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Detoxified *Jatropha curcas* Kernel Meal: An Excellent Fish Meal Replacer in Common Carp (*Cyprinus carpio* L.) Diet

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Abstract

Jatropha curcas (L.) is a multipurpose and drought resistant tree, widespread throughout the tropics and subtropics. Its seeds are rich in oil and protein. It is being promoted as a biofuel plant. Jatropha kernel meal obtained after oil extraction is an excellent source of protein. However, presence of toxic and antinutritional constituents restrict its use in fish feed. Jatropha kernel meal was detoxified. A 16-weeks experiment was conducted to evaluate the nutritional quality of the detoxified Jatropha kernel meal (DJKM) in common carp. Carp (36) with an initial average body weight of 22±0.12 g were randomly distributed into three treatments with four replicates and fed iso-nitrogenous and iso-energetic diets (crude protein 38 %, crude lipid 10 %): Control (fish meal based protein), J50 and J62.5 (50 % and 62.5 % of fish meal protein replaced by DJKM). Body mass gain (374–588 %), specific growth rate (1.4–1.7 %), metabolic growth rate (6.8–8.8 $g\,kg^{-0.8}\,day^{-1}$), feed conversion ratio (1.7–2.2), protein efficiency ratio (1.2–1.6), protein productive value (21.9–26.5 %), and apparent lipid conversion (30–43 %) did not differ significantly among the three groups. Energy retention; dry matter, protein, lipid and energy digestibilities; and digestive enzyme (amylase, protease and lipase; U/g protein) activities were highest in control group, followed by J50 and J62.5 groups; all being significantly different. The ranges for energy retention and digestibilities of dry matter, protein, lipid and energy were 13.4–20.1 %, 70–75 %, 79–86 %, 80–86 % and 73–82 %, respectively. The relative intestinal length (mm g^{-1}) was in the order: J62.5 > J50 > control; all being significantly different. Red blood cells (RBC) count and hematocrit were highest in control group, followed by J50 and J62.5 groups; all being significantly different, while creatinine level in blood had the opposite trend. RBC count, hematocrit and creatinine level in blood were 1.32–1.52 ×106 cells mm

$^{-3}$, 30–45 % and 0.20–[1.55 mg dl^{-1} respectively. White blood cells count, hemoglobin, alanine transaminase, alkaline phosphatase, glucose, total bilirubin, urea nitrogen, albumin, globulin, total protein, calcium, phosphorus and sodium in blood did not differ significantly among the three groups and were within the normal ranges, suggesting no clinical toxicity. In conclusion, DJKM is a promising fish meal replacer in carp diet.

Keywords: Common carp, fish meal replacer, *Jatropha curcas*, kernel meal, protein source

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