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“Bridging the gap between increasing knowledge and decreasing resources”

Response of African Catfish, *Clarias gariepinus* to Diets of African Yam Bean (*Sphenostylis stenocarpa*) subjected to two Processing Methods

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Abstract

This study assesses the response of African Catfish (*Clarias gariepinus* Burchell 1822) to diets of African yam bean (*Sphenostylis stenocarpa*) subjected to two processing methods. Mature African yam bean (AYB) was boiled and fermented. Their meals were evaluated as a protein source for *Clarias gariepinus* fingerlings. Five diets were formulated to contain $44.01 \pm 0.46\%$ crude protein (Mean \pm SD) and $19.03 \pm 0.05 \text{ kJ g}^{-1}$ gross energy (Mean \pm SD) respectively. Fishmeal in the diets was substituted with each of the two processed AYB meals at 40% and 45% levels. Control diet did not contain AYB. Nine fingerlings (initial average weight $12.28 \pm 0.18 \text{ g}$) were stocked per experimental tank. Experimental diets were fed to triplicate groups of catfish fingerlings at 10% body weight for 56 days. Quantity of feed was adjusted forth nightly after bulk weighing of experimental fish. Experimental data, samples of fish and feedstuff were analysed at the end of experiment. Results indicated that fermentation process improved crude protein percentage and amino acid profile of AYB. Specific growth rate (SGR) was highest at 45% replacement of fermented yam bean (3.32 ± 0.20) compared to control (3.17 ± 0.44). Carcass composition of experimental fish varied significantly ($p < 0.05$) between diet treatments but was better than in control group. Body protein accumulation was highest ($57.82 \pm 0.02\%$) at 45% boiled AYB replacement and significantly different ($p < 0.05$) above control. This was followed by 45% fermented AYB diet replacement ($54.73 \pm 0.02\%$). Mean values for haematological parameters (PCV, HB, WBC and RBC) significantly increased ($p < 0.005$) above the initial status and control group. Haematological values for fish fed 40% inclusion level of fermented and boiled AYB in diet were the highest. However, damage to epithelial mucosa of the fish was observed in group fed 45% inclusion level of boiled and fermented AYB diet respectively. This study shows that fermentation and boiling are effective methods of reducing anti-nutrient in AYB and can enhance fish growth. However, based on the histological results processed AYB should not be included beyond 45% inclusion level.

Keywords: African catfish, African yam beans, alternative protein source, hematology, histology