

DIGESTIBILITY OF DIETARY PEASHRUB NUTRIENTS

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ABSTRACT

Peashrub, the common name for all cultivates of *Caragana microphylla* Kom., belongs to a perennial deciduous shrub. It is drought/heat-resistant, wind/sand-hardiness and is psammophilous plant grown in fixed/ half-fixed sand. Peashrub is regarded as a fine tree variety to sand shifting control and water/soil conservation. It has been listed as one of the important tree varieties in current Conversion Project in northern China. On the purpose to study peashrub nutritional values, a feeding experiment focusing on the effects to rabbit production performance was conducted from April to June in 2002. For approaches to new feed resources and to make good utilization of peashrub, the present study was undergone to evaluate nutritional values in peashrub through the measurement of rabbits' digestibility of crude protein, crude fat and crude fiber in rabbits. In the present experiment, 18 Hybrid young rabbits, half to half of the male to the female, and the method of endogenous indicator, 4NHCL un-dissolved ash method, were applied. The results are the following: The rabbits had a digestibility for dietary crude protein as high as 70.60%-73.75% and even high for peashrub CP from 70.59% to 88.76%; While the digestibility decreased along with the rise of level of peashrub meal in diet. Though rabbit's digestibility for crude fiber is rather limited, it was relatively high for peashrub crude fiber; Rabbits had a good digestibility over 98% for dietary and peashrub crude fat. These results suggest that Rabbits are capable of making a good utilization of peashrub nutrients and Peashrub could be considered as one of the important feed resources for domestic rabbits.

Key words: domestic rabbits, peashrub, digestibility experiment.

INTRODUCTION

Peashrub, the common name for all cultivates of *Caragana microphylla* Kom., belongs to a perennial deciduous shrub. It is drought/heat-resistant, wind/sand-hardiness and is psammophilous plant grown in fixed/ half-fixed sand. Peashrub is regarded as fine tree variety to sand shifting control and water/soil conservation. It has been listed as

one of the important tree varieties in current Conversion Project in northern China. How to make a comprehensive utilization of peashrub is a key approach to achieve sustainable development for the forest bio-system and local economy. For the purpose of studying the nutritional values of peashrub a feeding experiment focusing on the effects to rabbit production performance was conducted from April to June in 2002. For approaches to new feed resources and in order to make good utilization of peashrub, the present study was undergone aiming to evaluate the nutritional values in peashrub through measurement of rabbits' digestibility of crude protein, crude fat and crude fiber.

MATERIAL AND METHODS

Animals

The experiment was carried in the Experimental Rabbit Farm of the Institute of Animal Husbandry and Veterinary Sciences, SAAS. In the farm there are 10 half-open rabbit houses and one rabbit house for measurement of growth and development.

For the adult rabbit group 18 rabbits at the age over 18 months were selected and divided into 3 groups. In each group there are 6 rabbits half male and half female. Those 4 groups randomized as the group of control with basic diet, and in groups of I and II for diet with 10% and 20% peashrub meal respectively.

For the young rabbit group, 18 rabbits at the age over 18 months were selected. Those 4 groups randomized as the group of control with basic diet, and divided into 3 groups. In each group there are 6 rabbits half male and half female in groups of I and II for diet with 10% and 20% peashrub meal respectively.

Diets

The composition of the basic diet was: corn 27.3%, wheat bran 21.3%, bean cake 16.3%, millet grass 33.4%, CaHPO_4 1.4%, salt 0.3% and some trace elements. Its nutrition values crude protein 16.20%, crude fiber 13.84%, crude fat 1.86%, N-free extract 47.8%, crude ash 7.55%, Ca 0.81 and P 0.15%.

Method of endogenous indicator (4N HCl un-dissolved ash method) was applied in the digestibility test. All the AI ash tests were conducted by the analysis laboratories of the Animal Husbandry and Veterinary Institute and the Comprehensive Utilization Institute.

To completely remove all undigested residues from rabbit stomach and intestine, 5 days pre-experiment period was designed. For each experiment group, a special diet was arranged and no manure was collected during the pre-experiment period.

Table 1. Design of the experiment

group	Control	Group I	Group II
Adult rabbit	Basic diet	90%basic diet plus 10% peashrub meal	80%basic diet plus 20% peashrub meal
Young rabbit	Basic diet	90%basic diet plus 10% peashrub meal	80%basic diet plus 20% peashrub meal

The experiment was designed to last for 8 days and during this period manure was collected everyday at regular time.

All rabbits were kept in hutches. In each cage, with an area of 0.25sq.m., one rabbit was kept in. Free choice feeding and drinking, but no fresh grass supply. To collect manure, an iron wire net is laid under rabbit cage. The collection was done at 10 o'clock in the morning. The collected manure was air-dried and rabbit fallen hair were removed from the fecal. At the end of the experiment samples from each group were sent to Lab.

Dietary and fecal nutrition values like crude protein, crude fiber, crude fat and AI ash for all groups were measured.

RESULTS AND DISCUSSION

Effect to digestibility of crude protein

It is demonstrated in Table 2 that in the young rabbit group the digestibility of crude protein varied with the increase of crude fiber in diet, but the variations were not so significant. It consists with the report by Liu Shimin and is caused by small size protein which stay long in blind gut and it is once again digested with soft fecal in excretion, which is habit of rabbits. It confirmed the fact that rabbits are capable of making good utilization of dietary protein. It shows that there was no significant difference between the digestibility for the protein in the same treatment diet for the young or the adult rabbits. It suggests that the digestion function for 3-month young rabbit is tending towards maturity, which agrees with the result reported by TANG LIANGMEI *et al.*, 1990.

Domestic rabbit showed a fairly high digestibility of 70.59%-88.76% for peashrub crude protein. Though the digestibility decreased slightly with the increase of peashrub level in diet, it is still higher than its digestibility of 66%, 64%, and 51% for protein of alfalfa, red clover and soybean stock. It shows that rabbit not only makes good utilization of crude fodder but, it makes even better utilization for peashrub crude protein.

Table 2. Digestibility of the diet and peashrub crude protein (%)

group	control	Group I	Group II	CF of peashrub (group I)	Cf of peashrub (group II)
Adult rabbit	70.60	72.45	70.67	88.20	70.59
Young rabbit	70.96	72.74	73.75	88.76	84.91

Effect to digestibility of crude fiber

Table 3. Digestibility of the diet and peashrub crude fiber (%)

group	Group I	Group II	CF of peashrub (group I)	Cf of peashrub (group II)
Adult rabbit	3.03	-	70.47	-
Young rabbit	4.99	6.98	84.56	57.26

Table 3 showed that rabbit's digestibility of 3.03%-6.98% for crude fiber of the experiment diet is rather low. It is in line with the limited digestibility for crude fiber in diet. But rabbit showed a relatively high digestibility for peashrub crude fiber and the digestibility decreased with the rise of peashrub level in diet.

Effect to the digestibility of crude fat

Table 4 shows a fairly high digestibility for crude fat in all groups. At the mean time the digestibility of peashrub crude fat are also very high and all of them are higher than 98.90%.

Table 4. Digestibility of the diet and peashrub crude fat (%)

Group	Control	Group I	Group II	CF of peashrub (group I)	CF of peashrub (group II)
Adult rabbit	99.86	99.85	99.93	99.76	-
Young rabbit	99.98	99.77	99.69	98.90	99.43

CONCLUSIONS

Domestic rabbits have a good digestibility as high as 70.6% -73.75% for dietary crude protein and as far as peashrub is concerned it ranges from 70.59% to 88.76%.

Rabbit's digestibility for crude fiber is rather limited. While for peashrub, it is as high as 57.26% to 84.56%.

Rabbit's digestibility for dietary crude fat is over 98%.

The results of the present experiment showed that the rabbits have good digestibility for peashrub crude protein, crude fiber and crude fat, so peashrub could be developed as one of the important feed resources for domestic rabbits.

Further approach is necessary to understand the mechanism of rabbit's high digestibility research for peashrub dietary crude fiber.

REFERENCES

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