FEED INTAKE AND LIVE WEIGHT IN RABBITS FITTED WITH ILEAL CANNULA

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Abstract - Eighty-four female crossbred rabbits were fitted with a single T glass-cannula in the terminal ileum. After surgery, thirty animals died or were discarded. The feed intake of the fifty-four remaining animals increased until reaching a regular level from the 12th to the 29th day (58 gDM $kg^{-.75}$ day^{-1}). Different trends were observed in first or further cycles of experimental use: feed intake decreased progressively along the first cycle (-13% from adaptation to ileal digesta sampling) while rabbits seemed to complete the compensation of the negative effect of surgery, but it was regular through the further cycles (45 gDM $kg^{-.75}$ day^{-1}). The presupposed stressful procedures, such as caecotrophy prevention and ileal digesta sampling, had negligible effects on feed intake. As a result of caecotrophy prevention, live weight fell slightly (-2%). This could be related essentially to a decrease in digestive content because of non-recycled soft faeces.

INTRODUCTION

Ileal flow and digestibility measurements are necessary to evaluate precisely the digestion and nutritive values of diets in rabbits. These measurements involve an experimental model based on rabbits fitted with ileal cannula (GIDENNE et al., 1988). This model has been validated by comparing in cannulated and in non-cannulated rabbits feed intake, soft faeces excretion, rate of passage and faecal digestibility (GIDENNE and RUCKEBUSCH, 1989; GIDENNE et al., 1994; Merino, 1994).
The current work presents results of feed intake and live weight of cannulated rabbits during post-surgical recovery and measurements of ileal and faecal digestibilities of various diets.

MATERIAL AND METHODS

Experimental procedures

Eighty-four female crossbred rabbits 3-5 months old and weighing 3-4 kg were fitted with a single T glass-cannula in the terminal ileum, according to the technique described by GIDENNE *et al.* (1988). After surgery, the animals were housed in individual metabolic cages and fed ad libitum with a commercial diet. The feed intake and live weight were recorded at 3, 6, 9, 12, 15, 22 and 29th post-cannulation day. Thirty animals died or were discarded because of low intake.
The fifty-four remaining animals were used in experiments consisting in successive periods of: a) adaptation to experimental diet (7 days); b) faecal collection (4 days); c) soft faeces collection, including 2 measurements (48 h interval) with rabbits wearing a plastic collar for 24 h (from 14 h to 14 h); d) recovery after caecotrophy prevention (7 days); e) ileal digesta sampling, including 6 collections (each lasting 1 h) in 3 days and covering a 24 h cycle (i.e. at 10, 22, 14, 2, 18, 6 h) and carried out during a further faecal collection of 4 days. Feeding was ad libitum over the whole experimental cycle, the feed intake and live weight were recorded at each period described above. Some animals were used in further experimental cycles (twenty-three in a second, fourteen in a third and eight in a fourth).

Statistical analysis

Analyses of variance were performed using the GLM procedure (SAS, 1989) according to the following model : $y_{ij} = m+a_i+b_j+e_{ij}$, where y_{ij} = observed value, m = general mean, a_i = day effect (in post-surgical recovery) or period effect (in experimental cycle), b_j = individual effect and e_{ij} = residual error. The first or further experimental cycles were analysed separately; in the latter analysis the individual values in each period were the mean of second, third and fourth experimental cycles.

RESULTS

Post-surgical recovery

Table 1 shows that immediately following the cannulation feed intake was very low and live weight decreased sharply (8% at the end of 3 days). Later, feed intake increased progressively until reaching a constant level from the 12th day onward (58 gDM $kg^{-.75}$ day^{-1}), which led to a quick recovery of live weight (2% higher at 29th day than at time of cannulation).

Table 1 : Feed intake and live weight of rabbits fitted with ileal cannula during the post-surgical recovery (commercial diet)

	Feed intake		Live weight	
	gDM $kg^{-.75}$ day^{-1}		g	
Day	LSM	SE	LSM	SE
0	-		3579 ^{b}	15
3	3.2 ^{e}	1.8	3282 ^{e}	18
6	28.0 ^{d}	1.7	3228 ^{f}	17
9	42.6 ^{c}	1.6	3243 ^{ef}	16
12	51.3 ^{b}	1.8	3279 ^{e}	17
15	58.0 ^{a}	1.7	3367 ^{d}	16
22	58.6 ^{a}	1.5	3507 ^{c}	15
29	57.7 ^{a}	1.8	3639 ^{a}	15

LSM = Least Square Mean, SE=standard error
^{a,b,c,d,e,f} Values within a column without common superscript differ at P<.05

Experimental cycles

Different trends were observed in first or further cycles (Table 2). Feed intake decreased progressively along the first cycle (-13% from adaptation to ileal digesta sampling), while live weight varied conversely but slightly (increasing about 3.5 g day^{-1} as a mean, in spite of a decrease as a result of soft faeces collection). In further cycles, rabbits had regular feed intake throughout (45 gDM $kg^{-.75}$ day^{-1}) and their live weight was also regular (4010 g) except during soft faeces collection (-2%).

Table 2 : Feed intake and live weight of rabbits fitted with ileal cannula during the experimental cycles (experimental diets)

	First cycle				Further cycles			
	Feed intake		Live weight		Feed intake		Live weight	
	gDM $kg^{-.75}$ day^{-1}		g		gDM $kg^{-.75}$ day^{-1}		g	
Period	LSM	SE	LSM	SE	LSM	SE	LSM	SE
Initial day	-		3793 ^{d}	15	-		3994 ^{a}	16
Adaptation	50.3 ^{a}	1.1	3825 ^{cd}	16	44.4	1.4	4023 ^{a}	15
Fecal collection	48.7 ^{ab}	1.1	3838 ^{bc}	14	45.4	1.5	4019 ^{a}	15
Soft feces collection	46.6 ^{bc}	1.3	3809 ^{cd}	19	45.6	2.0	3923 ^{b}	21
Recovery after caecotrophy prevention	44.2 ^{c}	1.1	3873 ^{ab}	15	45.7	1.5	4014 ^{a}	16
Ileal digesta sampling	43.7 ^{c}	1.1	3881 ^{a}	15	44.8	1.5	4006 ^{a}	15

LSM=Least Square Mean, SE=standard error ; ^{a,b,c,d} Values within a column without common superscript differ at P<.05

DISCUSSION

Feed intake is a trait of major interest to be considered when assessing the effect of ileal cannulation on rabbit digestive processes. Our results were consistent with previous studies (GIDENNE et al., 1988 ; GIDENNE and RUCKEBUSCH, 1989 ; Merino, 1994), that reported a fully recovered feed intake 10-20 days after surgery. In fact, it seems that rabbits overfed from the 12th day onward, for compensating the negative effect of surgical damage on body condition. Rabbits should complete this compensation during their first experimental cycle, as can be deduced from results of feed intake and live weight.

The supposedly stressful procedures (caecotrophy prevention and ileal digesta sampling) had negligible effects on feed intake. Merino (1994) did not detected changes in feed intake in cannulated rabbits when caecotrophy was prevented for periods of either 24 h or 4 days, or even when rabbits were submitted to caecotrophy prevention for a period of 7 days simultaneously with daily ileal digesta collections of 1 h; this author also reported no effect on feed intake in cannulated rabbits either of delay between collections (48, 24 or 12 h) or of length of collection (1 h or 30 minutes). Similarly, prevention of caecotrophy for 7 days in non-cannulated rabbits did not have effect on feed intake (ROBINSON et al., 1985 ; RAHARJO et al., 1990).

Finally, the fall in live weight as a result of caecotrophy prevention could be related essentially to a decrease in digestive content because of non-recycled soft faeces. Thus, caecotrophy prevention appeared more problematic than ileal digesta sampling, that advising to alter the order of these two periods to avoid the specific need of an adjustment period to normalise the digestive system after soft faeces collection.

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Ingestion de pienso y peso vivo en conejas provistos de canula ileal - En ochenta y cuatro conejas cruzadas se colocó una cánula de vidrio en T en el extremo distal del íleon. Treinta animales murieron o fueron desechados en el post-operatorio. Los cincuenta y cuatro restantes mostraron una ingestión creciente, que se estabilizó entre el 12° y 29° día (58 gMS $kg^{-.75}$ $día^{-1}$). Se observó diferente tendencia en el primer ciclo de uso experimental que en los posteriores: la ingestión disminuyó progresivamente a lo largo del primer ciclo (-13% desde la adaptación hasta el muestreo de digesta ileal) mientras los conejos parecieron completar la compensación del efecto negativo de la cirugía, pero fue constante en los ciclos posteriores (45 gDM $kg^{-.75}$ day^{-1}). Las manipulaciones supuestamente estresantes, para impedir la cecotrofia o muestrear digesta ileal, no tuvieron efectos apreciables sobre la ingestión. El peso vivo disminuyó ligeramente cuando se impidió la cecotrofia. Ello estaría relacionado esencialmente con un descenso del contenido digestivo motivado por la no ingestión de heces blandas.