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## Effect of different levels of whey supplementation on economics of broiler production

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### Abstract

The present study was conducted to detect the performance of broiler birds upon liquid whey feeding. A total of 120 DOC broiler birds were supplemented with liquid whey ad libitum in the drinking water @ 5%, 10% and 15% upto 42 days. The four dietary treatment for broilers consisted of commercial broiler did without any whey supplementation served as control group, while their dietary treatments were supplemented with 5%, 10% and 15% liquid whey along with drinking water respectively for 6 weeks. The data collected with respect to various parameters for broiler growth rate, body weight, FCR, FI etc were subjected to statistical analysis. It was found upon analysis that, sour milk whey can be supplemented with drinking water at the rate of 10% (v/v) for best performance of broilers with better profit margin.

**Keywords:** Broilers, chicken, economics, production, whey

### Introduction

Poultry industry is the fastest growing segment in India today. It is estimated that with a poultry population of 729 million small and medium farmers are mostly engaged in contract farming system under larger integrators and there are around 30 million farmers engaged in backyard poultry as per 19<sup>th</sup> Livestock Census. For profitable poultry production, the needs of organized and unorganized sectors are very different. But from last few years, climatic change has created adverse effect on growth of poultry industry. Due to impact of climatic change, high ambient temperature is the major stress factor in the poultry production system which needs to be minimized through dietary interventions and good management practices. Dietary interventions are a common practice in the poultry industry to promote optimal performance and health of animals. Growth-promoting antibiotics are among feed additives. Among these animal and poultry feed additives, probiotics and prebiotics have drawn considerable attention. Numerous studies have been carried out to examine effects of probiotics on growth performance of broilers, and Blajman *et al.* (2014) [2], in a study using meta-analytical methods, reported body weight gain and improved feed efficiency in broilers as a result of using probiotics, leading to increased body weight gain and enhanced feed efficiency in chickens that received probiotics through water compared to broiler those receiving it in their feed. Mehri *et al.* (2004) [5] reported improved FCR by adding 4% whey powder to broiler diet. In addition, Rastad *et al.* (2008) [8] added probiotics and whey powder to broiler feed and found that diets containing 500 and 750 g probiotics per ton with 2% whey led to weight gain in chickens on days 21.

Whey is a milk by-product and highly nutritious fluid. Huge quantity of whey is produced daily and thrown away as waste by milk product processing industry in our country, which is a major cause of water pollution and increase in BOD of sewage system. So, there is need to utilize it efficiently to minimize pollution. For its utilization, lots of work has been done in India and abroad and many are in the trail to determine its efficacy on various traits and performance by feeding it to livestock and poultry. Ashour *et al.*, (2019) [1] investigated the response of broiler chickens to dietary whey protein concentrate (WPC) as a prebiotic supplement (0, 0.15, 0.20, and 0.25%) on performance, carcass criteria, blood metabolites, oxidative status of meat and liver and meat quality traits and found that WPC supplementation can enhance broiler performance and meat quality without biohazards. Bouassi (2020) [3] reported that supplementation of ACIDAL<sup>®</sup>ML and liquid whey (LW) through water, decreased feed consumption (from week 21-36) and mortality (throughout the experimental period), leading to increased body weight gains (from week 9-36) and improved feed conversion ratio (FCR).

The reduction in feed intake could be attributed to the improved feed retention in the gastrointestinal tract (GIT) and increased nutrient utilization (Bonsu *et al.*, 2014)<sup>[2]</sup> as a result of a better GIT milieu enabled by beneficial microorganisms (Olukosi and Dono, 2014; Pineda-Quiroga *et al.*, 2016)<sup>[6, 7]</sup>. Zarei *et al.* (2018)<sup>[9]</sup> observed a similar trend when dried whey was fed alone or in combination with probiotic to broilers. In poultry feeding, alternative to antibiotic residues, additives such as yeast products, whey powder and organic acids have been recommended due to their non-residual and non-resistant properties (Kim *et al.*, 2014)<sup>[4]</sup>.

In light of above facts, the study has been planned for supplementing liquid whey in poultry drinking water with the objective to evaluate the economics of broiler production.

### Materials and Methods

The present investigation was carried out with day old broiler chicks, which were reared for a period of seven weeks at poultry unit of Livestock Farm Complex, Department of Livestock Production Management, Bihar Veterinary College, Patna from 1<sup>st</sup> of Nov, 2021 to 12 Dec, 2021 to study the effect of supplementation of liquid whey on performance of broiler chicken and to calculate the economics of production.

Commercial broiler diets, both starter and finisher, supplied by M/s Hitech Nutrisol Pvt. Ltd., Hazipur were used in this experiment. The commercial starter and finisher Ration was fed to broiler chicken from 0-4 weeks and 4-7 weeks, respectively. The dietary treatment consisted of a commercial drinking water without adding any liquid whey served as control group (T<sub>1</sub>). The dietary treatment group (T<sub>2</sub>) consisted of commercial with 5% liquid whey. Commercial broiler diet with drinking water supplemented with 10% liquid whey served as treatment group (T<sub>3</sub>), and commercial broiler ration with drinking water supplemented with 15% liquid whey served as treatment group (T<sub>4</sub>). The chicks were vaccinated against Mareks disease, Gumboro and Ranithet disease. The chicks were reared under deep litter system of management with similar managerial and environmental conditions.

The broiler were reared under uniform condition of housing including broiler, feeding, watering, lighting etc. Growth performance, weekly mortality rate, Feed intake, FCR were recorded and analyzed and on that basis economics of broiler

production were calculated. Economics of Broiler and layer production was calculated on the basis of total expenditure occurred in each group and total income and net income by the final product from each group.

### Results and Discussion

The results were prepared on considering the overall performance of broiler birds. Taking in account the total input for rearing 30 broilers in each treatment groups. The total cost of 30 day old chicks @ Rs. 32 per chick, total cost of starter and finisher feed, total other recurring and miscellaneous expenditures incurred, the total input was calculated for finally rearing 30 broilers in each group.

The table 1 showed that the total input was highest in T<sub>2</sub> group (Rs. 6254.60) that was supplemented with 5% whey in comparison to control (Rs. 6249.76) while it was comparatively lower in T<sub>3</sub> (Rs. 6245.48) and T<sub>4</sub> (Rs. 6238.96) groups that were supplemented with 10% and 15% whey although that difference in input among the groups were marginal.

Taking in account the total output after considering output by sale of live birds, gunny bags and price of litter sold as manure the total output was found to be highest in T<sub>3</sub> group (Rs. 6907.55) followed by T<sub>2</sub> group (Rs. 6776.45), but it was found to be lowest in T<sub>4</sub> group (Rs. 6428.00) as compared to control T<sub>1</sub> (Rs. 6645.35) considering overall the factors involved profit per kg body weight was found to be highest in T<sub>3</sub> group (Rs. 11.15 kg) with B: C ratio of 1.11 and was found to be largest in T<sub>4</sub> group with (Rs. 3.42 kg body wt) with B: C ratio of 1.03 as compared to control (Rs. 7.60 kg) with B: C ratio of 1.07.

Thus on the bases of prevailing market price of Rs. 115/- kg live body wt of broilers, the 10% whey supplemented group (T<sub>3</sub>) showed highest return than control, while 5% whey supplemented group (T<sub>2</sub>) showed marginal higher return than control (T<sub>1</sub>). The result indicated (Table- 1) that supplementation of liquid whey @ 5% and @ 10% had only marginal effect on overall input but there was an increase in body weight of the bird with an economical advantage. The highest profit margin was found in (T<sub>3</sub>) group supplemented with 10% liquid whey in comparison to control.

**Table 1:** Effect of supplementation of liquid whey on the Economy of broiler production

Treatment Groups	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Cost of 30 day old broiler chicks @ Rs. 32 per chick	960.00	960.00	960.00	960.00
Total cost of starter feed consumed by each group in Rs.	598.32	583.20	574.64	569.16
Total cost of finisher feed @ Rs. 33 per kg.	3480.84	3448.80	3396.24	3347.20
Cost of litter material @ Rs. 100 per bags	150.00	150.00	150.00	150.00
Cost of medicine, vaccine etc. (Rs.)	45.60	45.60	45.60	45.60
Expenditure on Labour (Rs.)	625.00	625.00	625.00	625.00
Expenditure on Electricity charges (Rs.)	260.00	260.00	260.00	260.00
Miscellaneous expenditure including whey (Rs.)	130.00	182.00	234.00	282.00
Total input (Rs.)	6249.76	6254.60	6245.48	6238.96
Total live weight of birds (kgs)	57.09	58.23	59.37	55.20
Total sales price of live birds @ Rs. 115 per kg	6565.35	6696.45	6827.55	6348.00
Total prices of gunny bags sold (Rs.)	30.00	30.00	30.00	30.00
Total price of litter sold as manure (Rs.)	50.00	50.00	50.00	50.00
Total output (Rs.)	6645.35	6776.45	6907.55	6428.00
Net profit (Rs.)	395.59	521.85	662.07	189.04
Net profit per kg body weight (Rs.)	7.60	8.96	11.15	3.42
B:C Ratio	1.07	1.08	1.11	1.03

## Conclusions

Sour milk whey can be supplemented with drinking water at the rate of 10% (v/v) for best performance of broilers with better profit margin. T3 group showed best performance and was more economical followed by T2, T1 and T4. Above 10% level of whey feeding showed adverse effect on overall performance of broiler chickens.

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