



Tropentag, September 14-16, 2010, Zurich

“World Food System —
A Contribution from Europe”

Detoxified *Jatropha Curcas* Kernel Meal as a Protein Source for White Leg Shrimp (*Penaeus vannamei*) Diet

TILL HARTER, FREDERIK BUHRKE, VIKAS KUMAR, ULFERT FOCKEN, HARINDER P. S. MAKKAR,
KLAUS BECKER

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

Abstract

Jatropha curcas (L.) is a multipurpose and drought resistant tree, widespread throughout the tropics and subtropics. Its seeds contain up to 35 % oil and therefore are being promoted as a biofuel plant. *Jatropha* kernel meal (JKM) obtained after oil extraction from shell-free kernels is an excellent source of protein (60–65 % crude protein, similar to fish meal). The levels of essential amino acids (except lysine) are higher in JKM than in soybean meal. However, presence of toxic and antinutritional constituents restricts its use in fish and shrimp feeds. JKM was detoxified (DJKM) and an eight-week experiment was conducted to evaluate its nutritional quality for white leg shrimp (*Penaeus vannamei*). White leg shrimp (60) with an initial average body weight of 4.46 ± 0.64 g were randomly distributed into three treatments with four replicates and fed iso-nitrogenous and iso-energetic diets (crude protein 35 %, crude lipid 9 %): Control (fish meal based protein), JC25 and JC50 (25 % and 50 % of fish meal protein replaced by DJKM). Higher body mass gain, specific growth rate and metabolic growth rate were observed in DJKM fed groups than in control group. The ranges for body mass gain (BMG), specific growth rate and metabolic growth rate were 138–209 %, $1.54\text{--}2.00\%$ day⁻¹ and $5.51\text{--}7.22\text{ g kg}^{-0.8}\text{day}^{-1}$ respectively. A lower feed conversion ratio (g feed consumed/g BMG) was observed in DJKM fed groups than in the control group, whereas protein efficiency ratio exhibited opposite trend. Feed conversion ratio and protein efficiency ratio were in the range of 2.3–3.2 and 1.0–1.4 respectively. Cholesterol level in plasma was highest in the control group, followed by in JC25 and JC50 groups; all being significantly different. The results from the present study demonstrated that the DJKM is a good quality protein source for white leg shrimp. It can replace fish meal protein by 50 % in the diet of white leg shrimp. Further research should be conducted to evaluate the nutritional quality of diets containing the DJKM beyond 50 % fish meal protein replacement.

Keywords: Fish meal replacer, growth, *Jatropha curcas*, nutrient utilisation, white leg shrimp