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Research Article

EFFECT OF PROBIOTIC SUPPLEMENTATION ON ECONOMICS OF FEEDING IN BROILER RABBITS

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Abstract- The present study was conducted in broiler rabbits to evaluate the effects of dietary supplementation of probiotic on an economics of feeding. Three dietary treatments were randomly and equally allotted to 30 rabbits at the age of 28 days. Thus, each treatment consisted of 10 rabbits. The three dietary treatments were: T1 as a control (Basal diet), T2 (Basal diet+ 0.5 g probiotic) and T3 (Basal diet +1 g probiotic). The total experimental period lasted for 8 weeks. Observations were recorded for the economics of feeding in broiler rabbits. Results showed that the return over feed cost (Rs.) at the 12th week was the highest in T2 (116.1) with mean body weight of 2.086 kg followed by T3 (105.42) with mean body weight 2.067 kg compared to control group T1 (107.11) with mean body weight of 1.964 kg. The return over feed cost (%) at the 12th week was the highest in T2 (53.35) followed by T1 (51.72) and T3 (46.79). Average weekly cost (Rs.) of feeding/ kg weight gain was the lowest in T2 (132.01) followed by T3 (135.81) and T1 (142.90).

Keywords- Probiotic, Economics of feeding, Broiler rabbits, Return over feed cost.

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Introduction

The rabbit farming is an important emerging enterprise in many countries of the world including India. Rabbit farming has great potential in the economy of high hilly areas [1]. Small body size, genetic diversity, short generation interval, rapid growth rate and high productive potential are characteristics, which provide suitability to rabbit as meat producing small livestock in developing countries of the world [2].

Weaning is a complex step which involving dietary, environmental, social and psychological stresses, which interfere deeply with feed consumption, gastrointestinal tract development and adaptation to the weaning diet [3]. Raising rabbits in an intensive system can cause many physiological and environmental stresses, especially during weaning period. Because of the common intention to limit antibiotics in animal feed as growth promoters concerning side-effects, resistance and public perception about healthy food, new alternatives to antibiotics are needed [4].

For the replacement of the antibiotics, new ways are used for prevention and control of these infections, which can modulate the gut microflora. These non-antibiotic compounds with bacteriostatic or bactericidal activity are probiotics, bacteriocins and organic acids [5]. There are some studies dealing with the use and beneficial effects of probiotics, prebiotics and fatty acids in rabbits, but many of them show preliminary results and do not focus on the specific parameter and/or diseases; others show zero or even negative effects [6,7].

Definitions of the Probiotics are "live microbial feed supplements which beneficially affect the host animal by bringing improvement in intestinal microbial balance" [8]. The microorganisms which are most commonly used as probiotics are the lactic acid bacteria–*lactobacilli*, *enterococci*, *bifidobacteria* and yeasts [9,10].

Probiotic creates beneficial conditions for nutrient utilization. The influence of probiotic on better intestinal digestion and more efficient energy utilization in rabbits has been documented [11-13]. Probiotic enhances gut colonization and stabilize eubiosis by competitive growth against harmful micro-organisms, reducing the intestinal pH with the production of lactic acid and improving digestion by producing enzymes and vitamins. These functions give strength the animal's own non-specific immune defence [14].

Several studies have been conducted on the use of probiotics on various livestock species in the past two decades by many workers in India and abroad. Till now, most of the work has been done on ruminants and poultry, the literature on the rabbits are scanty.

The objective of this study was to determine the effect of supplementation of probiotic on economics of feeding in broiler rabbits.

Materials and Methods

This study was carried out at rabbit unit, Instructional Livestock Farm Complex, Department of Livestock Production and Management, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, which is located at semi arid region of the Banaskantha District of North Gujarat having latitude of 24.35^0 North and longitude of 72.59^0 East.

Experimental rabbits

This study was undertaken on 30 weaned rabbits, which were obtained through mating between 5 Soviet chinchilla and 3 white giant does and 3 Soviet chinchilla and 1 white giant buck at Rabbit unit, Instructional Livestock Farm Complex, Department of Livestock Production and Management, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. Natural mating was carried out. Transferring each doe to the buck's cage to be mated and return back to its cage after mating.

Experimental design

At the age of 4th weeks weaning of kits was done and identification numbers were applied on ear of rabbits. Kits were distributed randomly into 3 treatment groups as per the technical plan of investigation. Each group contained 10 rabbits. Experiment started at weaning (4th week) and finished at 12th week of age.

Housing management

The rabbits were housed in cages provided with feeders and waterers, in a well ventilated room and were kept under the same managerial, hygienic and environmental conditions. A period of 12 hours of day light was provided. Feed and water were available all time *adlibitum* during the experimental period. In one cage, maximum 4 experimental rabbits were kept. All possible measures were strictly followed to maintain standard and uniform management conditions to all the experimental rabbits throughout the period (i.e., up to 12th week of age). The rabbits were protected against various diseases by taking strict sanitary measures and routine cleaning and washing of feeding and watering utensils. Manure was dropped from the cages on the floor and were collected and removed daily. The room temperature was maintained almost in the range of 18-25°C throughout the experimental period by providing air conditioner.

Experimental diet

After weaning rabbits were supplied concentrate, vegetable and fodder. Feeding trial was continued upto 12th week. Concentrate ration was mixed with probiotic which was purchased from the market. Treatment groups were supplemented with probiotic in two doses i.e. T_2@ 0.5 g/kg of concentrate and T_3@ 1 g/kg of concentrate. Rabbits received a diet without probiotic in the Control group T_1.

Composition of probiotic

Each gram contains

Saccharomyces cerevisiae: 1.5 x 10^8 CFU

Lactobacillus sporogenes: 5 x 10^7 CFU

Vegetable and fodder was offered without the addition of probiotic to rabbits. Provision of fresh, clean and wholesome water to rabbits was made available throughout the day. All the measures were taken to minimize wastage of feed.

Economics of feeding analysis

These experimental broiler rabbits were sold in the market as per Rs. 160 per kg live weight. The rabbits were fed concentrate, vegetable, fodder and probiotic as per the standard practices followed in the Small Animal Laboratory, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar. The cost of concentrate (Rs. 46/kg), vegetable (Rs. 21/kg) and probiotic (Rs. 0.40/g) were taken into consideration while calculating the economics. Fodder fed was grown at the Instructional Livestock Farm Complex, but for economics, the cost considered was (Rs. 1/kg).

Results and Discussion

Economics of feeding

Cost of feeding/rabbit (Rs)

The result shows that the weekly cost of feeding/rabbit in T_1 was in the range of Rs. 16.77 to 34.56, in T_2 17.41 to 34.94 and for T_3 17.62 to 35.10 during the 5-12 weeks of experimental period [Table-1]. Total weekly cost (Rs.) of feeding was the lowest in T_1 (207.09) followed by T_2 (211.11) and T_3 (212.32). Slightly higher cost in T_2 and T_3 is due to the additional cost of probiotic whereas T_1 was not supplemented with probiotics.

Table-1 *Total weekly cost (Rs.) of feeding/rabbit during the experiment*

Week	Cost (Rs.) of feeding		
	T_1 (n=10)	T_2 (n=10)	T_3 (n=10)
5	16.77	17.41	17.62
6	17.20	17.27	17.48
7	20.32	21.58	21.67
8	26.15	26.59	26.71
9	27.92	28.35	28.48
10	31.24	31.66	31.79
11	32.93	33.31	33.47
12	34.56	34.94	35.10
Total	207.09	211.11	212.32

Return over feed cost

Result reveals that the return over feed cost at the 12th week was the highest in T_2 (Rs. 116.1) with mean body weight of 2.086 kg compared to T_3 (105.42) with mean body weight 2.067 kg compared to control group T_1 (107.11) with mean body weight of 1.964 kg. The return over feed cost (%) at the 12th week was the highest in T_2 (53.35) followed by T_1 (51.72) and T_3 (46.79) [Table-2]. This clearly indicates that probiotic supplementation @ of 0.5 g/kg of concentrate is profitable.

Table-2 *Return over feed cost in terms of (Rs./rabbit) at 12th week under different treatments*

Treatment	Mean body weight (kg)	Price/kg live weight (Rs. 160/kg)	Cost of feed/animal (Rs.)	Cost of probiotic (Rs.)	Total cost (Rs.)	Return over feed cost (Rs.)	Return over feed cost (%)
T_1	1.964	314.2	207.09	Nil	207.09	107.11	51.72
T_2	2.086	333.7	210.39	7.2	217.60	116.10	53.35
T_3	2.067	330.7	210.88	14.4	225.28	105.42	46.79

Cost of feeding per kg weight gain (Rs.)

The feed cost per unit live weight gain is mostly dependent on the cost of feed and efficiency of feed utilization.

Result shows that average weekly cost (Rs.) of feeding/ kg weight gain was the lowest in T_2 (132.01) followed by T_3 (135.81) and T_1 (142.90). Thus better economic efficiency is observed in probiotic supplemented group T_2 and T_3 compare to control group T_1.

The result of the present study concurred with the findings of Ayyat *et al.* (1996), Shanmuganathan *et al.* (2003), Onu and Oboke (2010), Shehata *et al.* (2010), Adeniji and Zubairu (2013), Shehu *et al.* (2014), Abd El-Aziz *et al.* (2014), Adeniji and Adewole (2015) and Ezema and Eze (2015) [15-23] who reported that probiotic supplementation reduced the feed cost per kg live weight. However Adeniji *et al.* (2014) [24] observed no positive effect of probiotic supplementation.

Lower value of feed cost/kg gain may be due to the lower value of feed conversion ratio and the higher average body weight gain.

Table-3 *Average weekly cost (Rs.) of feeding/kg weight gain during the experiment*

Week	Cost (Rs.) of feeding		
	T_1 (n=10)	T_2 (n=10)	T_3 (n=10)
5	82.75	70.09	75.23
6	87.27	88.22	90.41
7	87.58	96.95	98.63
8	144.77	131.30	112.77
9	134.05	157.52	173.78
10	241.46	145.69	181.25
11	172.05	174.87	160.93
12	193.27	191.43	193.47
Average	142.90	132.01	135.81

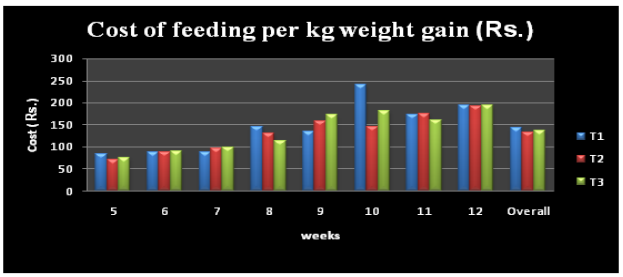

Fig-1 Mean cost of feeding per kg weight gain (Rs.) under different treatments

Conclusions

From the above findings of the research work, by considering the overall performance of experimental rabbits, the following conclusions were drawn:

The weekly cost of feeding was higher in the probiotic-supplemented group compared to control group, but it is merely due to the additional cost of probiotic supplementation.

Higher return cost in T_2 group indicated that using lower doses of probiotic can also improve economy in terms of better returns.

The cost per kg weight gain was better in rabbits fed with probiotic than the control group. The return over feed cost of the 12th week was the highest in the probiotic supplemented group (T_2 and T_3).

Overall, it was concluded that feeding a probiotic was beneficial for developing Indian rabbit farming.

Conflict of Interest: None declared

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