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Duration of Balance Trials with Caecectomized Muscovy Drakes (*C. moshata* L.)

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Abstract

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The decrease of excretion of caecectomized 42-44 wk. Muscovy drakes up to minimum relatively stable levels was evaluated by measuring excreted dry matter and amino acids in regular intervals. The dynamics of the quantity of excreta and amino acids was recorded up to the 12th hour after starvation, followed by relatively stable minimum values. The recommended period of cleaning of the digestive tract of caecectomized Muscovy drakes should be 12 to 18 hours.
Key words: Muscovy drakes, caecectomy, endogenic excretion, starvation, dry matter, amino acids

Introduction

In balance trials with poultry, it is important to establish the exact content of endogenic excreta. This is necessary not only for the assessment of true metabolizable energy and true feed amino acid digestibility but also for the identification of the duration of preliminary starvation period in order to clear the digestive tract of any residues prior to the actual experiment.

There are a considerable number of scientific publications discussing the evaluation of preliminary starvation period based on certain indicators and parameters. They are mostly for gallinaceous species, e.g. the fecal method (Sibbald, 1986; Sibbald et al., 1987) as well as ileal digestibility method preferred lately for the higher accuracy, especially in the evaluation of amino acid digestibility (Ravindran, 2004). Recently, similar data derived from Pekin duck trials, have been published (Adeola et al., 1997, etc.).

The Muscovy duck (*Cairina moshata* L.) is a separate independent species that differs from the domestic Pekin duck both biologically and economically. The references we know do not contain any data on feed nutritive value for this specific species. Therefore, we made it our major objective to study energy and protein nutritive value of basic feed for Muscovy ducks. Balance trials by the fecal method have already been described in Bulgaria (Penkov, 2005) and can be used as a basis for our work.

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The objective of the present study is to identify the duration of clearing the digestive tract of caecectomized Muscovy ducks in order to identify the duration of preliminary and *per se* balance trials.

Material and Methods

A trial with 4 caecectomized (Ivanova et al., 2006; Penkov et al., 2006) 64-66-wk-old Muscovy drakes was carried out in 2006. They were fed compound feed containing corn, wheat, soybean meal, sunflower expeller, dicalcium phosphate, limestone, salt and vitamin and mineral premix. The content of metabolizable energy (as per Todorov et al., 2004) was 11.30 MJ/kg, crude protein – 16%, lysine – 0.8%, methionine +cystine – 0.5%, Ñà – 1% and digestible P – 0.4%. Before induced feed deprivation, fowls were fed ad lib – about 80-90 g/24 h.

One week after the surgical procedure (with completely recovered feeding functions), we deprived all the fowls of feed at a certain time. We collected excreta at certain intervals of feed deprivation (3, 6, 12, 18, 24 and 30 hours), dried them to dry matter (AOAC - 1994) and made amino acid analysis (with preliminary hydrochloric hydrolysis).

Data were processed variationally and statistically in Excel.

Results and Discussion

Table 1 shows the dynamics of changes in dry matter content of caecectomized fowls after a certain period of feed deprivation.

The highest level of dry matter excretion was recorded during the first 3 hours of feed deprivation – an average of 22.5 g, followed by a sharp decrease to about 9 g on the 6th and 4 g on the 12th hour after beginning of starvation. Excreta obtained every 6 hours, starting from the 12th hour after the beginning of starvation, were not very different in terms of quantity – an average of 2.5 g. Only the differences between the first three periods were statistically significant, while there were no statistically significant differences in the quantities of separate excreta records af-

Table 1

Dry matter content of excrements of caecectomized Muscovy drakes (g) after a certain period of feed deprivation (*n* =4)

Values → / Hours after the beginning of feed deprivation ↓	x*	Sx	S%	Sx%
0-3	22.52 A,A1	4.37	38.69	19.34
3-6	8.86 A,B,B1	1.32	29.91	14.95
6-12	3.97 A1,B,C	0.49	24.75	12.38
12-18	2.45 A1,B1,C	0.18	14.51	7.26
18-24	2.51 A1,B1,C	0.21	17.08	8.54
24-30	2.37 A1,B1,C	0.1	9	4.5

*Note: In the rows of column 2, statistical significance of equal letters is as follows:
A-A, B-B, C-C - P< 0.05; A1-A1, B1- B1- P< 0.01

Table 2
Content of essential amino acids in excreta of caecectomized Muscovy drakes (g) after a certain period of feed deprivation (n=4)

Hours after the beginning of feed deprivation	0-3	3-6	6-12	12-18	18-24	24-30
Amino acids	x±Sx	x±Sx	x±Sx	x±Sx	x±Sx	x±Sx
Lysine	0.05±.0.01	0.02±0.004	0.009±0.002	0.007±0.0006	0.01±0.001	0.01±0.001
Arginine	0.18±0.05	0.09±0.02	0.05±0.008	0.03±0.002	0.04±0.004	0.04±0.002
Threonine	0.17±0.05	0.08±0.01	0.04±0.007	0.03±0.002	0.04±0.004	0.04±0.002
Cysteine	0.05±0.01	0.03±0.005	0.05±0.008	0.02±0.002	0.02±0.003	0.02±0.001
Valine	0.18±0.05	0.09±0.008	0.05±0.008	0.03±0.003	0.04±0.004	0.04±0.002
Methionine	0.03±0.009	0.02±0.003	0.006±0.001	0.005±0.0004	0.006±0.0007	0.006±0.0004
Isoleucine	0.14±0.04	0.06±0.01	0.03±0.005	0.02±0.002	0.02±0.003	0.02±0.002
Leucine	0.23±0.07	0.13±0.02	0.06±0.01	0.04±0.004	0.05±0.006	0.05±0.003
Tyrosine	0.14±0.04	0.07±0.01	0.04±0.007	0.03±0.002	0.03±0.004	0.03±0.002
Phenylalanine	0.16±0.04	0.08±0.01	0.04±0.006	0.03±0.002	0.03±0.004	0.035±0.002
Total essential amino acids	1.33±0.01A	0.67±0.01AB	0.37±0.001AB	0.24±0.001AB	0.28±0.001AB	0.29±0.001AB

*Note: In the last row, statistical significance of equal letters is P< 0.05

ter the 12th hour after the beginning of starvation.

The same was the tendency for amino acid excretion (Table 2). The highest content was recorded in excreta, obtained up to the third hour, followed by a sharp decrease on the 6th and 12th hour of starvation, while after this period, the quantities of essential amino acids excreted every 6 hours were relatively stable. Therefore, we might conclude that after 12 hours of feed deprivation, caecectomized fowls excreted only amino acids of endogenic origin.

It is important to note even the minimal differences in amino acid excretion after the 12th hour, meaning that in balance trials, carried out in different periods of time, feed deprived analogues should be included in the groups for each separate trial.

To sum up, the removal of caeca of trial Muscovy drakes caused decrease of feed transport through the digestive system within 12 hours. Therefore, balance trials based on ileal digestion approach, should take into consideration this specific minimum period. The deprivation period may be extended to 18 hours for more accurate results.

Our data are significantly different from those of Sibbald (1986), obtained in normal fowls (48 hours preliminary feed deprivation).

Conclusions

When deprived of feed, excretion of caecectomized Muscovy ducks was reduced from 22.5 g (3rd hour) to 4 g (12th hour after feed deprivation). After this period, the quantities of dry matter excreted every 6 hours, were within 2.5 g and showed no significant differences.

A similar tendency was observed in essential amino acid content of excrements of feed deprived fowls.

Based on the reported results, we would recommend that the minimum period of feed deprivation for clearing the digestion system of caecectomized Muscovy ducks from previous feed residues should be 12 or even 18 hours – for better accuracy.

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