Comparison of feeding values of palm kernel meal and copra meal for broilers

B. Sundu, A. Kumar and J. Dingle

School of Animal Studies, University of Queensland, Gatton Qld 4343, s4022046@student.uq.edu.au

Bulk density and water holding capacity (WHC) are two physical characteristics that could affect the nutritional value of the feed through their negative correlation with feed intake (Sundu *et al.*, 2004). Information about the physical characteristics, digestibility and apparent metabolisable energy (AME) of copra meal (CM) and palm kernel meal (PKM) is scarce. This information is essential for diet formulation. The following experiment aimed to asses the feeding value of CM and PKM with respect to bulk density, WHC, AME and their effect on digesta viscosity.

The feeding values of CM and PKM were assessed in a one week digestibility trial. Fifty six 5–week–old male birds were used in a completely randomised design with 2 diets, each with 4 replicate cages of 7 birds. The CM diet consisted of 87% CM, 6% sunflower oil, 0.4% vitamin and mineral mix, 3.7% dicalcium phosphate, 0.4% limestone, 0.5% salt and 2% celite, while the PKM diet contained 91.5% PKM, 4% sunflower oil, 0.4% vitamins and minerals mix, 1.6% limestone, 0.5% salt and 2% celite. The crude protein and gross energy values for the diets are presented in Table 1. Faeces were collected on day's five to seven. Three birds from each replicate were randomly taken and killed by cervical dislocation. Digesta from the jejunum was collected and frozen for viscosity measurement. Data were analysed using analysis of variance.

CM is potentially a better source of protein for chickens in comparison to PKM (Table 1). However, CM had a lower bulk density (0.49 g/cm^3) and higher WHC (4.14 g water/g feed) than PKM. These physical properties may lead to low feed intakes in birds fed CM.

The digestibility of DM, protein and NDF were higher for CM than for PKM, however, the AME of PKM was higher. The higher AME of PKM is probably due to the higher digestibility of lipid (94.7 vs. 93.1%) together with the higher lipid content in PKM (Table 1). The main carbohydrate in these feedstuffs is β–mannan, which has been reported to be viscous in the digestive tract of birds. However, the low jejunal digesta viscosity of these feedstuffs indicates that the β–mannan in CM and PKM is mainly water insoluble.

In conclusion, the low bulk density and higher WHC of CM need to be considered during feed formulation, as these two properties have a bulking effect which can reduce feed intake. The low digestibility of DM in CM and PKM suggest that mannan–degrading enzymes or enzyme cocktails may need to be used to improve their feeding value. This study also suggests that digesta viscosity will not be a problem in diets containing CM or PKM.

Sundu, B., Kumar, A., and Dingle, J., (2004). The effect of commercial enzymes on chicks fed high copra meal and palm kernel meal diets. *Proceedings Seminar Nasional Pemanfaatan sumber Daya hayati berkelanjutan, 2004*, pp. 26–31 (ed. M.H. Husain). Tadulako University Press, Palu, Indonesia.

Table 1 Physical characteristics, nutrient contents and digestibilities of copra meal (CM) and palm kernel meal (PKM) when fed to 5–week old male chickens.

Nutrients and physical characteristics	CM	PKM	Parameters	CM	PKM
Protein (%)	21.7	13.6	Dry matter digestibility (%)	44.7[a]	38.7[b]
Crude fibre (%)	14.1	21.3	Protein digestibility (%)	55.0[a]	48.7[b]
Lipid (%)	6.9	11.1	NDF digestibility (%)	39.8	36.2
Gross energy (kcal/kg)	4,247	4,998	Lipid digestibility (%)	93.1	94.7
Bulk density (g/cm^3)	0.49	0.57	Jejunal viscosity (cPs)	1.41	1.54
WHC (g water/g feed)	4.14	2.93	AME (Mcal/kg)	2.179	2.260

Values with a different superscript within a row are significantly different (P<0.05)