tilapia (*Oreochromis niloticus* x *Oreochromis aureus*). Israel Journal of Aquaculture-Bamidgeh, 59: 10-16.
- Genc, M.A., Aktas, M., Genc, E. and Yilmaz, E. 2007. Effects of dietary mannan oligosaccharides on growth, body composition and hepatopancreas histology of *Penaeus semiculcatus*. Aquaculture Nutrition, 13: 156-161.
- Ghaly, A.E. and Alkokaik, F.N. 2009. The yellow mealworm as a protein novel source. American Journal of Agricultural and Biological Science, 4(4): 319-331.
- Gibson, G.R. 1999. Dietary modulation of the human gut microflora using the prebiotics oligofructose and inulin. Journal of Nutrition, 129: 1438-1441.
- Gibson, G.R. and Collins, M. 1999. Concepts of balanced colonic microbiota, prebiotics and synbiotics. In: Hanson, L.A. and Yolken, R.H. (Eds.) Probiotics: Other nutritional factors and intestinal microflora. Philadelphia: Rayen Publishers.
- Gibson, G.R. and Roberfroid, M.B. 1995. Dietary modulation of the human colonic microbiota: introducing the concept of prebiotics. Journal of Nutrition, 125: 1401-1412.
- Gibson, G.R., Probert, H.M., Rastall, R.A. and Roberfroid, M.B. 2004. Dietary modulation of the human colonic microbiota: updating the concept of prebiotics. Nutrition Research Reviews, 17: 259-275.
- Glencross, B.D., M. Booth and Allan, G.L. 2007. A feed is only as good as its ingredients – a review of ingredient evaluation strategies for aquaculture feeds. Aquaculture Nutrition, 13: 17-34.
- Goddard, S. 1996. Feed Management in Intensive Aquaculture. London: Chapman & Hall.

- Grisdale-Helland, B., Helland, S.J. and Gatlin III, D.M. 2008. The effect of dietary supplementation with mannoooligosaccharide, fructooligosaccharide and galactooligosaccharide on the growth performance and feed utilization of Atlantic salmon (*Salmon salar*). *Aquaculture*, 283: 163-167.
- Guimaraes, I.G., Pezzato, L.E. and Barros, M.M. 2007. Amino acid availability and protein digestibility of several protein sources for Nile tilapia *Oreochromis niloticus*. *Aquaculture Nutrition*, 14(5): 396-404.
- Gumus, E., Kaya, Y., Balci, B.A. and Acar, B.B. 2009. Partial replacement of fishmeal with tuna liver meal in diets for common carp fry, *Cyprinus carpio* L. 1758. *Pakistan Veterinary Journal*, 29: 154-160.
- Gumus, E., Kaya, Y., Balci, B.A., Aydin, B., Gulle, I. and Gokoglu, M. 2010. Replacement of fish meal with sand smelt (*Artherina boyeri*) meal in practical diets for Nile tilapia fry (*Oreochromis niloticus*). *Israeli Journal of Aquaculture*, 62: 172-180.
- Hale, O.M. 1973. Dried *Hermetia illucens* larvae (Stratiomyidae) as a feed additive for poultry. *Journal of the Georgia Entomological Society*, 8: 16-20.
- Hamzah, A., Nguyen N.H., Ponzoni, R.W., Kamaruzzaman, B.N. and Subha, B. 2008. Performance and survival of three red tilapia strains (*Oreochromis spp.*) in pond environment in Kedah State, Malaysia. 8th International Symposium on Tilapia in Aquaculture 2008. pp.199-211.
- Hanley, F., Brown, H. and Carbey, J. 1995. First observation on effect of mannan oligosaccharide added to hatchery diets for warmwater hybrid red tilapia. Poster at the 11th Annual Symposium on Biotechnology in the Feed Industry, Lexington, KY, USA.
- Hardy, R.W. 2006. Worldwide fishmeal production outlook and the use of alternative protein meals for aquaculture. In: Elizabeth, C.S., Denis, R.M., Mireya, T.S., Martha, G.N.L., David, A.V.C. and Ana, C.P. (Eds.), Nuevo Leon, Mexico.
- Hardy, R.W. and Tacon, A.G. J. 2002. Fish meal historical uses, production trends and future outlook for supplies. In: Stickney, R.R. and MacVey, P. (Eds), *Responsible Marines Aquaculture*, CAB International, UK, pp. 211-325.
- Harper, A.J., Benevenga, N.J. and Wohlueter, R.M. 1970. Effect of ingestion of disproportionate amounts of amino acids. *Physiol. Rev.*, 50: 428-558.
- Hashim, R. 2006. Alternative ingredients for aquafeeds: The feasibility and economic equation. National Fisheries Symposium. 26 – 28 June 2006. Sarawak, Malaysia.

- Hassan, A.A., Sani, I., Maiangwa, M.W. and Rahman, S.A. 2009. The effects of replacing of graded level of fish meal with grasshopper meal in broiler starter diets. *Production Agriculture and Technology*, 5(1): 30-38.
- Hassan, M.R., Akand, A.M. and Siddiqua, A. 1993. Studies on poultry offal meal and silk worm pupae meal as dietary protein sources for Indian major carp, *Catla catla* (Hamilton). *Bangladesh Journal of Training and Development*, 6: 55-66.
- Hendricks, J.D. 2002. Adventitious Toxins. In: Halver, J.E. and Hardy R.E. (Eds.) *Fish Nutrition*, Academic Press, Elsevier Science, San Diego, California, USA, pp. 601-649.
- Hepher, B. 1988. *Nutrition of Pond Fishes*. Cambridge, UK: Cambridge University Press.
- Hertrampf, J.W. and Piedad-Pascual, F. 2000. *Handbook on Ingredients for Aquaculture Feeds*. The Netherlands: Kluwer Academic Publishers.
- Hishamunda, N., Ridler, N.B., Bueno, P. and Yap, W.G. Commercial aquaculture in Southeast Asia: Some policy lessons. *Food Policy*, 34: 102-107.
- Holm, J.C. and Torrison, K.R. 1987. Growth depression and acclimatization if protease in Atlantic salmon first-feeding fry responding to a diet supplemented with Zooplankton. *Aquaculture*, 66: 171-174.
- Houlihan, D., Boujard, T. and Jobling, M. 2001. *Food Intake in Fish*. Oxford, UK: Blackwell Science, p 417.
- Hussain, M.G. 2004. *Farming of Tilapia: Breeding Plans, Mass Seed Production and Aquaculture Technique*. Dhaka, Bangladesh: Momin Offset Press, p 149.
- Igbinosun, J.E. 1991. Fish Feed Development & Production. In: Ajayi, T.A. and Gzawa, B.I. (Eds.) *Proceedings of the Fourth Annual Seminar of the Committee of Directors Research Institute for Oceanography and Marine Research Lagos*, p. 46.
- Ijaiya, A.T. and Eko, E.O. 2009. Effects of replacing of dietary fish meal with silkworm (*Anaphe infracta*) caterpillar meal on growth, digestibility and economics production of starter broiler chickens. *Pakistan Journal of Nutrition*, 8(6): 845-849.
- Jackson, A.J., Capper, B.S. and Matty, A.J. 1982. Evaluation of some plant proteins in complete diets for the tilapia *Sarotherodon mossambicus*. *Aquaculture* 27 (2): 97-109.

- Jauncey, K. 1998. *Tilapia Feeds and Feeding*. Stirling, Scotland: Pisces Press Ltd., p. 241.
- Jauncey, K. 2000. *Tilapias: Biology and Exploitation*, Fish and Fisheries Series 25. In: Beveridge, M.C.M. and McAndrews B.J. (Eds.). *Nutritional requirements*, pp.327-375. Dordrecht, Netherlands: Kluwer Academic Publishers.
- Jauncey, K. and Ross, B. 1982. *A Guide to Tilapia Feeds and Feeding*. Stirling (UK): Institute of Aquaculture, University of Stirling, p. 111.
- Jobling, M., Gomes, E. and Dias, J. 2001. Feed types, manufacture and ingredients. In: Houlihan, D., Boujard, T. and Jobling, M., (Eds.) *Food intake in fish*, pp.25-48. Oxford, UK: Blackwell Science.
- Kalsoom, U.E., Salim, M., Shahzadi, T. and Barlas, A. 2009. Growth performance and feed conversion ratio in hybrid fish (*Catla catla x Labeo rohita*) fed on wheat bran, rice broken and blood meal. *Pakistan Veterinary Journal*, 29: 55-58.
- Kanazawa, A., Teshima, S., Sakamoto, M. and Awal, M.A. 1980. Requirement of *Tilapia zillii* for essential fatty acids. *Bulletin of the Japanese Society of Scientific Fisheries*, 33: 47-55.
- Kaur, K., Wadhwa, M. and Bakshi, M.P.S. 2010. Nutritional evaluation of *Pleurotus florida* harvested spent wheat rice straw based diets in goats. *Indian Journal of Animal Sciences*, 80(9): 906-909.
- Keembiyehetty, C.N. and Gatlin III, D.M. 1993. Total sulphur amino acid requirement of juvenile hybrid striped bass (*Morone chrysops x M. saxatilis*). *Aquaculture*, 110: 331-339.
- Khan, J.K., Kuo, Y.H., Kebede, N., Lambein, F. 1994. Determination of nonprotein amino acids and toxins in Lathyrus by high performances of liquid chromatography with precolumn phenylisocyanate derivatization. *Journal of Chromatography*, 687: 113-119.
- Kim, S.K., Takeuchi, T., Yokoyama, M. and Murata, Y. 2003. Effect of supplementation with taurine, β -alanine and GABA on the growth of juvenile and fingerlings of Japanese flounder. *Fisheries Science*, 69: 242-248.
- Koide, S.S. 1998. Chitin – chitosan: properties, benefits and risks. *Nutrition Research*, 18(6): 1091-1011.
- Koprucu, K. and Ozdemir, Y. 2005. Apparent digestibility of selected feed ingredients for Nile tilapia (*Oreochromis niloticus*). *Aquaculture*, 205: 308-316.

- Kramer, K.J., Hopkins, T.L. and Schaefer, J. 1995. Application of solids NMR to the analysis of insect sclerotized structures. *Insect Biochemistry Molecular Biology*, 25: 1067-1080.
- Krogdahl, A., Penn, M., Thorsen, J., Refstie, S. and Bakke, A.M. 2010. Important antinutrients in plant feedstuffs in aquaculture: an update on recent findings regarding response in salmonids. *Aquaculture Research*, 41: 333-344.
- Lamin, S. 2010. Business proposal for commercial farming of red tilapia (*Oreochromis sp.*) in cages. Department of Fisheries Malaysia, Putrajaya, Malaysia.
- Lawson, T.B. 1995. *Fundamentals of Aquacultural Engineering*. New York, UK: Chapman and Hall.
- Lewis, A.J. and Bayley, 1995. Amino acid bioavailability. In: Ammerman, C.A., Baker, D.H. and Lewis, A.J. (Eds.) *Bioavailability of Nutrients for Animals: Amino Acids, Minerals and Vitamin*. San Diego, CA: Academic Press, Inc.
- Li, M.H and Robinson, E.H. 1998. Effects of supplemental lysine and methionine in low protein diets on weight gain and body composition of young channel catfish *Ictalurus punctatus*. *Aquaculture*, 163: 297-307.
- Li, P. and Gatlin III., D.M. 2004. Dietary brewer's yeast and the prebiotic GroBiotics AE influence growth performance, immune response and resistance of hybrid striped bass to *Streptococcus iniae* infection. *Aquaculture*, 231: 445-456.
- Liu, Y.J., Tian, L.X., Liu, D.H., Liang, G.Y. and Zhao, X.K. 2002. Influence of practical diet of supplementation with free and coated lysine on the growth, free plasma amino acids and protein synthesis rates in muscle of *Ctenopharyngodon idellus*. *Journal of Fisheries China*, 26: 252-258.
- Lovell, R.T. 1989. *Nutrition and Feeding of Fish*. New York, UK: Van Nostrand-Reinhold.
- Maar, A., Mortimer, M.A.E and Van Der Lingen, I. 1966. *Fish Culture in Central East Africa*. Rome, Italy: FAO.
- Macfarlane, G.T., Steed, H. and Macfarlane, S. 2008. Bacterial metabolism and health-related effects of galacto-oligosaccharides and other prebiotics. *Journal of Applied Microbiology*, 104: 305-344.
- Madu, C.T. and Ufodike, E.B.C. 2003. Growth and survival of catfish (*Clarias anguillaris*) juveniles fed live tilapia and maggots as unconventional diets. *Journal of Aquatic Science*, 18: 47-51.

- Mahajna, J.D., Dotan, N., Zaidman, B.Z., Petrova, R.D. and Wasser, S.P. 2009. Pharmacological values of medicinal mushrooms for prostate cancer therapy: the case of *Ganoderma lucidum*. *Nutrition and Cancer*, 6(1): 16-26.
- Mahious, A.S., Gatesoufe, F.J., Hervi, M., Metailler, R. and Ollivier, F. 2006. Effect of dietary inulin and oligosaccharides as a prebiotic for weaning turbot (*Psetta maxima*). *Aquaculture International*, 14: 219-229.
- Mahious, A.S. and Ollivier, F. 2005. Probiotics and prebiotics in aquaculture. 1st regional workshop on techniques for enrichment of live food for use in larviculture 2005, AAARC. Urmia, Iran, p.67.
- Mambrini, M. and Kaushik, S.J. 1994. Partial replacement of dietary protein with dispensable amino acids in diets of Nile tilapia *Oreochromis niloticus*. *Comparative of Biochemical Physiology*, 109: 469-477.
- Mambrini, M., Roem A.J., Carvedi, J.P., Lalles, J.P. and Kaushik, S.J., 1999. Effect of replacing fish meal with soy protein concentrate and DL-Methionine supplementation on high energy, extruded diets on the growth and nutrient utilization of rainbow trout, *Onchorhynchus mykiss*. *Journal of Animal Science*: 2990-2999.
- Mazid, M.A., Tanaka, Y., Katayama, T., Asadur Rahman, M., Simpson, K.L. and Chichester, C.O. 1979. Growth response of *Tilapia zillii* fingerlings fed isocaloric diets with variable protein levels. *Aquaculture*, 18: 115-122.
- Mc Coy, H.D. 1990. Fish meal: The critical ingredients in aquaculture feeds. *Aquaculture Magazine*, 16(2): 43-50.
- Mc Googan, B.B. and Reigh, R.B. 1996. Apparent digestibility of selected ingredients in red drum (*Sciaenops ocellatus*) diets. *Aquaculture*, 114: 233-244.
- Miller, J.W. 1976. Fertilization and feeding practices for warm water pond fish culture in Africa. Symposium on Aquaculture in Africa, Accra, Ghana. 30 September - 2 Oktober 1975, pp. 512-541.
- Ministry of Agriculture Malaysia. 2010. Archives from Minister Speech of in Parliament of Malaysia Available at <http://www.moa.gov.my/web/guest/15jun2010>. Accessed on 28th February 2011.
- Mizuno, T. 1999. The extraction and development of antitumor active polysaccharides from medicinal mushrooms in Japan. *International Journal of Medicinal Mushrooms*, 1: 9-29.

- Mizuno, T. and Zhuan, C. 1995. Houbitake, *Pleurotus sajor caju* antitumoractivity and utilization. Food Reviews International, 11: 185-187.
- Mohanta, K.N., Mohanty, S.N. and Jena, J.K. 2007. Protein sparing effect of carbohydrate in silver balb fry. Aquaculture Nutrition, 13: 311-317.
- Moyle, P.B. and Cech Jr, J.J. 2000. Fish: An Introduction to Ichthyology. Prentice Hall Inc. United States of America.
- Mozaffarian, D. and Rimm, E.B. 2006. Fish Intake, Contaminants and Human Health: Evaluating Risks and Benefits. Journal of American Medical Association, 296: 1885-1899.
- Mukhopadhyay, N. and Ray, A.K. 2001. Effect of amino acid supplementation on the nutritive quality of the fermented linseed meal protein in the diet of rohu, *Labeo rohita*, fingerlings. Journal of Applied Ichthyology, 17: 220 - 226.
- Murai, T., Ogata, H., Kisutarak, P. and Arai, S. 1986. Effect of amino acids supplementation and methanol treatment on utilization of soy flour by fingerling carp. Aquaculture, 56: 197- 206.
- Murai, T. and Andrews, J.W. 1978. Riboflavin requirement of channel catfish fingerlings. Journal of Nutrition, 108 (9):1512-1517.
- Nandeesh, M.C., Gangadhara, B., Varghese, T.J. and Keshavanath, P. 2000. Growth response and flesh quality of common carp, *Cyprinus carpio* fed with high levels of nondefatted silkworm pupae. Asian Fisheries Science, 13: 235-242.
- Nation, J.L. 2002. Insect physiology and biochemistry. Boca Raton: CRC Press.
- Naylor, R.L., Goldberg, R.J., Primavera, J.H. Kautsky, N., Beveridge, M.C.M., Clay, J., Folke, C., Lubchenco, J., Mooney, H. and Troell, M. 2000. Effect of aquaculture on world fish supplies. Nature, 405: 1017-1024.
- Nengas, I., Alexis, M.N. and Davies, S.J. 1999. High inclusion levels of poultry meals and related by products in diets for gilthead sea bream, *Sparus aurata* L. Aquaculture, 179: 13-23.
- New, M.B. 2003. Responsible aquaculture: Is this a special challenge for developing countries?. World Aquaculture, 34(3): 1-52.
- New, M.B. 1989. Formulated aquaculture feed in Asia: Some thought on comparative economics, industrial potential, problems and research needs in relation to small scale farmer. In report of the workshop on shrimps and finfish in feed development. ASEAN/SF/89/GE/11.

- New, M.B. 1987. Feed and Feeding of Fish and Shrimp, ADCP/REP/87/26, FAO/UNDP, Rome.
- Ng, W.K., Teh, S.W., Chowdhury, M.A., Chen, O.L. and Bureau, D.P. 2009. A field survey of tilapia farming in Malaysia with focus on production strategies feed inputs. Asian-Pacific Aquaculture 2009. Kuala Lumpur, Malaysia.
- Ng, W.K., Liew, F.L., Ang, L.P. and Wong, K.W. 2001. Potential of mealworm (*Tenebrio molitor*) as an alternative protein source in practical diets for African catfish, *Clarias gariepinus*. Aquaculture Research, 32: 273-280.
- Nose, T. 1974. Effects of amino acid supplemented to petroleum yeast on growth of rainbow trout fingerlings. Bulletin of Freshwater Fisheries Research 24, 2:101-109.
- NRC. 1993. Nutrient Requirement of Fish. National Research Council, Washington D.C.: National Academy Press.
- Nwanna, L.C. and Daramola, J.A. 2000. Harnessing of Shrimp head waste in Nigeria for low cost production of Tilapia, *Oreochromis niloticus* (L.). In: Fitzsimmons, K. and Filho, J.C. (Eds.). Tilapia aquaculture in the 21st Century. Proc. of the 5th International Symposium on Tilapia in Aquaculture. Rio de Janeiro, Brazil, 3-7 September 2000, pp. 174-178.
- Ogunji, J., Toor, R.S., Schulz, C. and Kloas, W. (2008). Growth performance, nutrient utilization of Nile tilapia *Oreochromis niloticus* fed housefly maggot meal (Magma) diets. Turkish Journal of Fisheries and Aquatic Sciences, 8: 141-147.
- Ogunji, J.O., Kloas, W., Wirth, M., Schulz, C. and Rennert, B. 2006. Housefly maggot meal (magma): an emerging substitute of fishmeal in tilapia diets. Deutscher Tropentag 2006, Conference on International Agricultural Research for Development, Stuttgart-Hohenheim, Germany, 11-13 October 2006, p. 7.
- Ogunji, J.O. and Wirth, M. 2000. Effect of dietary protein content on growth, food conversion, body composition of *Oreochromis niloticus* fingerlings fed fish meal diets. Journal of Aquaculture in the Tropics, 15(4): 381-389.
- Ojewola, G.S., Okoye, F.C. and Ukoha, O.A. 2005. Comparative utilization of three animal protein sources by broiler chickens. International Journal of Poultry Science, 4970: 462-467.
- Olsen, R.E. and Ringo, E. 2008. The influence of temperature on apparent nutrient and fatty acid digestibility of Arctic charr. Aquaculture Research, 10: 695-701.

- Olsen, R.E., Henderson, R.J. and McAndrew, B.J. 1990. The conversion of linoleic acid and linolenic acid to longer chain polyunsaturated fatty acids by Tilapia (*Oreochromis niloticus*) *in vivo*. *Fish Physiology and Biochemistry*, 8: 261-270.
- Olvera-Novoa, M.A., Pereira-Pacheco, F., Olivera-Castillo, L., Perez-Flores, V. and Navarro, L. Samano, J.C. 1997. Cowpea (*Vigna unguiculata*) protein concentrate as replacement of fish meal in diet for tilapia (*Oreochromis niloticus*) fry. *Aquaculture*, 158: 107-116.
- Ovie, S.O. and Ovie, S.I. 2007. The effect of replacing fish meal with 10% groundnut cake in the diets of *H. longifilis* on its growth, food conversion and survival. *Journal Applied Science Environmental Management*, 11 (3): 87-90.
- Oyetayo, V.O. and Oyetayo, F.L. 2005. Preliminary study of health promoting potentials of *Lactobacillus fermentum* OVL and *Pleurotus sajor cajo* administered to rats. *Pakistan Journal of Nutrition*, 4(2): 73-77.
- Papadoyainis, E.D. 2008. Sustainable production of the high quality fish meal substitute from insects. Available at: www.aquafeed.com/docs/aha2008/Papadoyianis.doc. Accessed on 3rd March 2011.
- Patrick, H. 1953. Deficiencies in a sesame meal type of ration for chicks. *Poultry Science*, 33: 744-745.
- Peng, L. and Gatlin III, D.M. 2003. Evaluation of brewers yeast (*Saccharomyces cerevisiae*) as a feed supplement for striped hybrid bass (*Morone chrysops* x *M. saxatilis*). *Aquaculture*, 219: 681-692.
- Pereira, N.R., Filho, O.S., Matsushita, M., Souza, N.E. 2003. Proximate composition and fatty acid profile of *Bombyx mori* L. chrysalis toast. *Journal of Food Composition and Analysis*, 16: 451 - 457.
- Perschbacher, P.W., Lihono, M.A. and Koo, J. 2010. GMT Nile tilapia *Oreochromis niloticus* growth and lipid composition fed a spirulina commercial pellet combination or commercial pellet only. *Asian Fisheries Science*, 23: 91-99.
- Pillay, T.V.R. 1992. *Aquaculture and the Environment*, p.189. Cambridge: University Press.
- Pike, I.H., Barlow, S.M. 2003. Impact of fish farming on fish stocks. *International Aquafeed Directory*: 24-29.
- Pinto, W., Figuiera, L., Ribeiro, L., Yufera, M., Dinis, M.T. and Aragao, C. 2010. Dietary taurine supplementation enhances metamorphosis and growth potential of *Solea senegalensis* larvae. *Aquaculture*, 309: 159-164.

- Polat, A. 1999. The effect of methionine supplementation to soybean meal based diets on the growth and whole body carcass composition of tilapia (*T. zillii*). Turkish Journal Zoology, 23: 173 - 178.
- Pompa, T. and Masser, M. 1999. Tilapia: Life History and Biology. SRAC (Southern Regional Aquaculture Center Publication No. 283.
- Pongmaneerat, J., Watanabe, T., Takeuchi, T. and Satoh, S. 1993. Use of different protein meals as partial and total substitution for fish meal in carp diets. Nippon Suisan Gakkaishi, 59: 1249-1257.
- Poston, H.A., Riss, R.C., Rumsel, G.L. and Ketola, H.G. 1977. The effect of supplemental dietary amino acids, minerals and vitamins on salmonid fed cataractogenic diets. Cornell Veterinary, 67: 472-509.
- Powell, A. and Rowley, A.F. 2007. The effects of dietary chitin supplementation on survival and immune reactivity of adult shore crab, *Carcinus maenus*. Comparative Biochemical Physiology: Part A (Mol Integr Physiol), 147: 122-128.
- Pratumsri, N., Tabthipwon, P., Jintatapron, O. and Srisaphum, P. 2009. Substitution of Eri silkworm *Philosomia ricini*, (Boisd) hydrolysate for fish meal in hybrid catfish (*Clarias macrocephalus* x *Clarias gariepinus*) diets. Proceedings of the 47th Kasetsart University Annual Conference, Kasetsart, 17-20 March, 2009, pp. 154-161.
- Pullin, R.S.V. 1984. Tilapia potentially an international food commodity. Infofish Marketing Digest, 3: 35-36.
- Ramos-Elorduy, J., Moreno, J.M.P., Prado, E.E., Perez, M.A., Otero, J.L. and de Guevera, O.L. 1997. Nutritional value of edible insects from the state of Oaxaca, Mexico. Journal of Food Composition and Analysis, 10: 142-157.
- Reigh, R.C., Stickney, R.R. 1989. Effects of purified fatty acids on the fatty acid composition of freshwater shrimp, *Macrobrachium rosenbergii*. Aquaculture, 77: 157 -174.
- Rennert, B. 1994. Water pollution by a land-based trout farm. Journal of Applied Ichthyology, 10(4): 373-378.
- Ricker, W.E. 1979. Growth rates and models. In: Hoar, W.S., Randall, P.J., Brett, J.R. (Eds.). Fish Physiology. New York, UK: Academic Press.

- Riley, W.W., Higgs, D.A., Dosanjh, B.S. and Eales, J.G. 1996. Influence of dietary arginine and glycine content on thyroid function and growth of juvenile rainbow trout. *Aquaculture Nutrition*, 2: 235-242.
- Ringo, E., Olsen, R.E., Gifstad, T.O., Dalmo, R.A., Amlund, H., Hemre, G.I. and Bakke, A.M. 2010. Prebiotics in aquaculture: A review. *Aquaculture Nutrition*, 16: 117-136.
- Robinson, E.H. 1991. Improvement of cottonseed meal protein with supplemental lysine in feeds for channel catfish. *Journal of Applied Aquaculture*, 1: 1-14.
- Rowland, S.J. and Ingram, B.A. 1991. Diseases of Australian Native Fishes. Fisheries Bulletin 4, NSW Fisheries, Sydney, NSW, Australia.
- Royes, J.A.B. and Chapman, F. 2003. Preparing your Own Fish Feeds. Circular 97. Department of Fisheries and Aquatic Sciences, Florida Executive Extension Services, Institute of Food and Agricultural Sciences, University of Florida.
- Sadler, M. 2003. Nutritional properties of edible fungi. *Nutrition Bulletin*, 28: 305-308.
- Sado, R.Y., Almeida Bicudo, A.R.D. and Cyrinus, J.E.P. 2008. Feeding dietary mannan oligosaccharides to juvenile Nile tilapia *Oreochromis niloticus* has no effect on haematological parameters and showed decreased feed consumption. *Journal of World Aquaculture Society*, 39: 821-826.
- Santiago, C.B. and Reyes, O.S. 1993. Effects of dietary lipid source on reproductive performance and tissue lipid levels of Nile tilapia (*Oreochromis niloticus*) broodstock. *Journal of Applied Ichthyology*, 9: 33-40.
- Salze, G., Craig, S.R., Schwarz, M. and Mclean, E. 2008. Novel live feed enrichments beneficially impact on digestive ontogeny in larval cobia. Abstract of *Aquaculture America 08*. p. 337.
- Subasinghe, R.P., Arthur, J.R. (Eds.). Diseases in Asian Aquaculture, pp. 413-417. Manila, Philippines.
- Salem, M.F.I., Khalafalla, M.M.E., Saad, I.A.I. and El-Hais, A.M.A. 2008. Replacement of fish meal by silkworm *Bombyx mori* pupae meal in Nile tilapia *Oreochromis niloticus* diets. *Egyptian Journal of Nutrition and Feeds*, 11: 611-624.

- Samrongpan, C., Areechon, N., Yoonpundh, R. and Sirsapoome, P. 2008. Effect of mannan oligosaccharides on growth, survival and disease resistance of Nile tilapia fry.
http://ag.arizona.edu/azaqua/ista/ISTA8/Abstract_Papers/Chinnapat's%20full%20paper-Thailand.doc.
- Santiago, C.B. and Lovell, R.T. 1988. Amino acid requirements of growth of Nile tilapia. *Journal of Nutrition*, 118: 1540-1546.
- Sargent, J.R. and Tacon, A.G.J. 1999. Development of farmed fish: a nutritionally necessary alternative to meat. *Proc. Nutr. Soc.* 58: 377-383.
- Sargent, J.R., Tocher, D.R. and Bell, J.G. 2002. The lipids. In: Halver, J.E. and Hardy, R.W. (Eds.). *Fish Nutrition*. San Diego, California: Academic Press, pp: 181-257.
- Sealey, W.M., Gaylaord, T.G. and Barrows, F.T. 2011. Sensory analysis of rainbow trout *Oncorhynchus mykiss* fed with enriched black soldier fly prepupae *Hermetia illucens*. *Journal of World Aquaculture Society*, 42: 34-44.
- Schuhmacher, A., Wax, C. and Gropp, J.M. 1997. Plasma amino acid in rainbow trout (*Oncorhynchus mykiss*) fed intact protein or a crystalline amino acid diet. *Proceedings of the Sixth International Symposium on Feeding and Nutrition in Fish*.
- Shearer, K.D. 1994. Factors affecting the proximate composition of cultured fishes with emphasis on salmonids. *Aquaculture*, 119: 63-88.
- Shiau, S.Y. 2002. Tilapia. In: Webster, C.D. and Lim, C. (Eds.) *Nutrient Requirements and Feeding of Finfish for Aquaculture*. UK: CABI Publishing.
- Shiau, S.Y. and Yu, Y.P. 1999. Dietary supplementation of chitin and chitosan depresses growth in tilapia, *Oreochromis niloticus* x *O. aureus*. *Aquaculture*, 179: 439-446.
- Shiau, S.Y. 1997. Utilization of carbohydrates in warmwater fish-with particular reference to tilapia, *Oreochromis niloticus* x *Oreochromis aureus*. *Aquaculture*, 151: 79-96.
- Shiau, S.Y., Lin, S.F., Yu, S.L., Lin, A.L. and Kwok, C. C. 1990. Defatted and full-fat soybean meal as partial replacement for fish meal in tilapia (*Oreochromis niloticus* x *O. aureus*) diets at low protein levels. *Aquaculture*, 86: 401-407.
- Shiau, S.Y., Chuang, J.L. and Sun, C.L. 1987. Inclusion of soybean meal in tilapia (*Oreochromis niloticus* x *Oreochromis aureus*) diets at two protein levels. *Aquaculture*, 65 (3-4): 251-261.

- Sogbesan, A.O. and Madu, C.T. 2008. Evaluation of earthworm meal (*Hyperiodrilus euryaulos*, Classen, 1914; Oligochaeta, Euridrilidae) meal as protein feedstuff in the diets of *Heterobranchus longifilis* fingerlings under laboratory conditions. *Research Journal of Environmental Sciences*, 2(1): 23-31.
- Sogbesan, A.O. and Ugwumba, A.A.A. 2008. Nutritional evaluation of termites (*Macrotermes subhyalinus*) meal as animal protein supplements in the diets of *Heterobranchus longifilis* (Valenciennes, 1840) fingerlings. *Turkish Journal of Fisheries and Aquatic Sciences*, 8: 149-157.
- Sogbesan, A.O., Ajuonu, M., Musa, B.O. and Adewole, A.M. 2006. Harvesting technique and evaluation of maggot meal as animal dietary protein source for *Heteroelarias* in outdoor concrete tanks. *World Journal of Agriculture Sciences*, 2(4): 394-402.
- Soroush, G., Sahar, G., Maryam, F. and Reza, H. 2011. Effect of addition of *Saccharomyces cerevisiae* and *Bacillus subtilis* in diet of selected haematological and biochemical parameters in common carp (*Cyprinus carpio*). *World Journal of Fish and Marine Sciences*, 31(1): 96-99.
- Spinneli, J. 1979. Influence of feed on finfish quality. In: Halver, J.E. and Tiews, K. (Eds.) *Fish nutrition and fish feed technology. Proceedings of a Symposium*, 20-23 June 1978, pp. 351-352. Hamburg, Germany.
- Staykov, Y., Spring, P., Denev, S. and Sweetman, J. 2007. Effect of mannan oligosaccharides on growth performance and immune system of rainbow trout (*Oncorhynchus mykiss*). *Aquaculture International*, 15: 153-161.
- St-Hilaire, S., Shepard, C., Tomberlin, J.K., Irving, S., Newton, L., McGuire, M.A., Mosley, E.E., Hardy, R.W. and Sealey, W. 2007. Fly prepupae as a feedstuff for rainbow trout, *Oncorhynchus mykiss*. *Journal of the World Aquaculture Society*, 38: 59-67.
- Strom, T. and Eggum, B.O. 1981. Nutritional value of fish viscera silage. *Journal of Science of Food Agriculture*, 32: 115-120.
- Suresh, V. 2003. Tilapia. In: Lucas, J.S. and Southgate, P.C. (Eds.) *Aquaculture: Farming of Aquatic Animals and Plants*. Oxford, UK: Blackwell Publishing. pp. 321-345.
- Sviever, Nordas, Berge, Lied. 2001. Dietary inclusion of crystalline D- and L-methionine: Effect on growth, feed, protein utilization and digestibility in small and large Atlantic salmon (*Salmon salar* L.). *Aquaculture Nutrition*, 7(3): 169-181.

- Swann, L. 2007. A Fish Farmer's guide to understanding Water Quality. Aquaculture Network Information Centre (AquaNIC). Available at: <http://www.ces.purdue.edu/extmedia/AS/AS-503.pdf>. Accessed on 1st March 2011.
- Szilagyi, A. 2002. Lactose – a potential prebiotic. *Alimentary Pharmacology and Therapeutics*, 16: 1591-1602.
- Tacon, A.G.J., Hasan, M.R. and Subasinghe, R.P. 2006. Use of fishery resources as feed inputs for aquaculture development: trends & policy implications. *FAO Fisheries Circular*. No. 1018.
- Tacon, A.G.J. and Forster, I.P. 2000. Trends and challenges to aquaculture and aqua feed development in the new millennium. In: Cruz-Suarez, L.E., Ricque-Marie, D., Tapia-Salazar, M. Olvera-Novoa, M.A. and Civera-Cerecedo, R. (Eds.). Yucatan, Mexico. pp. 1-12.
- Tacon, A.G.J. 1993. Supplementary feeding in semi-intensive aquaculture systems. In: New, M.B., Tacon, A.G.J. and Csavas, I. (Eds.) *Farm Made Aquafeeds*. Proceedings of the FAO/AADCP (Bangkok, Thailand), pp. 61-74.
- Tacon, A.G.J. 1981. The possible substitution of fish meal in fish diets. *Proceedings of Highlands and Islands Board/Scottish Marine Biology Association Fish Farming Meeting*, Oban, Scotland, 26-27 February 1981, pp. 46-56.
- Takeuchi, T., Satoh, S. and Kiron V. 2002. Common carp, *Cyprinus carpio*. In: Webster, C.D. and Lim, C.E. (Eds.). *Nutrient Requirement and Feeding of Finfish for Aquaculture*. Oxon, USA: CABI Publishing.
- Takeuchi, T, Satoh, S. and Watanabe, T. 1983. Requirement of *Tilapia nilotica* for essential fatty acids. *Bulletin of the Japanese Society of Scientific Fisheries*, 49: 1127-1134.
- Tantikitti, C. and March, B.E. 1995. Dynamics of plasma free amino acids in rainbow trout under variety of dietary conditions. *Fish Physiology and Biochemistry* 14: 179-194.
- Teshima, S. and Kanazawa, A. 1988. Nutritive value of methionine enriched soybean plastein for *Oreochromis niloticus* fry. In: Pulin, R.S.V., Bhukaswan, T., Tonguthai, K. and Maclean, J.L. (Eds.). *International Symposium on Tilapia in Aquaculture*. Bangkok, Thailand.

- Teshima, S. and Kanazawa, A. 1986. The growth and nutrition requirements of tilapia. *Journal of Aquaculture Japan*, 23: 106 -111.
- Teshima, S., Kanazawa, A. and Yamashita, M. 1986. Dietary value of several protein and supplemental amino acids for larvae of the prawn *Penaeus japonicus*. *Aquaculture*, 51: 225-235.
- Teshima, S., Kanazawa, A. and Sakimoto, M. 1982. Essential fatty acids of *Tilapia nilotica*. *Memoirs of Faculty of Fisheries, Kagoshima University*, 1: 201-204.
- Thebault, H. 1985. Plasma essential amino acid changes in sea bass after feeding diets deficient and supplemented in L-Methionine. *Comparative Biochemical Physiology A*, 82: 233-237.
- Tidwell, J.H. and G.L. Allan. 2001. Fish as food: aquaculture's contribution. EMBO (European Molecular Biology Organization) report 2. 11: 958-963.
- Tocher, D.R. 2003. Metabolism and functions of lipids and fatty acids in teleost fish. *Review in Fisheries Science*, 11: 107-184.
- Torrescillas, S., Makol, A., Caballero, M.J., Montero, D., Robaina, L., Real, F. and Sweetman, J. 2007. Immune stimulation and improved infection resistance in European sea bass (*Dicentrarchus labrax*) fed mannan oligosaccharides. *Fish Shellfish Immunology*, 23: 969-981.
- Vetter, J. 2007. Chitin content of cultivated mushrooms of *Agaricus bisporus*, *Pleurotus ostreatus*, *Lentinula edodes*. *Food Chemistry*, 102: 6-9.
- Viola, S., Arielli, Y. and Zohar, G. 1988. Animal protein free feeds for hybrid tilapia (*Oreochromis niloticus* x *O. aureus*) in intensive culture. *Aquaculture*, 75: 115-125.
- Wang, N., Hayward, R.S. and Noltie, D.B. 1998. Effect of feeding frequency on food consumption, growth, size variation and feeding pattern of age-0 hybrid sunfish. *Aquaculture*, 165: 261-267.
- Wasser, S.P. 2002. Medicinal mushrooms as a source of antitumor and immunomodulating polysaccharides. *Applied Microbiology and Biotechnology*, 60: 258-274.
- Watanabe, T. Verakunpiriya, V. Watanabe, K., Kiron, V. and Shuichi, S. 1997. Feeding rainbow trout with non fish meal diets. *Fisheries Science*, 63: 258-266.
- Watanabe, T., Kiron, V. and Satoh, S. 1997. Trace mineral in fish nutrition. *Aquaculture*, 151: 185-207.

- Watanabe, T., Satoh, S. And Takeuchi, T. 1988. Availability of minerals in fish meal to fish. *Asian Fisheries Science*, 1: 175-195.
- Weatherup, R.N. and McCracken, K.J. 1999. Changes in rainbow trout, *Onchorynchus mykiss* (Walbaum), body composition with weight. *Aquaculture Research*, 30: 305-307.
- Webster, C.D., Goodgame-Tiu, L.S. and Tidwell, J.H. 1995. Total replacement of fish meal by soybean meal with various percentage of supplemental L-methionine in the diets for blue catfish, *Ictalurus punctatus*. *Aquaculture Research*, 26: 299-306.
- Willet, W.C. and Sacks, F.M. 1991. Sterol content of food of plant origins. *Journal of American Dietetic Association*, 73: 39-47.
- Williams, K., Barlow, C. and Rodgers, L. 2001. Efficacy of crystalline and protein – bound amino acids for amino acid enrichment in diets of barramundi / Asian seabass (*Lates calcarifer* Bloch). *Aquaculture Research*, 1: 415 – 429.
- Wilson, R.P. 2002. Protein and amino acids. In: Halver, J.E. and Hardy, R.W. (Eds.). *Fish Nutrition*. Elsevier Science. San Diego, USA.
- Wilson, R.P. 1989. Amino acids and proteins. In: Halver, J.E. (Ed) *Fish Nutrition*. New York, UK: Academic Press.
- Yamada, S., Simpson, K., Tanaka, Y. and Katayama, T. 1981. Plasma amino acid changes in rainbow trout force-fed casein and corresponding amino acid mixture. *Bulletin of the Japanese Society for Scientific Fisheries*, 47: 1035-1040.
- Yamamoto, T., Sugita, T. and Furuita, H. 2005. Essential amino acid supplementation to fish meal based diets with low protein to energy ratios improves protein utilization in juvenile rainbow trout *Oncorhynchus mykiss*. *Aquaculture*, 246: 379-391.
- Yang, H.J., Liu, Y.J., Tian, L.X., Liang, G.Y. and Lin, H.R. 2010. Effects of supplemental lysine and methionine on growth performance and body composition of grass carp (*Ctenopharyngodon idella*). *American Journal of Agriculture and Biological Sciences*, 5: 222-227.
- Yilmaz, E., Genc, M.A. and Genc E. 2007. Effect of dietary mannan oligosaccharides on growth, body composition and intestine and liver histology of rainbow trout. *Oncoryhnchus mykiss*. *Israel Journal of Aqauculture Bamidgeh*, 59: 182-188.
- Yousefian, M. and Amiri, M.S. 2009. A review of the use of prebiotic in aquaculture for fish and shrimp. *African Journal of Biotechnology*, 8(25): 7313-7318.

- Zerai, D.B., Fitzsimmons, K.M., Collier, R.J. and Duff, G.C. 2008. Evaluation of brewer waste as partial replacement of fish meal protein in Nile tilapia, *Oreochromis niloticus* diets. *Journal of World Aquaculture Society*, 39: 556-564.
- Zhou, Q-C., Buentello, J.A. and Gatlin III, D.M. 2010. Effect of dietary prebiotic in growth performance, immune response and intestinal morphology of red drum (*Sciaenops ocellatus*). *Aquaculture*, 309: 253-257.
- Zhou, Z.G., Ding, Z.K. and Huiyuan, L.V. 2007. Effect of short chain fructooligosaccharides on intestinal microflora, survival, growth performance of juvenile white shrimp, *Litopenaeus vannamei*. *Journal of World Aquaculture Society*, 38: 296-301.