

# Comparative Study of Feeding Aloe Vera, Amla and Antibiotic (Amoxicillin) On Live Weight, Fcr and Economics of Cobb-500 Broiler Chickens

Mukti Bhandari<sup>1</sup>, Nirajan Bhattarai<sup>2</sup>, Naba Raj Devkota<sup>2\*</sup>

<sup>1</sup>: Heifer International Nepal, Hattiban, Lalitpur; <sup>2</sup>: Agriculture and Forestry University, Chitwan, Nepal

\*Correspondence: [nabadevkota.aafu@gmail.com](mailto:nabadevkota.aafu@gmail.com)

## ABSTRACT

*An experiment was conducted at Tulsipur, Dang from August to October with the main objective to determine cumulative final live weight and FCR including the economics of broiler chickens. Diets were iso-caloric and iso-proteinous and adequately supplemented with required vitamins and minerals. All birds were supplemented with the added proportion of Aloe vera, Amla and Antibiotics. A total of 200 Cobb-500 broiler chicks of similar body weight were procured from Chitwan and divided into four treatments (50 birds/treatment). There were a total of four treatments, each replicated five times. All twenty experimental units were distributed with 10 birds per unit by using Completely Randomized Design (CRD). The treatments were; Basal diet only (T1); Basal diet + 0.1% Aloe Vera juice (T2); Basal diet + 0.1% Amla juice (T3); and Basal diet + 0.05% Amoxicillin for 13 days (T4). Average cumulative weekly live weight, feed efficiency (FCR) and economics broiler were observed, recorded and analyzed. The results showed non-significant ( $P > 0.05$ ) effect of supplementation of Aloe vera, Amla and Antibiotic to average cumulative weekly live weight. However, the higher tendency of live weight ( $2495.42 \pm 54.94$  g) was recorded in broiler fed with basal diet + 0.1% Aloe Vera juice (T2). Effects of Aloe vera, Amla and Antibiotic (Amoxicillin) didn't have a*

*significant effect also on the average cumulative feed consumption and feed conversion ratio (FCR). Nevertheless, net income per bird and B:C ratio (NPR29.02 and 1.068 respectively) was comparatively higher for T3 (Basal diet + 0.1% Amla juice). The results obtained from this experiment concluded that although effect of Aloe vera, Amla and Antibiotic (Amoxicillin) supplement didn't have a significant difference among the treatments, but it was relatively better to supply Aloe Vera in terms of relative live weight and feed efficiency. Whereas Amla juice could be comparatively better than others in terms of net income per bird and B:C ratio. The results also concluded that supplementation of Aloe Vera juice, Amla juice could be similar to the Antibiotics and can be used in poultry to increase live weight and also for better feed efficiency instead of Antibiotics. As these juices are herbal products, It will be suitable to mitigate/minimize harmful effects and health hazard risk on poultry and Human as well. Hence, poultry growers can utilize Aloe Vera juice and Amla juice to obtain added growth performance and economics. However, this finding requires to be established through corporeal work by considering other potentialities and scale under farmer's management condition afore recommendation.*

**Keywords:** Aloe vera, Amla, Antibiotic, Live weight, FCR, Economics, Hazard.

## INTRODUCTION

### Background

Poultry production sector plays a significant role in the national economy of Nepal. Poultry sector in Nepal has shown unstoppable growth during the last three decades and now it has become one of the major national agriculture industries (Bhattarai, 2005). But still, the quantity of consumption has remained much lower as compared to developed countries. Poultry today not only acts as income stabilizer but also provides regular and timely income as compared to crop and other livestock farming. The poultry industry in Nepal is growing at a fast rate of about 15% per annum in which over 30,000 farm families involved directly or indirectly. The contribution of poultry to the national GDP is nearly 4% of the total GDP and 8% of the agriculture GDP of the writing with an output of 10 billion rupees from this sector (Dhakal, 2000).

Use of sub-therapeutic dose of antibiotics in food animals feed is a common practice to prevent animals from diseases and improve production performance in modern animal husbandry (Cheng, 2014). The phyto-medicines are not only cheap and affordable but are also purportedly safe with no or minimal side reactions (Jagadeeswaran, 2007). Aloe Vera is one of the suitable natural growth factors for replacement of antibiotic due to its wound healing, anti-parasitic, antifungal, anti-

bacterial and immune-modulatory properties. Another natural growth factor Amla is one of the emerging herbal plants that also replacing the place of antibiotic in the present scenario. It contains phenolic acid (gallic acid and tannic acid). Tannic acid in Amla is responsible for the antibacterial property i.e. it kills the bacteria. Amla is one of the powerful anti-oxidative agents. Along with this, it also acts as; anti-viral agent, anti-fungal agent, anti-aging agent and immune-enhancing agent. Thus present study had aimed at measuring and comparing the live weight among different treatments composed with the added proportion of herbal juice and antibiotics and calculate and compare feed conversion ratio (FCR) among different treatments composed with the added proportion of herbal juice also considering economic aspects.

## MATERIAL AND METHODS

Tulsipur, Dang was purposively selected for the study. The area lies in Tulsipur, province 5, Rapti Zone to perform our task. The feeding trial was conducted in randomized Completely Randomized Design (CRD). A total of 200 Cobb-500 commercial broiler chicks were randomly allocated to 4 different treatments with 5 replications each (fifty birds per treatment, ten birds per replicate). There were altogether twenty experimental units and each experimental unit consist of 10 birds. The chicks were kept in the brooder for one week under special care and management. The shed was washed, cleaned and disinfected using Virkon solution. The

floor was top dressed with Lime. Dry rice husk was used as the litter material spread over the floor of the experimental shed up to the depth of 2 cm at the initial stage and was up to 5 cm as the chicks grew. For every 100 sp. ft. area, 500 gm dust lime was mixed in the litter. Virkonsolution was sprayed inside and outside the brooders. Dry rice husk was used as litter material and was maintained at 5-6 cm thickness on the floor. The litter was stirred twice in a week to prevent caking. Wet litter was removed immediately and replaced with dry but the lime was coated as a disinfectant before replacing the litter. All the experimental birds including control groups were given with ND vaccine- F1 (Lentogenic strain) at the age of 6 days through intraocular route. Similarly, all the 5

groups were also vaccinated with modified live IBDV vaccine containing an intermediate plus form of IBD hot strain virus intraocular IBDV (Intermediate plus) at age of 14 days and 22 days. The booster dose of ND with LaSota strain was given to all groups at age of 28 days.

### Layout of the experiments

A total of 200 commercial Cobb-500 broiler chicks were purchased from the commercial hatchery (Chitwan). Chicks were equally and randomly divided and distributed in four treatment groups T1, T2, T3 and T4 having five replications in each. Each treatment group consists of 40 chicks distributed in five replicated pens (R1, R2, R3, R4, and R5) with 10 chicks in each.

T1R4	T2R3	T4R2	T2R1	T3R5
T3R3	T1R2	T3R1	T4R5	T2R4
T2R2	T4R1	T2R5	T4R4	T4R3
T1R1	T1R5	T3R4	T1R3	T3R2

Figure 1. Layout of the experiment

### Experimental treatments

Where treatment groups are;

T1 = Basal diet only

T2 = Basal diet + 0.1% AV juice

T3 = Basal diet + 0.1% Amla juice

T4 = Basal diet + 0.05% Amoxicillin for 13 days

### Experimental Diets

The chickens were fed with ration viz. starter ration & finisher ration. These two types of rations were fed at different period of time.

- Starter ration: 0-4 weeks
- Finisher ration: 4-6 weeks

The following parameters were measured during the experimental period.

- The initial weight of birds

- Average daily gain (ADG) =  $\frac{\text{Final wt. of bird} - \text{Initial wt. of bird}}{\text{No. of bird} \times \text{No. of days}}$
- Average Daily feed intake (ADFI) = Daily feed offered- daily leftover feed
- Average daily gain (ADG) =  $\frac{\text{Final wt. of bird} - \text{Initial wt. of bird}}{\text{No. of bird} \times \text{No. of days}}$
- Daily water consumption = Water offered- Left over water.

Weekly live weight gain and feed efficiency will be calculated as below:

- Feed conservation ratio (FCR) =  $\frac{\text{Average daily feed intake (g)}}{\text{Average daily weight gain (g)}}$

Feed samples (Broiler starter and finisher) were sent to Department of animal nutrition and fodder production lab for proximate analysis. The chemical composition of broiler feed samples was identified through proximate analysis (Weende system of feed analysis) at Animal Nutrition lab at Agriculture and Forestry University, Rampur, Chitwan. Moisture %, Crude Protein (CP), Crude Fiber (CF), Ether extract (EE), Nitrogen-free extract (NFE), Ash (Minerals) etc. of starter and finisher

rations were calculated after proximate analysis. The economics of broiler production was calculated at the end of the experiment. Gross expenditure was calculated by the sum of the cost of chicks, medicines and vaccines, feed and labor. Data obtained was recorded in MS –Excel and analysis of variance were carried out by using MSTAT program and comparison between groups was done by student t-test. Comparison between means was done by LSD at 5% level of significance.

### RESULTS AND DISCUSSION

#### Live weight (g)

Table 1. Average weekly cumulative live weight (gm) of broiler fed with Aloe vera, Amla and antibiotic in Tulsipur (2017)

Treatments	Research periods in weeks and LW in gm						
	Initial	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week	5 <sup>th</sup> week	6 <sup>th</sup> week
Basal diet only	49.44±1.36	196.98±5.24	496.00±32.40	962.00±39.04	1435.49±5.314	2038.89±14.70	2434.43±7.394
Basal diet+0.1% Aloe vera	48.80±0.32	207.07±5.98	528.71±18.20	983.14±18.74	1500.81±5.074	2131.07±11.080	2495.42±5.494
Basal diet+0.1% Amla	49.02±1.44	203.76±7.73	514.74±35.87	972.10±33.63	1471.67±4.830	2091.96±62.58	2480.99±6.550
Basal diet+0.05% Amoxicillin (for 13 days)	50.40±1.66	206.23±4.80	525.18±13.88	960.90±26.02	1444.84±3.360	2047.88±29.93	2450.38±1.118

F – value	1.47	2.86	1.50	0.58	1.95	2.09	1.20
P – value	NS	NS	NS	NS	NS	NS	NS
CV%	2.63	2.97	5.18	3.13	3.22	3.17	2.30

Average weekly live weight of broiler added with herbal plant extracts and antibiotic is shown in Table 1. Analysis of Variance (ANOVA) showed non-significant ( $P>0.05$ ) effect on the average weekly live weight of broiler during the entire experimental period. Overall, the tendency of highest weekly live weight was observed for the treatment fed with Basal diet + 0.1% AV juice and comparatively lower weekly live weight was observed in the treatment fed with Basal diet only (T1) group. During the sixth week of the experiment, cumulative weekly live weight tended to higher ( $2495.42\pm 54.94$  g) for the treatment fed with Basal diet + 0.1% AV juice (T2) and the tendency of lowest cumulative weekly live

weight ( $2434.43\pm 73.94$  g) was observed in the treatment fed with Basal diet only (T1) group. This is why, AV juice contains several beneficial ingredients including vitamins, minerals, enzymes, organic acids, and carbohydrates which could improve performance criteria of broilers. Olupona *et al.* indicated that supplementation of AV gel to drinking water seems to have an affirmative influence on body weight (BW) via higher intake (FI). Darabighane *et al.* reported that broilers fed diets supplemented with 1.5%, 2% and 2.5% Aloe vera (AV) gel indicated higher daily feed intake (DFI) and body weight (BW) than those fed basal diets.

**Feed Conversion Ratio/Feed Efficiency (FCR)**

Table 2. FCR (Mean  $\pm$  SD) of broiler chickens fed with Aloe vera, Amla and Antibiotic in Tulsipur from (2017)

Treatments	Research Periods in weeks						
	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week	5 <sup>th</sup> week	6 <sup>th</sup> week	Cumulative
Basal diet only	0.95 $\pm$ 0.05	1.30 $\pm$ 0.10	1.40 $\pm$ 0.04	1.99 $\pm$ 0.19	1.910 $\pm$ 0.14	2.99 $\pm$ 0.45	1.82 $\pm$ 0.05
Basal diet+0.1% Aloe vera	0.90 $\pm$ 0.02	1.22 $\pm$ 0.06	1.46 $\pm$ 0.08	1.83 $\pm$ 0.19	1.914 $\pm$ 0.25	3.08 $\pm$ 0.55	1.78 $\pm$ 0.02
Basal diet+0.1% Amla	0.911 $\pm$ 0.04	1.25 $\pm$ 0.11	1.45 $\pm$ 0.13	1.89 $\pm$ 0.19	1.87 $\pm$ 0.19	3.02 $\pm$ 0.30	1.79 $\pm$ 0.05
Basal diet+0.05 % Amoxiciln (for 13 days)	0.912 $\pm$ 0.03	1.24 $\pm$ 0.04	1.51 $\pm$ 0.09	1.94 $\pm$ 0.10	1.90 $\pm$ 0.08	2.89 $\pm$ 0.19	1.81 $\pm$ 0.02
F – value	1.57	0.90	1.15	0.74	0.06	0.17	0.887
P – value	NS	NS	NS	NS	NS	NS	NS

CV%	4.07	6.70	6.23	9.08	9.28	13.19	2.15
-----	------	------	------	------	------	-------	------

The mean FCR of broiler added diet supplemented with herbal plant extracts and antibiotic is shown in Table 2. The results indicate non-significant ( $P>0.05$ ) effect of feeding herbal plant extracts and antibiotic in DW from the first to sixth week of the experiment. The tendency of lowest cumulative FCR ( $1.78\pm 0.02$ ) was recorded in the treatment fed with Basal diet + 0.1% AV juice (T2) and comparatively higher FCR ( $1.82\pm 0.05$ ) was seen for the treatment fed with Basal diet only (T1). The tendency

of lowest FCR recorded from broilers fed with Basal diet + 0.1% AV juice is due to the higher body weight gain during entire experimental periods. Hassanbeigy-Lakehet *al.* (2012) reported the largest body weight gain and the smallest FCR in broilers supplemented with 1.8ml/ltr AV gel via DW. Eevuri and Putturu (2013) also found that supplementation of Aloe Vera in broiler ration increased the body weight gain and FCR.

### Economic analysis

Table 3. Economic analysis of broiler (per bird) fed with Aloe vera, Amla and Antibiotic in Tulsipur (2017)

#### Gross Expenditure/Bird:

Expenditure/bird (NRs)	T1	T2	T3	T4
Chicks cost @90/chicks	90	90	90	90
Feed cost @57.43/Kg	253.78	255.51	254.93	254.76
Labor cost	50	50	50	50
Medicine cost	14	24	19	28
Rice husk	10	10	10	10
Gross expenditure	417.78	429.56	424.98	432.75

#### Gross Income/Bird:

Income/bird (NRs)	T1	T2	T3	T4
Live weight/bird (kg)	2.43	2.49	2.48	2.45
From sale @ Rs. 175/kg	425.25	435.75	434.00	428.75
Manure	20	20	20	20
Gross income/bird	445.25	455.75	454.00	448.75
Net income/bird	27.47	26.19	29.02	16.00
B:C Ratio	1.065	1.060	1.068	1.036

Economic analysis of broiler (per bird) fed with herbal plant extracts and antibiotic is shown in Table 3. The gross expenditure (per bird) of different treatments

differs with supplementation of herbal plant extracts and antibiotic in DW. The tendency of highest gross expenditure (NRs 432.75) was recorded for the treatment fed with

Basal diet + 0.05% Amoxicillin for 13 days (T4) and comparatively lower gross expenditure (NRs 417.78) was recorded in the treatment fed with Basal diet only (T1). This might be due to the expensive rate of Amoxicillin that leads to the highest cost of production.

The tendency of highest gross income per bird (NRs 455.75) was recorded for the treatment fed with basal diet + 0.1% AV juice (T2) and comparatively lower gross income per bird (NRs 445.25) was observed in the treatment fed with Basal diet only (T1). This result is due to the broiler from Basal diet + 0.1% AV juice group showed the maximum live weight at the end of an experiment which leads to the maximum gross income per bird.

Net income per bird and B:C ratio was comparatively higher (NRs 29.02 and 1.068 respectively) for the treatment fed with Basal diet + 0.1% Amla juice. Whereas, the tendency of lowest net income per bird and B:C ratio (NRs 16.00 and 1.036 respectively) was recorded in the treatment fed with Basal diet + 0.05% Amoxicillin for 13 days (T4). Comparatively higher net income per bird and B:C ratio in treatment fed with Basal diet + 0.1% Amla juice (T3) is due to the cheaper rate of Amla juice as compared to the rate of AV juice and Amoxicillin. Final body weight of broiler from Basal diet + 0.1% Amla juice group is slightly higher than the broiler from Basal diet only (T1) and Basal diet + 0.05% Amoxicillin for 13 days group (T4). This is another factor which leads comparatively higher net income per bird and B:C ratio.

Patil (2012) reported slightly higher net income per bird and B:C ratio in a bird with supplementation of different level of Amla juice as compared to the findings of the present experiment.

## CONCLUSION

The results obtained from this experiment concluded that although the effect of supplementation of Aloe vera, Amla and Antibiotic (Amoxicillin) did not have significant differences among the treatments, it was relatively better to supply Aloe Vera in terms of relative live weight, feed efficiency. Whereas Amla juice in drinking water could be comparatively better than others in terms of net income per bird and B:C ratio.

The results also concluded that supplementation of Aloe Vera juice, Amla juice could be similar to the Antibiotics and can be used in poultry to increase live weight and also for better feed efficiency instead of Antibiotics. As these juices are herbal products, it will be suitable to mitigate/minimize harmful effects and health hazard risk on poultry and Human as well.

## REFERENCES

- [1]. Bhattarai, T.C. (2005). Present Scenario and Opportunities of Nepalese Poultry Industries. Proceeding of National Poultry Expo-2005. pp 55-57
- [2]. Cheng, G., Hao, H., Xie, S., Wang, X., Dai, M., Huang, L., & Yuan, Z. (2014). Antibiotic alternatives: the substitution of antibiotics in animal husbandry? *Frontiers in Microbiology*, 5, 217. <http://doi.org/10.3389/fmicb.2014.00217>
- [3]. Darabighane, B., Zarei, A., Shahneh, A. Z., & Mahdavi, A. (2011). Effects of different levels of Aloe vera gel as an alternative to antibiotic on performance and ileum morphology in broilers. *Italian Journal of Animal Science*, 10(3), e36.
- [4]. Dhakal, I. P. (2000). Present scenario of poultry farming in Chitwan district of



Nepal. *Proceeding of the avian health*, 30-34.

[5]. Eevuri, T. R., &Putturu, R. (2013). Use of certain herbal preparations in broiler feeds-A review. *Veterinary World*, 6(3).

[6]. Hassanbeigy-Lakeh, Z. (2012). Roustae Ali-Mehr M, Haghghian-Roudsari M. Effect of Aloe gel on broiler performance. In *Proc. 5th Iranian Congress on Animal Science Isfahan, Iran* (pp. 973-977).

[7]. Jagadeeswaran, A., 2007. Exploration of growth promoting and immunomodulating potentials of indigenous drugs in broiler chicken immunized against Newcastle viral disease. Ph.D. thesis submitted to Tamil Nadu

Veterinary and Animal Sciences University, Chennai.

[8]. Olupona, J. A., Omotoso, O. R., Adeyeye, A. A., Kolawole, O. D., Airemionkhale, A. P., &Adejinmi, O. O. (2010). Effect of aloe vera juice application through drinking water on performance, carcass characteristics, hematology and organoleptics.

[9]. Patil R.G, Kulkarni A.N, Bhutkar S.S, Korake R.L. (2012) Effect of different feeding levels of *EmbllicaOfficinalis* (Amla) on performance of broilers. *Res. J. Anim. Husbandry Dairy Sci.* 3:102–04