ECONOMIC IMPORTANCE OF PROBIOTIC IN BROILER RATIONS; A CASE STUDY OF DISTRICT MANSEHRA, NWFP, 2006

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ABSTRACT

The present experiment was carried out to investigate the economic importance of using *Organic Green Culture* (OGC) probiotic, imported from Korea, available in the local market, in the rations of commercial broiler chicks. For such purpose, four hundred and forty eight day-old broiler chicks were randomly divided into 4 main groups viz. A, B, C and D. Each main group had 4 sub groups containing 28 chicks each. Four experimental rations, I (control), II, III and IV containing probiotic at 0, 1, 2 and 4 g/kg starter or finisher were randomly allotted to these groups. The experiment lasted for 42 days. The mean values for net return per chick (NRPC) were Rs. 20.89, 23.19, 37.23 and 34.44 for the chicks in groups A, B, C and D, respectively. There was significant ($P<0.001$) difference among the chicks in groups A, B, and C and D for the NRPC values. The chicks in groups C and D resulted significantly ($P<0.001$) higher values for NRPC than the chicks in groups A and B. It was concluded that Probiotic addition at 2 g/kg rations have the potential to increase successfully the net return. Therefore, under the conditions of present study, it is recommended that using OGC probiotic in the starter as well as in the finisher rations of commercial broilers @ 2 g/kg could be proved highly economical for the local broiler producers of Hazara division of North West Frontier Province.

INTRODUCTION

Poultry farming is a sub-sector of livestock which has been developed from backyard chicks, raising to commercial farming during the past four decades. Among all other agricultural industries, it is now considered as one of the most progressive and innovative business. In Pakistan, for meat and egg production on commercial scale, poultry raising was initiated in 1963.

Further progress was made, when a Canadian firm, "Shaver" extended its collaboration with Pakistan International Air-lines, to establish a modern hatchery at Karachi in 1965. Since then, a rapid and a continuing boosting-up expansion is in progress in this field. This in turn, brought a great revolution through increasing broiler and layer farming, hatcheries establishing and feed milling especially in the private sector. In Pakistan, poultry produces 0.428 million tones of meat and 6.077 million eggs, this contributes a sum of Rs.50.490 million to the national economy, annually (Economic Survey of Pakistan, 2006).

Feed is the major component, affecting net return from the poultry business, because 60 to 75% of the total cost of production is spent on feed purchase (Asghar *et al.*, 1999; Farooq *et al.*, 2001). To obtain more net return and to minimize high expenses on feed, are the main challenges, for the present progressive poultry farmers. For this purpose, during the last decade, many research strategies have been practiced, such as introducing feed supplements and feed additives etc (Pervaz, 1992; Farina, 1992).

Choudhury (1998) who obtained higher profit for the chicks fed the rations containing antibiotics as compared to control or probiotic.

Baidya *et al.* (1994) who reported that from the cost-benefit analysis, income per bird was the highest in groups fed antibiotics or probiotics at weekly intervals as compared to control.

The *Organic Green Culture* (OGC) probiotic, which is locally available in Pakistan and imported from Korean company (*Hanpoong industry*), contains micro-organisms like *Saccharomyces cerevisiae, Lactobacillous acidophillous, Bacillous subtilis and Aspergillous oryzae*. These micro-organisms check the growth of pathogenic bacteria in the gastro intestinal tract and enhance the growth of commensal bacteria. As a result both production and reproduction potentials of the birds are increased. Probiotics have also been reported to have the stimulating effect, due to a reduced burden of pathogens, on the immune system. It is therefore, the present study was designed to evaluate the economic importance of various levels of OGC probiotic, when fed to the commercial broilers during starter as well as during finisher phases, in terms of calculating mean net return per chick per group.

MATERIALS AND METHODS

The present experiment was carried out at Broiler Farm Baffa, District Mansehra of NWF Province, to evaluate the economic importance of using *Organic Green Culture* (OGC) probiotic, imported from Korea, available in the local market, in the rations of commercial *Hubbard* broiler chicks. For such purpose, four hundred and forty eight day-old broiler

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chicks were randomly divided into 4 main groups viz. A, B, C and D. Each main group had 4 sub groups containing 28 chicks each (Table 1). Four experimental rations, I (control), II, III and IV containing probiotic at 0, 1, 2 and 4 g/kg starter or finisher were randomly allotted to these groups (Tables 2-5). The experiment lasted for 42 days. The data were recorded for dry matter intake and gain in body weight during starter as well as during finisher phases for calculating the economics of the experimental rations.

The mean values for net return per chick (NRPC) per group were calculated as:

NRPC = O - I
Where,
O = cost of output = Mean gain in body weight (g)/chick/group x cost (Rs)/kg live weight
I = cost of input = Mean feed consumed (g)/chick/group x cost (Rs)/kg ration

The data for the above parameters were statistically analyzed using the standard procedures of analysis of variance using Completely Randomized Design, as described by Steel and Torrie (1981). The mean values were compared for significance of difference with the LSD procedure (Steel and Torrie, 1981). The statistical package (SAS, 2007) was used to perform the above analysis on computer.

Statistical Modal $Yij = \mu + Tj + \sum ij$
Yij = ith observation of jth treatment.
Tj = Effects due to treatment.
$\sum ij$ = Experimental or random error.
μ = Over all mean (mean effect).

RESULTS AND DISCUSSION

The main objective of the present study was to determine the feasibility of the probiotic in the broiler rations in term of economics. For such purpose the treatments and the replicates were distributed according to the criteria given in Table 1. The Tables 2 and 3 are mentioning the nutrients composition (NC), the proportions of various levels of probiotic and the proportions of basal feed ingredients (BFI) used in the starter rations. Same as the Tables 4 and 5 are showing the NC, the share of various levels of probiotic and the different quantities of BFI used in the finisher diets.

The mean values for gain in body weight of chicks in groups A, B, C and D were 1287.5, 1302.5, 1427.5 and 1431.3 grams, respectively. The chicks in groups C and D were significantly ($P<0.001$) higher in gain in body weight than groups A and B. The mean feed consumption values were 2345.0, 2298.5, 2203.8 and 2206.8 grams for the chicks in groups A, B, C and D, respectively. The chicks in groups C and D showed significantly ($P<0.001$) less feed consumption as compared to the chicks in groups A and B. The mean cost of feed consumption per chick was Rs. 37.23, 37.52, 37.51 and 38.86 for groups A, B, C and D, respectively. Significant ($P<0.001$) difference was obtained for cost of feed consumption per chick among the groups A, B, C and D. The mean net return per chick was Rs. 20.89, 23.19, 37.23 and 34.44 for groups A, B, C and D, respectively. There was highly significant ($P< 0.001$) difference obtained among the treatments for net return per chick. The over all performance of the chicks in groups C and D showed significantly ($P<0.001$) higher net return as compared to the chicks in groups A and B (Table 6).

Based on the findings of the present experiment, it is concluded that Probiotic @ 2 g/kg of ration have the capability of improving the net return or the economic out put successfully.

Moreover, under the conditions of present study, it is also recommended that including OGC probiotic in the starter as well as in the finisher rations of the commercial broilers @ 2 g/kg could be proved highly economical for the local broiler producers of Hazara division of North West Frontier Province.

Table I ***Experimental design for distribution of treatments and replicates***

Treatments		Replicates			
Rations	Groups	R1	R2	R3	R4
I	A	28	28	28	28
II	B	28	28	28	28
III	C	28	28	28	28
IV	D	28	28	28	28

Source: Steel and Torrie (1981)

Table II ***Various proportions of probiotic and basal feed ingredients in g/kg of the starter rations***

Ingredients	Ration I (control)	Ration II	Ration III	Ration IV
Probiotic	0	1	2	4
Maize	320	320	320	320
Wheat	200	200	200	200
Canola meal	50	50	50	50
Corn gluten meal	50	50	50	50
Soybean meal	100	100	100	100
Blood meal	28	28	28	28
Fish meal	100	100	100	100
Rice polishing	80	80	80	80
Molasses	30	30	30	30
Rock phosphate	30	30	30	30
L-Lysine	0.8	0.8	0.8	0.8
DL-Metheonine	1.2	1.2	1.2	1.2
Vit. Min. Premix	10	10	10	10
Total	1000	1000 + 1	1000 + 2	1000 + 4

Source: National Research Council (1994)

Table III ***Laboratory analysis showing the nutrients composition of the experimental starter rations***

Ingredients	Ration I	Ration II	Ration III	Ration IV
Metabolizable energy kcal/kg	3280.84	3280.84	3280.84	3280.84
Crude protein %	23.52	23.52	23.52	23.52
Crude fiber %	4.27	4.27	4.27	4.27
Dry matter %	87.74	87.74	87.74	87.74
Ash %	7.90	7.90	7.90	7.90
Ether extract %	4.00	4.00	4.00	4.00

Source: Association of Analytical Chemists (2006)

Table IV ***Various proportions of probiotic and basal feed ingredients in g/kg of the finisher rations***

Ingredients	Ration I (control)	Ration II	Ration III	Ration IV
Probiotic	0	1	2	4
Maize	380	380	380	380
Wheat	200	200	200	200
Canola meal	50	50	50	50
Corn gluten meal	50	50	50	50
Soybean meal	70	70	70	70
Blood meal	28	28	28	28
Fish meal	70	70	70	70
Rice polishing	80	80	80	80
Molasses	30	30	30	30
Rock phosphate	30	30	30	30
L-Lysine	0.8	0.8	0.8	0.8
DL-Metheonine	1.2	1.2	1.2	1.2
Vit.Min.Premix	10	10	10	10
Total	1000	1000 + 1	1000 + 2	1000 + 4

Source: National Research Council (1994)

Table V ***Laboratory analysis showing the nutrients composition of the experimental finisher rations***

Ingredients	Ration I	Ration II	Ration III	Ration IV
Metabolizable energy kcal/kg	3359.54	3359.54	3359.54	3359.54
Crude protein %	20.97	20.97	20.97	20.97
Crude fiber %	4.90	4.90	4.90	4.90
Dry matter %	89.00	89.00	89.00	89.00
Ash %	7.98	7.98	7.98	7.98
Ether extract %	4.10	4.10	4.10	4.10

Source: Association of Analytical Chemists (2006)

Table VI ***Effect of various levels of probiotic on net return per chick***

Groups	A	B	C	D	LSD
Rations	I	II	III	IV	
Probiotic g/kg feed	0	1	2	4	
Cost (Rs) /kg feed	37.23 [b]	37.52 [b]	37.51 [b]	38.86 [a]	1.02
Mean feed intake/bird (g)	2345.0 [a]	2298.5 [b]	2203.8 [c]	2206.8 [c]	4.04
Feed intake cost (Rs)/bird	87.30	86.26	82.72	85.76	
Cost (Rs) /kg liveweight	84.00	84.00	84.00	84.00	
Mean Weight/bird (g)	1287.5 [c]	1302.5 [b]	1427.5 [a]	1431.3 [a]	11.17
Sale (Rs)/bird	108.19 [a]	109.45 [b]	120.07 [a]	120.20 [a]	0.74
Net return(Rs)/Chick	Y	23.19 [c]	37.23[a]	34.44[b]	2.43

Mean values in the same row with the same letter are not significantly different.

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