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Kernel Meal from a New Non-toxic *Jatropha* Species - *Jatropha platyphylla* - as a Protein Source for Nile Tilapia (*Oreochromis niloticus* L.) Diet

AKINWALE AKINLEYE¹, VIKAS KUMAR¹, HARINDER P. S. MAKKAR¹, MIGUEL ANGULO-ESCALANTE², KLAUS BECKER¹

¹University of Hohenheim, Department of Animal Production in the Tropics and Subtropics, Germany

²Centro de Investigación en Alimentación y Desarrollo (CIAD), Hermosillo, Sonora, México, Mexico

Abstract

Jatropha platyphylla (local name: “sangregrado”) is a drought-resistant shrub, available in Mexico and belongs to *Euphorbiaceae* family. Its seeds are rich in oil and protein. The kernel meal from *J. platyphylla* obtained after oil extraction 70–75 % crude protein. The meal is free of phorbol esters, the main toxins present in other *Jatropha* species; however, it contains phytate, lectin and trypsin inhibitor. Levels of essential amino acids (except lysine) are higher in the meal than soybean meal (SBM). Using Nile tilapia (*Oreochromis niloticus*) fingerlings, a 12-week experiment was conducted to evaluate nutritional quality of heated *J. platyphylla* kernel meal (H-JPKM) and to compare it with that of SBM and fishmeal. Two experiments were conducted simultaneously. The first experiment was in a recirculatory-system to evaluate the nutritional and haematological responses and the second in a respirometric-system to evaluate the metabolic responses. Fingerlings, 15 fish; average weight 13.7 ± 0.21 g for the recirculatory-system and another 15 fish, 13.9 ± 0.17 g for the respirometer-system were randomly distributed in three groups with five replicates for each system. In both experimental set ups the control diet containing fishmeal and the two other diets replacing 62.5 % of the fishmeal protein with H-JPKM (*Jatropha* group) and SBM (Soybean group) were fed to fingerlings. The last two diets contained phytase at a level of 500 FTU kg^{-1} and all diets were iso-nitrogenous (crude protein 36 %). Growth performance, feed conversion ratio, protein efficiency ratio and energy retention did not differ significantly among the three groups in both experimental (recirculatory and respirometer) set ups. Higher protein productive value was observed in plant protein fed groups; whereas, apparent lipid conversion exhibited reverse trend in both the experimental set ups. RBC count, hematocrit and blood-glucose were higher in plant protein fed groups than control group, while WBC count, haemoglobin, calcium and sodium ions, bilirubin, urea-nitrogen and alkaline phosphatase and alanine aminotransferase activities in blood did not differ significantly among the three groups. Average metabolic rate, energy expenditure per g protein fed and retained in the body were also similar. The results demonstrate that H-JPKM is a good quality protein source for Nile tilapia feed and it can replace 62.5 % of fishmeal protein in their diet.

Keywords: Fish meal replacer, *Jatropha platyphylla*, kernel meal, Nile tilapia, protein source