

SAFE USE OF PALM KERNEL CAKE (PKC) FOR SMALL RUMINANT PRODUCTION

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Keywords: foodstuff, palm kernel cake, copper toxicity, oil palm by-products.

Introduction

Palm kernel cake is a by-product obtained after oil extraction from oil palm kernel. It has been used as feed for ruminants and to some extent non ruminants. On the average, PKC contains about 16 % crude protein and about 10.5 MJ Metabolisable Energy/ kg dry matter, which makes it a suitable energy and protein source for ruminants. However, PKC also contains about 30 ppm copper, which makes it toxic to sheep when fed high levels of for long periods. Earlier studies (Hair-Bejo and Alimon, 1994) have shown that sheep fed PKC comes down with liver damage associated with copper toxicity. It is a well-known fact that sheep, unlike cattle and buffaloes, are less tolerant to high levels of copper in the diet. Incidences of copper toxicity can be reduced by addition of zinc sulphate or molybdenum in the ration. However, the level of supplementation on long term basis, has not been established. This study investigated the effect of molybdenum with/without sulphur on copper levels in blood and liver of sheep fed PKC based diets.

Materials and Methods

Seventy two six-months to one-year old Malin- cross sheep were selected and randomly allocated to nine groups. They were offered PKC pellets supplemented with different levels of sulphur and molybdenum (in the form of sodium sulphate and ammonium molybdate) to give the following dietary treatments: Diet A (Mo 4 mg/kg), Diet B (Mo 8mg/kg) Diet

C (Mo 16 mg/kg) Diet D (32 mg/kg), Diet E (Mo 4mg/kg + Sulphur 0.2g/kg (S)), Diet F (Mo 8mg/kg + S), Diet G (Mo 16mg/kg + S), Diet H (Mo 32mg/kg + S) and Diet I (S) . The sheep were fed the diets ad libitum and body weight and intake measurements were taken on a regular basis. After a period of three months two or three sheep from each group were slaughtered and blood and liver samples obtained for copper analysis. The rest of the animals were kept for a further three months after which they were slaughtered and samples of liver obtained and analysed for copper. Standard procedures for copper determination as described by AOAC were carried out.

Results and Discussion

The results of the study clearly indicate that supplementation with molybdenum and sulphur significantly reduced incidences of copper toxicity in sheep fed solely on PKC. In general, the liver of sheep supplemented with Mo and S at 3 months slaughter and at 6 months slaughter did not vary significantly. However, the values recorded at 3 months slaughter were slightly higher than those at 6 months slaughter. The copper concentration tended to range between 450 ppm to as high as 1300 ppm.

Conclusions

While PKC can be a good source of protein and energy for ruminants incidences of copper toxicity have been observed in sheep fed PKC. From this study it can be concluded that PKC when supplemented with molybdenum can reduce the levels of copper in the liver of sheep. Copper levels in the liver are indicative of copper status in sheep. Molybdenum and sulphur appear to be more effective in reducing copper levels in the liver.

References

Hair-Bejo, M. and Alimon, A.R. 1995. The protective role of zinc in palm kernel cake (PKC) toxicity in sheep, *Mal. J. Nutrition.* 1: 75-82.