DIGESTIBLE ENERGY AND CRUDE PROTEIN LEVEL FOR GROWING REX RABBITS

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ABSTRACT

In recent years a lot of work have been focused on nutrition requirement for meat-purpose and Angora rabbits and remarkable achievement has been got. In recent year some feeding standards for meat rabbit have been presented and played important role in meat and Angora rabbit production. However, systematic approaches to nutrition requirement for fur purpose rabbit is rather limited. At this situation though standards for meat and Angora rabbit are taken as reference in fur-purpose rabbit production, it is far to meet the quality and efficiency goals. In present experiment**,** 72 Rex rabbits at the age of 100 day were applied to study energy and crude protein requirements for growth. Four groups were designed as: Group 1 high-energy high-protein diet (DE 11.17MJ/Kg, CP 18.44%); Group 2 high-energy medium-protein diet (DE 10.98MJ/Kg, CP 16.29%); Group 3 low-energy high-protein diet (DE 10.53MJ/Kg, CP 19.29%); and Group 4 low-energy medium-protein diet (DE 10.26MJ/Kg, CP 16.05%). The results of growth and coat hair quality measurements at 47 days suggested that: 1) When diet with digestible energy of around 11MJ/Kg was used, it was good to improve growth rate and feed efficiency, and yield of carcass. In the range, the diet with DE 11.17 MJ/Kg and CP 19.29% got the best growth rate and feed efficiency. 2) When the diet with digestible energy of around 10.4MJ/Kg and crude protein between 16.05% -19.29% was applied, it was good to coat hair quality. Therefore, on purpose to get fine quality fur from Rex rabbit, it better to use feed with 10.4MJ DE/Kg.

Key words: Rex rabbit, digestive energy, crude protein.

INTRODUCTION

Feed nutrition is of the first important material basis for domestic rabbit farming. In recent years a lot of works have been focused on nutrition requirement for meat-purpose and Angora rabbits and remarkable achievement has been got. Rougeot (France, 1994),

Klaus (Germany, 1995) and Shiming Liu (China 1994) have given feeding standards for Angora rabbit (REN K.L *et al* 2002). Those standards have played important role in meat and Angora rabbit production. However, systematic approaches to nutrition requirement for fur purpose are rather limited. At this situation though standards for meat and angular rabbit are taken as reference in fur-purpose rabbit production, it is far to meet the quality and efficiency goals.

MATERIALS AND METHODS

Animals

Present study was conducted at the Experimental Rabbit Farm of the Institute of Animal Husbandry and Veterinary Science, Shanxi Academy of Agricultural Sciences. 72 young Rex rabbits of good body condition, healthy, and at the similar age about 100 days were used in the trial.

Diets

Main ingredients of feed were corn, wheat bar, bean meal, alfalfa meal, peanut shell meal and calcium monophosphate, salt and trace elements. The chemical composition for all feed stuff material were tested and 4 groups were divided according to levels of energy and protein as high-energy high-protein, high-energy medium-protein, low-energy high-protein and low-energy medium-protein. The chemical composition of these diets is shown in Table 1.

Table 1. Chemical composition of experimental diets.

Nutrient	group 1	group 2	group 3	group 4
Estimated Digestive Energy (MJ/Kg)	11.17	10.98	10.53	10.26
Crude protein (%)	18.44	16.29	19.29	16.05
Crude fiber (%)	14.00	15.45	16.00	18.26
Crude ash (%)	6.02	5.80	6.90	6.79
Calcium (%)	1.31	1.31	1.35	1.35
Phosphorous (%)	1.16	1.12	1.23	1.20

Experimental procedure.

The animals were randomly divided into 4 groups. From the beginning to the end of the experiment (47 days) the same diet was supplied without any changes.

Measuring items were the following: initial and final weights, daily intake, body weights in every week during the experiment, and hair coat grade at the end of the experiment. Besides, in slaughtering test, body weight before slaughtering, carcass weight and dressing parameters were controlled. For all rabbits in each experimental group ear tattoo was made and the condition was kept at the same level. The experiment rabbit were kept individually in separate cages with a space of 0.42m^3, and regulate time interval and feed supply about 170g without fresh forage and *ad libitum* watering.

All the results were tested with analysis of variance and multiple comparisons.

RESULTS AND DISCUSSION

Effect of energy and protein level on growth rate and feed conversion rate

The results in Table 2 seem to show that daily gain for the high-energy groups were higher than those low energy groups. The results of that analysis of variance and multiple comparison showed that the daily gain of the group 1 was 17.3% ($P<0.05$) and 35.6% ($P<0.01$) higher that those of the group 3 and 4 respectively. At the same level of energy, the daily gains for both high protein groups were higher than those of the low protein groups, but the differences were not significant. Feed conversion efficiency for high energy groups were lower than those of the low energy groups. The feed conversion efficiencies for group 1 and 2 were 31.5% ($P<0.01$) and 20.6% ($P<0.05$) lower than that of group 4. The difference between the rest groups was not significant.

Table 2. Effect of energy and protein level on growth rate and feed conversion efficiency (mean±s.e.).

Group	n	Initial weight (g)	Final weight (g)	Mean daily intake (g)	Mean daily gain (g)	Feed efficiency
1	18	2321±124	2860±144	132.0±6.6	12.2±2.8	11.3±2.3
2	17	2318±125	2844±213	133.3±6.5	11.1±2.7	13.1±5.0
3	17	2334±115	2821±186	134.4±3.5	10.4±2.4	13.6±3.3
4	18	2321±125	2746±190	134.0±4.9	9.0±2.9	16.5±6.0

Effect of energy and protein level on slaughtering performance

Table 3 shows that the slaughtering percentage all groups was similar. For example, the half-chest-clean slaughtering percentage of group 1 was only 2.1% and 3.0% higher than

group 3 and 4; and whole-chest-clean slaughtering percentage was only 2.2%and 3.4% higher than group 3 and 4. It suggests that levels of energy or crude protein had no significant effect to slaughtering percentage.

Table 3. Slaughtering performance.

Group	n	Weight at Slaughtering (g)	Dressed Weight (g) Half-chest-clean	Dressed Weight (g) Whole-chest-clean	Dressing percentage Half-chest-clean	Dressing percentage Whole-chest-clean
1	13	2907±146	1715±82^{b}	1602 ±76^{b}	59.0±1.8	55.1± 1.9
2	12	2863±157	1671±118^{ab}	1556±117^{ab}	58.3 1.5	54.3± 1.7
3	10	2820±194	1630±105^{ab}	1520±100^{ab}	57.8 ±1.8	53.9± 1.7
4	15	2745±192	1570±107^{a}	1462±111^{a}	57.3 ±2.7	53.3± 2.9

Means in the same column with different superscript differ significantly.($p<0.05$)

Effects of energy and crude protein on the quality of hair coat.

Table 4 showed that at the end of the experiment the coat hair quality of low energy groups were better than those of high energy groups. Group 3 and group 4 had fine quality coat and coats of grade I, II and III accounted for 17.6%, 22.2%, 76.5%, and 66. 7%,5.9%, 11.1%. The results suggest that in the diet for young Rex rabbit when the energy level reaches 10.4MJ/Kg, it could meet the requirements to get a qualified coat.

Table 4. Effects of energy and crude protein on the quality of hair coat .

Group	n	Grade I	Grade II	Grade III
1	18	2 (11.1%)	14 (77. 8%)	2 (11.1%)
2	17	2 (11.8%)	12 (70.6%)	3 (17.6%)
3	17	3 (17.6%)	13 (76.5%)	1 (5.9%)
4	18	4 (22.2%)	12 (66.7%)	2 (11.1%)

CONCLUSIONS

The results in present experiment showed that when Rex rabbit received a diet with around11MJ DE/Kg it was adequate to improve growth rate and feed conversion efficiency, and slaughtering percentage as well. And in this case the best result was for the diet with 11.17MJ/Kg and crude protein 19.29%.

The results in present experiment showed that diets with around 10.4MJ DE/Kg are

adequate to improve Rex rabbit coat quality.

REFERENCES

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