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**THESIS OF THE MASTER DEGREE**

**EFFECT OF SOLUBLE FIBER AND INSOLUBLE  
FIBER LEVEL ON RABBITS**

**EFEECTO DEL NIVEL DE FIBRA SOLUBLE E  
INSOLUBLE EN CONEJOS**

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## **Abstract**

The aim of this work was i) to study strategies to reduce of variability in the ileal digestibility determination by modifying the feeding regime (ad libitum vs. no access to feeder from 8:00 to 13:00 h) and slaughter time (20:00 vs. 08:30 h) using two diets differing in the soluble fibre level and ii) to study comparatively digestion in the duodenum, jejunum and ileum. A total of 240 rabbits weaned at 25 d of age were blocked by litter and randomly assigned to the 8 experimental treatments (2 type of feeding  $\times$  2 hours of slaughter  $\times$  2 dietary level of soluble fibre). Rabbits were slaughtered at 39 d of age and digesta of duodenum, jejunum and ileum sampled. The feed restriction from 8:00 to 13:00 h did not influence the growth traits from 25 to 38 d of age ( $P \geq 0.20$ ). The feed restriction did not affect the variability of feed intake in the different periods. The feed intake of restricted rabbits around 98% than those fed ad libitum. The increase of soluble fibre impaired the feed intake and growth rate from 25 to 38 d of age (both by 6%.  $P \leq 0.003$ ) with no effect on feed efficiency. The feed restriction during the morning did not affect the variability of the weight of the digestive organs obtained at different hours and did not influence the weight in grams of digestive tract, stomach, caecum and liver or caecal pH ( $P \geq 0.16$ ). However, the relative weight of the digestive organs respect to the live weight increased in the restricted group ( $P \leq 0.008$ . Table 4) and in the case of stomach this effect was only observed at 8:30 h ( $P = 0.039$ ) due to the different influence of restriction on live weight depending on the hour of slaughter ( $P = 0.074$ ). There was no effect of restriction in rabbits slaughtered at 20:00 h, but at 8:30 h those restricted showed a lower live weight than at 20:00 h. The hour of slaughter influenced the weight of the digestive organs as expected. Rabbits slaughtered at 20:00 h showed a higher weight of the digestive tract and the caecum (in grams and relative to live weight) than those

at 8:30 h ( $P < 0.001$ ). The restriction had no influence on the presence of soft faeces in the stomach or on the caecal pH. Soft faeces were present in the stomach in the morning and absent in the evening as expected ( $P < 0.001$ ), but rabbits fed low soluble fibre diet showed a lesser presence of soft faeces in the morning, especially when they were fed ad libitum ( $P = 0.050$ ). The increase of soluble fibre increased the relative weight of the digestive tract, stomach (also the weight in grams) and caecum ( $P \leq 0.003$ ).

The DM and CP digestibility done in the duodenal samples showed a much higher variability than that found in the jejunum or ileum that was considered in the statistical model. The digestibility of DM in the small intestine was higher in the morning ( $P < 0.001$ ), derived from the higher ytterbium concentration, and increased progressively from duodenum to the ileum as expected ( $P < 0.001$ ), but no effect of the type of restriction or any interaction was found. The small intestine digestibility of protein showed an interaction hour  $\times$  segment ( $P = 0.035$ ) due to the higher jejunal protein digestibility in the evening than in the morning due to the higher protein concentration in the digesta in the morning. Duodenal and ileal protein digestibility did not vary according to the hour. Protein digestibility in the small intestine was not influenced by the type or restriction or the diet. In conclusion, the restriction of the access to the feeder from 8:00 to 13:00 did not reduce the variability of the different traits related to ileal digestibility, and did not seem to synchronize the circadian rhythms of intake/excretion. It is confirmed that the best moment to determine the ileal digestibility using the slaughter procedure is in the evening as it is usually performed.

Keywords: ileal digestibility, methodology, rabbit