EFFECTS OF PROBIOTICS AND NANOMETER IMPLEMENT ON GROWTH PERFORMANCE OF REX RABBIT

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ABSTRACT

To study the effects of Probiotics and Nanometer Implement on performance of Rex Rabbit, eighty 30-day old rabbits were selected and randomly divided into 4 groups: control group (group C), Nanometer Implement processing water group (group N), Probiotics processing water group (group P) and Probiotics and Nanometer Implement processing water group (group PN). The average daily weight gain of groups P, N and PN were respectively higher 15% ($P<0.05$), 6% ($P<0.05$) and 23.9% ($P<0.05$) than the group C. The feed conversion ratio of groups P, N and PN were respectively lower 12.7% ($P<0.05$), 12.7% ($P<0.05$) and 18.1% ($P<0.05$) than that of group C. At 1 month of age, digestibility of crude protein, ether extract and crude fibre were higher in group PN, respectively 9% ($P<0.05$), 5.8% ($P<0.05$) and 25.3% ($P<0.05$) than that of group C. While at 3 months of age no differences were found between groups on digestibility of crude protein, ether extract and crude fibre. This study shows both probiotics and Nanometer Implement improved the average daily gain and remarkably enhance the digestibility. The use of both Probiotics and Nanometer Implement together can have better effect.

Key words: Probiotics, Nanometer Implement, Daily weight gain, Feed conversion ratio, Digestibility

INTRODUCTION

Probiotics can improve the condition of the intestines and enhances the average daily weight gain and digestibility. Nanometer Implement is a kind of facility which can activate water made by a high-technical company in Nan Chang. The animal which drinks the water processed by the Nanometer Implement can get the effect of activating the histiocytes, improving the activation of the enzymatic, accelerating the metabolism and improving the immunity.

MATERIALS AND METHODS

Experiment Design and Diets

Eighty 30-day old Rex Rabbits were selected and allotted into four groups at random with twenty ones of each. Four types of drinking waters were treated with Probiotics (2×10^6/l *Bacillus subtilis*, Group P), Nanometer Implement (Group N), Probiotics and Nanometer Implement (Group PN) and control group (Group C), respectively. The composition of basic pelleted diet was as shows in Table 1.

Testing targets and Methods

The experimental rabbits were weighed every two weeks and the feed intake noted daily. Respectively in the beginning and mid phase of the experiment, three rabbits were selected randomly from every group and allocated in digestive cages. All feces were collected for three days. 10% Hydrochloric acid was added to the feces according to the 5% of the weight of feces. The feces were placed in the oven

at 65ºC, and its dry matter (DM), crude protein (CP), ether extract (EE), crude fibre (CF), Ca and P content was tested.

Table 1: Ingredients and chemical composition of the diet

Ingredients	(%)	Chemical composition	(% DM)
Corn	23	DE (MJ/kg)	9.72
Soybean Meal	14.5	Crude protein	18.1
Wheatbraan	11.7	Crude fibre	13.2
Milletbran	8.7	Ca	0.9
Dehydrated Lucerne	40	Available P	0.62
Premix	0.25	Lys	0.85
Anti-coccidiosis addtive	0.25	Met+Cys	0.6
Enzyme	0.2	NaCl	0.5
Met	0.1		
CaHPO4	0.8		
NaCl	0.5		

Statistical analysis

Statistical analyses were conducted using SPSS 12.0 software. Body weights, average daily gain, feed conversion and digestibility were analyzed by an analysis of variance using the UNIANOVA procedure and adjusting for treatment (a, b or c). The amounts of results were showed as mean±SD. Differences among means were tested with a Duncan test. Out of range values (0.5% right or left of the normal curve) were eliminated from the analysis.

RESULTS

The effects of Probiotics and Nanometer Implement on performance of the Rex rabbit

From the Table 2 we can see that compare with Group C, the final body weight of the Groups P, N, and PN were respectively increased 12.5% (P<0.05), 13.3% (P<0.05) and 19.8% (P<0.05). The average daily gain of Groups P, N, and PN were respectively higher 15% (P<0.05), 16% (P<0.05) and 23.9% (P<0.05) than that of Group C. No significant differences of the feed intake were observed among groups. The feed conversion ratio of Groups P, N and PN were respectively lower 12.7% (P<0.05), 12.7% (P<0.05) and 18.1% (P<0.05) than Group C.

Table 2: The effects of Probiotics and Nanometer Implement on performance of the Rex rabbit

	Group C	Group P	Group N	Group PN
Initial body weight(g)	506±20	507±18	514±15	510±21
Final body weight(g)	2662±48	2994±45	3015±52	3188±56
Average daily gain(g/d)	18.0 ± 0.4^{a}	20.7 ± 0.4^{b}	20.8 ± 0.3^{b}	22.3 ± 0.4^{c}
Feed intake(g/d)	117.8 ± 20.2^{a}	118.2 ± 18.4^{a}	118.7 ± 15.6^{a}	119.5 ± 14.4^{a}
Feed conversion ratio	6.54^{a}	5.71^{b}	5.71^{b}	5.36^{c}

$^{a\,b\,c}$Means in the same row with different superscripts differ significantly(P<0.05)

The effects of Probiotics and Nanometer Implement on digestibility of the rex rabbit

Table 3 show that at 1-month old, the digestibility of CP, EE and CF respectively in Group P was higher 6.9% (P<0.05), 4.9% (P<0.05) and 9.6% (P<0.05) than that of Group C; Digestibility of Group N was higher 8.4% (P<0.05), 5.3% (P<0.05) and 20.7% (P<0.05) than that of Group C, and no significant differences of digestibility of CP or EE were observed between Groups P, N and PN. But digestibility of CF of Group PN was significantly higher (P<0.05) than that of Group P. We can see that digestibility coefficients in Group PN were higher 9% (P<0.05), 5.8% (P<0.05) and 25.3% (P<0.05) for CP, EE and CF, respectively, than that of Group C. Clearly, group PN had the best results. At 3-months old, there were no significantly differences in the digestibility of CP, EE and CF among all groups, but the digestibility was enhanced gradually and, compared with control group, digestion of CP, EE and CF of group P, N and PN was respectively higher 3.2%, 3.3% and 5.8%.

Table 3: The effects of Probiotics and Nanometer Implement on digestibility of rex rabbit

Age	Groups	CP	EE	CF
1-month old	Group C	70.48±1.21 [a]	69.86±2.43 [a]	24.48±2.33 [a]
	Group P	75.34±0.93 [b]	73.28±2.05 [b]	27.83±1.87 [a]
	Group N	75.97 ±0.84 [b]	73.59±1.46 [b]	29.55±1.62 [b]
	Group PN	77.16±1.05 [b]	73.94±1.27 [b]	30.68±1.74 [b]
3-month old	Group C	78.26±1.37 [a]	71.54±2.11 [a]	30.98±2.06 [a]
	Group P	79.83±1.65 [a]	71.62±1.87 [a]	31.25±1.67 [a]
	Group N	80.47±0.89 [a]	73.76±1.41 [a]	31.34±2.43 [a]
	Group PN	80.76±1.23 [a]	73.89±0.98 [a]	32.79±1.58 [a]

[a b]Means in the same row for the same age' with different superscripts differ significantly (P<0.05)

DISCUSSION

Growth Performance

This study showed that compared with group C, average daily weight gain of group N increased 16.0% and feed conversion ratio decreased 12.7%. This result was in concurrence with those of Pan Kang-Cheng (2006) and Li Chun-Li (2005).

Many people reported that Nanometer Implement could increase the performance of the animals. Nie Dao-Gui (2002) reported that, after water and feedstuff were treated with Nanometer Implement, average daily weight gain of the trial group chicken increased 27.88%, feed conversion ratio decreased 17.88%; and in the study of Li Wan-Ji (2003), average daily gain of the trial group of swine increased 28.69%, feed conversion ratio decreased 11.24%. In this study, compare with group C, average daily gain of the group P increased 15% and feed conversion ratio decreased 12.7%.

The results showed that Probiotics and Nanometer Implement could improve the performance of the rex rabbits. We also found that both Probiotics and Nanometer Implement use together can have better effect.

Digestibility

In this study, the digestibility of group N was higher than that of group C. In particular, 1-month old rabbits got better results than that of 3-month old rabbit, because digestive canal of 1-month old rabbits is still not fully developed enzymes is scarce (Han, 1999; Li Chang-Zhong, 2003; Yu Xi-Hua, 2004). Especially, weanling could depress the activity of Pancreatic Lipase, trypsinase, amylopsin and chymotrypsin and at the same time the activity of lactase, sucrase and maltase is also depressed (Zhang Xin-Ru, 2005; Zhang Hong-Fu, 2002). Probiotics can improve the condition of digestive canal that is short of digestive enzymes. In this study, at 1-month old rabbit the digestibility of CP, EE and CF was respectively higher 8.4%, 5.3% and 20.7% than that of GroupC. At 3-month old rabbit the digestibility of CP, EE and CF was similar for all groups and only increased respectively 2.8%, 3.1% and 1.2% in groups with additives in relation to control group. The result of this study is consistent with the report above.

Nanometer Implement can make the big groups of water into small groups of water. The small groups of water move faster than the big one and they have more chance to collide with each other. Consequently it can active the cell of organization and boost up activity of enzymes. So it can help animal digestibility (Nie Daogui and Huang Limu, 2002; Li Wanji and Huang Xinheng, 2004). The result of this study is consistent with earlier reports. The same is with the probiotics-the 1-month old rabbits had the better result than that of 3-month old rabbits and group PN showed the best results.

CONCLUSIONS

To sum up all the data, we can see that both Probiotics and Nanometer Implement improved the average daily weight gain and digestibility of Rex Rabbits. The effect of Probiotics was better than that of Nanometer Implement for 1-month old Rex Rabbit. The effect of Probiotics and Nanometer Implement on 1-month old Rex Rabbit is better than that on 3-month old Rex Rabbit. This study suggested that both Probiotics and Nanometer Implement use together could do have better effect but whether it has a joint effect or not need further studying.

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