

## **The Effect of Dietary Supplementation of Chicory Root Powder on Growth Performance of Broilers Chicks**

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### **Abstract**

*In the present study, chicory root powder (CRP) as growth promoter was supplemented in broilers' diet to investigate the growth performance. Forty five, one-day-old broilers were used in a completely randomized design (CRD) with 2 treatments and 3 replicates (5 chicks per replicate). Chicks' feed of Control, Treatment one and Treatment two were supplemented with 0gr/kg, 2.5 gr/kg and 4gr/kg of Chicory root powder respectively. On day 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup>, 28<sup>th</sup> and finally on the 32<sup>nd</sup> day feed intake (FI), weight gain (WG), and feed conversion ratio (FCR) were measured. There was no difference of live body weight during first, second and third days ( $p>0.05$ ). On 28<sup>th</sup> and 32<sup>nd</sup> days, T1 and T2 groups were gained significantly more live body weight than Control group ( $p<0.05$ ). No significant difference of FCR was observed on 7<sup>th</sup> and 14<sup>th</sup> days but on 21<sup>st</sup>, 28<sup>th</sup> and on 32<sup>nd</sup> day of the experiment, T1 and T2 group had less FCR than Control Group ( $p<0.05$ ). In conclusion, chicory root powder can improve growth performance and FCR in broilers chicks.*

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### **I. Introduction**

Chicory is a perennial plant indigenous to Europe, India, and Egypt. It was introduced to the US in the late 19th century. It grows as a weed in temperate climates and is widely cultivated in northern Europe. There are two principal types: The Brunswick variety has deeply cut leaves and generally spreads horizontally; the Magdeburg variety has undivided leaves and grows erect. Chicory has bright blue flowers that bloom from July to September. The dried root is the primary part of the plant used.

The efficiency of broiler growing and feeding programs can be determined by live body weight, feed conversion and the age at which a desired body weight is reached. Usually, as feeding programs become more efficient, feed conversion is improved and the length of time necessary to reach a desired weight decreases. However, growth rate is the most important. The supplementation of antibiotics in diet has been a common practice in poultry feed industry to promote the chicken growth, which usually costs 0.029 US dollars/Kg feed, equivalent to one billion rupees per year (Bhatti, 2011).

To establish a more productive program for raising broilers, it becomes necessary to speed up growth rate (North and Bell, 1990). Rapid growth not only saves labor and feed but also allows the production of more broilers annually; thereby, minimizing many of the fixed costs of production (Austic and Nesheim, 1990). Prebiotics are health promoting non-digestible food ingredients that affect the host beneficially by selectively stimulating the growth and/or activity of one or many naturally present or introduced bacterial species in the intestine (Gibson and Roberfroid, 1995). Prebiotics are not digested by the animal's digestive enzymes and affect the host beneficially by selectively stimulating the growth and/or metabolic activity of one or more naturally present or introduced bacterial species in the intestine (Young, 1998). Ammerman *et al.* (1989) reported that feeding male broilers a 0.375% level of oligofructose produced heavier birds at 47 days and improved percent hot carcass weight and percent breast weight while percent fat pad was lowered.

It is well known that the use of certain polysaccharides such as inulin that may have prebiotic effect is a possible way to improve intestinal health and animal performance in the absence of antibiotic growth promoter by stimulating and selective effect on the growth or activity, or both, of indigenous bifidobacteria and lactobacilli (Roberfroid and Delzenne 1998; Gibson and Fuller 2000).

There is lack of considerable information in Afghanistan where the aforementioned herbal plant has been used as herbal growth promoter in poultry; hence in this study we aimed to use the aqueous leaves extract of this herbal plant as growth promoter, hepatoprotectant and immune modulant in broilers. However, Waldroup *et al.* (1993) reported that the addition of oligofructose to nutritionally complete broiler diets at 0.375% had little consistent effect on growth rate, feed utilization, mortality, carcass dressing percentage, abdominal fat content and incidence or severity of salmonella contamination of processed broiler carcasses. These differences could be due to the difference in bird sexes.

Therefore, the aim of the present work was to investigate the effects of chicory supplementation On broiler performance.

## II. Materials and Methods

A total of 45 Hubbard Classic commercial day-old broiler chicks of mixed sex have purchased from local Market and randomly divided into three experimental units (pens) of 15 chicks. The experiment was arranged in three dietary treatments containing different percentage of Chicory root powder and three replications. The chicks were offered with feed twice a day at 8:00 a.m. and 4:00 p.m. *adlibitum* and clean water was available to the birds all the time throughout the experimental period with plastic cascades. The chicks were fed with the starter diet containing different levels of carrot pulp for 20 days and had been switched to the finisher ration on 21 to day 42. The carrot pulp was dried with Natural air force in sunlight and included in feed formulation as 3 and 5% instead of corn. Formulation of Corn and carrot pulp was adjusted in order to keep the total energy and crude protein of the treatments to make them equal in digestible energy and same percentage of crude protein. Vitamins and minerals premixes were added equally in all treatment rations.

## III. Results and Discussion

In first, second and third weeks' there was any significant difference in body weight gain, but in fourth week treated groups were gained more than control group ( $P < 0.05$ ). At the end of the experiment, the group fed 4gr/kg Chicory root powder was gained significantly than the control and that group fed 2.5gr/kg chicory root powder as well.

Food Conversion Ratio was not significantly changed between control and treated groups during first and second weeks, but after third, fourth and fifth week treated groups had better FCR than control group ( $p < 0.05$ ).

Recent research and understanding of chicory root powder focused on the growth performance of broiler chicks. In our study, there was an improved weight gain of broiler chicks on 4gr/kg chicory root powder when compared to chicks fed 2.5gr/kg chicory root powder and control groups.

Rapid growth of broiler chickens leading more efficient and economical program for chicken production (North and Bell, 1990). It was found in the current study that chicks fed 2.5gr/kg chicory root powder gained more weight than control group meanwhile the group fed 4gr/kg chicory root powder was gained more body weight than any other group of the experiment. The study clarified also that FCR of the groups supplemented with 4gr/kg and 2.5gr/kg chicory root powder was lower than control group respectively.

Table,1: Average Live body weight  $\pm$ SEM of Broilers chicks (gr)

Group/Age	1 <sup>st</sup> -7 <sup>th</sup> days	7 <sup>th</sup> -14 <sup>th</sup> days	14 <sup>th</sup> -21 <sup>th</sup> days	21 <sup>th</sup> -28 <sup>th</sup> days	28 <sup>th</sup> - 32 <sup>rd</sup> days
Control	199.00 $\pm$ 0.41 <sup>a</sup>	319.87 $\pm$ 2.19 <sup>a</sup>	776.60 $\pm$ 6.7 <sup>a</sup>	1215.1 $\pm$ 6.42 <sup>a</sup>	1693.0 $\pm$ 1.36 <sup>a</sup>
Treatment 1	119.40 $\pm$ 2.07 <sup>a</sup>	320.67 $\pm$ 4.17 <sup>a</sup>	823.87 $\pm$ 16.83 <sup>a</sup>	1317.3 $\pm$ 21.94 <sup>b</sup>	1782.7 $\pm$ 1.94 <sup>b</sup>
Treatment 2	122.40 $\pm$ 1.40 <sup>a</sup>	317.87 $\pm$ 4.25 <sup>a</sup>	812.93 $\pm$ 20.20 <sup>a</sup>	1266.7 $\pm$ 34.90 <sup>b</sup>	1790.9 $\pm$ 2.26 <sup>b</sup>

The means within the same columns have significant difference ( $P < 0.05$ ).

SEM:Standard Error Mean

Control Group fed standard ration without supplementation. Treatment1 fed ration containing 2.5gr/kg Chicory root powder and Treatment2 supplemented 4gr chicory root powder/kg of feed.

Table,1: Average Feed Conversion Ratio  $\pm$ SEM of Broilers chicks (No)

Group/Age	1 <sup>st</sup> -7 <sup>th</sup> days	7 <sup>th</sup> -14 <sup>th</sup> days	14 <sup>th</sup> -21 <sup>th</sup> days	21 <sup>th</sup> -28 <sup>th</sup> days	28 <sup>th</sup> -32 <sup>rd</sup> days
Control	0.340 $\pm$ 0.020 <sup>a</sup>	0.836 $\pm$ 0.017 <sup>a</sup>	0.980 $\pm$ 0.005 <sup>a</sup>	1.123 $\pm$ 0.003 <sup>a</sup>	0.986 $\pm$ 0.003a
Treatment 1	0.333 $\pm$ 0.003 <sup>a</sup>	0.820 $\pm$ 0.005 <sup>a</sup>	0.981 $\pm$ 0.015 <sup>a</sup>	1.110 $\pm$ 0.015 <sup>a</sup>	0.930 $\pm$ 0.000b
Treatment 2	0.326 $\pm$ 0.006 <sup>a</sup>	0.830 $\pm$ 0.005 <sup>a</sup>	0.983 $\pm$ 0.014 <sup>a</sup>	1.110 $\pm$ 0.015 <sup>a</sup>	0.926 $\pm$ 0.006b

The means within the same columns have significant difference ( $P < 0.05$ ).

SEM:Standard Error Mean

Control Group fed standard ration without supplementation. Treatment1 fed ration containing 2.5gr/kg Chicory root powder and Treatment2 supplemented 4gr chicory root powder/kg of feed.

## IV. Conclusion

In conclusion, the result of our study suggest that chicory root powder is one of the better supplemental additive for gaining better weight and lower FCR. We suggest that 4gr/kg chicory root powder is better supplementation for good performance in broiler chickens.

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