

NUTRITIVE VALUE OF DIETS CONTAINING ALFALFA HAY AND WHOLE CORN PLANT TO GROWING RABBITS

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ABSTRACT

The real actual utilization of a feed depends on its nutrient availability and the first step should be determine its nutritive value. The objective of this experiment was to evaluate the apparent digestibility of diets containing alfalfa hay and whole corn plant using growing rabbits. Eighteen New Zealand White rabbits were allocated in a completely randomized design with two treatments (diets containing alfalfa hay or whole corn plant) and nine replications. Alfalfa hay and the whole corn plant were grounded and, after 9% soybean oil addition, they were pelleted. The diets with alfalfa hay had CP 17.52%, CE 4,910 Mcal/kg, NDF 55.51% and ADF 46.07% and with whole corn plant had CP 6.96, CE 5,000 Mcal/kg, NDF 57.71% and ADF 34.34%. The experimental period lasted 19 days, 12 for adaptation to the diets and cages and seven to feces collect. There was no significant difference between the digestibility coefficients of both diets in dry matter, crude energy and ether extract. However, there was a significant difference ($P<0.01$) to crude protein, acid detergent fiber and neutral detergent fiber results. The best digestibility coefficient for crude protein (76.08%), acid detergent fiber (36.32%) and neutral detergent fiber (40.14%) was observed for the diet with alfalfa hay. These results suggest that the diet with alfalfa hay can be better used by growing rabbits than the one with whole corn plant.

Key words: alfalfa hay, digestibility, corn plant.

INTRODUCTION

The chemical composition is the starting point to determine the nutritive value of feedstuff but its real utilization depends on the nutrient availability to the animal that is a characteristic measured and expressed as a digestibility coefficient. The study of the alternative sources at the feeding of any specie has as the main objective reduces the feeding costs that, in the rabbit case, can reach 70% of the production costs.

Alfalfa (*Medicago sativa*) is used in the rabbit feeding for showing a good palatability and its hay be a fiber source (CHEEKE, 1987). However, GARCIA *et al.* (1999) commented the variations in its chemical composition, contamination and also price. Alfalfa contain, approximately, 50% of wall cell and its fiber composition is balanced, including 8% of pectins, 10% of hemicellulose, 25% of cellulose and 7% of lignin and because of it assure a rate of passage.

The quality of the grain and the fiber portion (stem, leaves, corn cob and straw), combined with the percentage of each one of these parts in the plant is which determining the nutritive value of the material (MAYOMBO *et al.*, 1997).

The objective of this experiment was to compare the nutritive value of diets containing alfalfa hay and corn plant, both pelleted, using growing rabbits.

MATERIAL AND METHODS

An experiment was carried out at the Experimental Rabbitary of the Faculdade de Ciências Agrárias e Veterinária – UNESP/Jaboticabal. Eighteen New Zealand White rabbits were used in an entirely randomized design with two treatments (diets containing alfalfa hay or corn plant, both pelleted) and nine replications. The animals were 50 days old, both sexes, and were individually housed in metabolism cages.

The diets with alfalfa hay and corn plant had their composition determined (Table 1) and, after that, they had their apparent digestibility coefficient calculated. Alfalfa hay was grounded and, after the 9% soybean oil addition, was pelleted. Corn plant was harvested at the farinaceous grain stage being pelleted after the 9% soybean oil addition.

Table 1. Composition (%) and crude energy (kcal/kg) of diets containing alfalfa hay and whole corn plant

Composition ¹	Diets	
	Alfalfa hay	whole corn plant
Dry matter	89.28	89.55
Crude protein	17.52	6.96
Crude energy	4,910	5,000
Neutral detergent fiber (NDF)	55.51	57.71
Acid detergent fiber (ADF)	46.07	34.34
Ether extract	8.18	6.70

1 – values based on the dry matter content.

2 – Analysis made at the Animal Nutrition Laboratory of the FCAV/UNESP.

The experimental period lasted 19 days, 12 for adaptation to the diets and cages and seven to feces collect. The amount of diet provided to each animal, daily corresponded to 80% of the determined daily feed intake, in the adaptation phase and was given to the animals once in a day, in the morning, and the water was provided *ad libitum*.

Feces collect was done daily for one week, always in the morning, and the collected material was weighed, identified and kept in a freezer at -10°C . At the end of the collect phase, the individual samples of each animal were homogenized making composed samples that were placed in a forced ventilation stove at 60°C for 48 hours and after that, they were grounded and conditioned in identified plastic recipients. Samples of the diets and feces were analyzed to determine the dry matter, crude protein, ashes, ether extract, neutral detergent fiber, acid detergent fiber and crude energy contents following the SILVA *et al.* (2002) methodology. After that the apparent digestibility coefficients were calculated.

Data were analyzed using the SAEG (Statistical and Genetics Analysis System) (1997) and the treatments means were compared by the Tukey test.

RESULTS AND DISCUSSION

Apparent digestibility coefficient of dry matter, crude protein, crude energy, neutral detergent fiber, acid detergent fiber and ether extract of diets containing alfalfa hay and whole corn plant are at the Table 2.

Table 2. Apparent digestibility coefficients (% DM)

Apparent digestibility coefficient	Diets	
	Alfalfa hay	Whole corn plant
Dry matter	56.90 ± 1.99	55.25 ± 1.97
Crude protein	$76.09 \pm 4.80^{\text{a}}$	$62.23 \pm 2.14^{\text{b}}$
Crude energy	59.17 ± 2.81	59.82 ± 1.61
Acid detergent fiber	$36.32 \pm 2.35^{\text{a}}$	$17.39 \pm 2.64^{\text{b}}$
Neutral detergent fiber	$40.15 \pm 4.12^{\text{a}}$	$32.77 \pm 2.43^{\text{b}}$
Ether extract	87.39 ± 1.90	88.87 ± 1.16

Means followed by different letters differ by Tukey test ($P < 0.01$).

Apparent digestibility coefficient of crude protein, neutral detergent fiber and acid detergent fiber of the diet containing alfalfa hay (DAH) were higher than of the one containing whole corn plant (DCP) and there was no differences between the coefficients of dry matter, crude energy and ether extract.

DAH had a higher digestibility coefficient due the fact of the alfalfa hay has a higher crude protein level than the DCP and, according to CAMERON *et al.* (1991), the crude protein digestibility increases with the crude protein content in a feed.

The apparent digestibility coefficient of the crude protein in DAH was similar to the ones obtained by PACI *et al.* (2000) and higher than the ones cited by GOMES & FERREIRA (1997) probably because these authors have worked with does, older than the rabbits used in this experiment. The apparent digestibility coefficient of the crude protein of the

DCP agreed with the ones of UKO *et al.* (1999) and DE BLAS *et al.* (1999) and was lower than those from SCAPINELLO *et al.* (1995).

The apparent digestibility coefficients of the neutral and acid detergent fiber were higher to the DAH than to DCP, probably because of the higher lignin content in the corn than in the alfalfa what can increase the passage time of the diet and also reduce the nutrient absorption in the gut. The apparent digestibility coefficients of the acid detergent fiber was higher than the ones mentioned by PACI *et al.* (2000) and of the neutral detergent fiber was higher than ones of GOMES & FERREIRA (1997) and lower than the ones from ARRUDA (2002) probably due the soybean oil supplementation because if a certain amount of undigested ration goes to the caecum it can have been enough to reduce the fermentative activity, possibly by the fibrous particles be involved by a oily layer, making difficult the adherence of microorganisms from the caecum and the digestion.

Similar results to the apparent digestibility coefficients of the dry matter, crude energy and ether extract of the DAH and DCP were related by SCAPINELLO *et al.* (1995), GOMES & FERREIRA (1997), UKO *et al.* (1999) and PACI *et al.* (2000).

CONCLUSIONS

It was concluded that the diet containing alfalfa hay has a higher level of digestible protein and digestible acid and neutral detergent fiber than the one with whole corn plant and can be used as a diet to growing rabbits better than the whole corn plant.

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