DIGESTIVE PHYSIOLOGY AND NUTRITION OF THE LESSER MOUSE DEER (*TRAGULUS JAVANICUS*)

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Introduction

The Malaysian lesser mouse deer (*Tragulus javanicus*) has been identified by the NRC as one of the world's little-known small animals with a promising economic future'. There is a special need to understand the animal's nutritional requirements and to develop diets in captivity. The animal is a selective feeder and in the wild, they browse on shrubs and fallen fruits, but in captivity they can be fed various feeds like kangkong, long beans, sweet potato and rabbit pellet. The animal has been shown to have a lean mass and a unique rumen microbial population (Nolan et al. 1995; Kudo et al. 1994). A better understanding of the animal's nutrient requirements and metabolism should be pursued as the information would be useful in assisting its management and production. The main objective of this project was to study the nutritional requirements of the lesser mouse deer (in terms of energy and protein) and to find ways to estimate the microbial synthesis in the rumen.

Materials and Methods

A choice feeding experiment was conducted to determine the maximum feed intake as well as the digestibility of nutrients (dry matter, nitrogen and energy) in eight mouse deer (four male and four female) when offered five feed materials – kangkong, sweet potato, french beans, long beans and pellet ad libitum at the same time. The experiment was conducted in two weeks, where the first week was for adaptation and the second week for measurements of nutrient intake, nutrient digestibility and nitrogen balance. In another experiment, urea, creatine and the various purine derivatives (allantoin, uric acid, hypoxanthine and xanthine excreted in the urine were measured by calorimetry and high performance liquid chromatography (HPLC) in six male mouse deer fed high protein high starch diet (rabbit pellet and sweet potato) and low protein high starch diet (sweet potato and a limited amount of kangkong) to see the changes in particular the purine derivatives excreted in the urine as the concentrations of these metabolites are directly related to the amount of microbial synthesis in the rumen.

Results and Discussion

Results from the choice feeding experiment showed that the mouse deer would consumed the various feeds offered, but with an order of preference which differed between the sexes. In terms of fresh weight, the male preferred sweet potato more than the other feeds, but the female preferred carrot. The reason for this is not known, but a study on pigs (Kyriazakis et al. 1993) showed that pigs selected a diet based on their protein and energy requirements. The carrot contained more than twice the amount of protein and half the energy than the sweet potato. The higher intake of sweet potato by the male could be related to its higher energy requirement. A significant ($P<0.05$) difference between the sexes was also observed in the intake of long beans. The female consumed more than twice the amount of long bean than the male. The long bean contained the highest amount of crude protein (CP)(30 %) when compared to the other feeds offered. However, because of the low dry matter content of both carrot and long bean (approximately 6%) and a significantly ($P<0.05$) higher intake of dry matter (DM) in the male, the CP intakes of both male and female mouse deer were not significantly different. In terms of DM of the feeds, both male and female mouse deer preferred pellet other feeds. The small and compact form of the pellets helped the mouse deer to pick up with their narrow, elongated muzzle and small mouth. The total dry matter intake was 40.7 g/d/kgW $^{0.75}$ for male and 35.9g/d/kgW $^{0.75}$ for female. This intake was comparable to the values obtained in mouse deer fed lundai (*Sapium baccatum*) leaves (Nolan et al. 1995). Percentage digestibilities of dry matter, organic matter, crude protein and gross energy were high within 72.7 – 80.8 % and were not significantly different between male and female mouse deer. Both male and female mouse deer were in positive nitrogen balance (0.6 g N/d/kgW $^{0.75}$). The HPLC analysis showed that the mouse deer excreted high amounts of creatine and uric acid and lower amounts of purine derivatives. The major purine derivative excreted by the mouse deer was uric acid (3.38μ mole/g digestible dry matter intake/d for high protein diet and 3.20μ mole/g digestible dry matter intake/d for the low protein diet. Allantoin excretion was the lowest (0.13- 0.23μ mole/g) digestible dry matter intake.

Conclusions

The present study showed that when male and female mouse deer were offered different foods of similar nutritional values (like carrot and sweet potato) or foods of different nutritional values (like kangkong and french bean), they were able to choose and regulate the intake of each food for their protein and energy requirements. In terms of purine derivatives excretion, the results indicate that the purine metabolism of the mouse deer is somewhat different from the other ruminants, where the major derivative is uric acid and not allantoin as observed in larger animals like cattle.

References

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