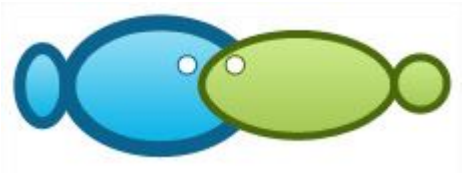

Using of fermented soy pulp as an edible coating material on fish feed pellet in African catfish (*Clarias gariepinus*) production

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Abstract. The quality of fermented soy pulp (FSP) as a coating material on fish feed pellets is significant globally due to the increasing demand for aqua feed industry. Coating technique was employed in this study to assess the physical, biochemical and bacteriologic properties of FSP coated experimental diets additionally to evaluate the loading potency of probiotics on fish feed pellet and growth performance of African catfish *Clarias gariepinus*. FSP was designated as a model edible coating material on fish feed pellet (0%, 25%, 50%, 75% and 100% of FSP) to deliver the probiotic to the fish gut. *Lactobacillus* spp. were employed as a model probiotic and model bacteria for the demonstration of this study to African catfish production. The physical properties of FSP coated diets were evaluated by using different equipment and formulae. FSP coated diets were analyzed for amino acids and bacterial quantification by the High-Performance Liquid chromatography (HPLC) and bacterial plate culture techniques respectively. The growth performance of fish was determined by using various formulae. The physical properties of FSP coated on fish feed pellet diet characteristics in term of feed diameter, expansion rate, bulk density, pellet durability index, floatability and water stability were significantly different ($p < 0.05$) among the experimental diets. The feed colour and odour were more in yellowish black and more strong flavour respectively with increased the different level of FSP coated on fish feed pellet. The distribution of amino acids such as arginine, histidine, leucine, lysine, phenylalanine, glutamic acid, alanine and aspartic acid were the major amino acids within the all five experimental diets. The mean value of lactic acid bacteria (LAB) was significantly ($p < 0.05$) increased with the increased of FSP coating level in the experimental diets. However, the lowest mean value of the total bacteria (TB) and LAB was observed in the control diet (0% FSP). Moreover, the palatability of experimental feed had similar trends among the diets of 0%, 25% and 50% of FSP diet group fish consumed less than 100% of given feed within 5 minutes whereas the palatability of 100% of FSP diet group was observed fish consumed less than 50% of given feed in 5 minutes. The growth parameters of fish in term of final weight, weight gain (%), specific growth rate (SGR) and condition factor were significantly ($p < 0.05$) different among the experimental diets. The highest weight gain and SGR occurred in the 50% FSP diet group fish compared to the other experimental diets. These finding provided a novel insight into plant based FSP coating products which enhanced more efficiently in generating low-cost and healthy aqua feed globally for African catfish and other freshwater fish production.

Key Words: coating, fermentation, soy pulp, aquaculture, African catfish.

Introduction. Aquaculture is rising because of the quickest growing food-producing business within the world due to the increasing demand for fish and seafood. Worldwide, the aquaculture business has vast at a median rate of 8.9% per year since 1970 (FAO 2016; Huang & Nitin 2019). However, aquaculture industries often suffer serious financial losses that threaten their growth and health standing, in the main cause of the outbreaks of assorted diseases (FAO 2016). Different types of chemical and drugs are used to control the diseases in aquaculture industry. Those chemicals and medicines are nearly prohibited by the European Union and other countries because they are harmful for human health and also can lead to environmental contamination. Probiotics are often different rather than medicine and chemicals to boost up useful microbes within the gut of fish for higher growth and health status (Yamamoto et al 2010; Ding et al 2015;