International Journal of Poultry Science 8 (7): 706-709, 2009
ISSN 1682-8356

Aloe vera in White Leghorn Layer Diet

M. Moorthy, C. Mehala, S. Saravanan and S.C. Edwin
Department of Poultry Science, Veterinary College and Research Institute,
Namakkal-637 002, Tamil Nadu, India

Abstract: Two hundred and eighty commercial layer chicks belonging to single hatch were purchased from local hatchery, wing banded, weighed and randomly allotted into four treatment groups with four replicates of ten chicks each. The chicks were reared in cages in a gable roofed, open sided house. All the chicks were provided with uniform floor, feeder and waterer space and were reared under standard management conditions throughout the experimental period. Treatment groups were T_1- control; T_2-0.1% *aloe vera* powder; T_3-0.1% *aloe vera* + 0.1% *Curcuma longa* powder and T_4-0.1% of *aloe vera* and 0.1% of probiotic powder There was significant ($p<0.05$) difference in hen housed egg production, feed conversion ratio and return over feed cost in one percent *aloe vera* fed group compared to other treatment groups. No significant difference was observed in feed consumption, percent hen day egg production and percent broken eggs. It can be concluded that inclusion of 0.1 percent *aloe vera* in White Leghorn diet is economical compared to its combination with turmeric and probiotic at 0.1 percent level.

Key words: Aloe vera, white leghorn, egg production

INTRODUCTION

Aloe vera is the medicinal plants found in tropical regions of India and is commonly incorporated in most of the poultry herbal medicines like liver tonics, anti-stress, antioxidants, antitoxic and growth promoting preparations. Apart from these benefits, it is used for various functions like antibacterial, antiseptic, anti-inflammatory, nematocidal and immunomodulatory properties. Besides, its usage for medicinal preparations, it can also be included in the poultry diet as feed additive to utilize their benefits to the maximum extent.

Two hundred and eighty commercial layer chicks belonging to single hatch were purchased from local hatchery, wing banded, weighed and randomly allotted into four treatment groups with four replicates of ten chicks each. The chicks were reared in cages in a gable roofed, open sided house. All the chicks were provided with uniform floor, feeder and waterer space and were reared under standard management conditions throughout the experimental period.

MATERIALS AND METHODS

The experimental diet was formulated according to the standards prescribed in Bureau of Indian Standards (B.I.S., 1992). *Aloe vera* powder was included in the basal diet and the following experimental groups were formed.

Treatments	Experimental diets
T_1	Control
T_2	0.1% *Aloe vera* powder
T_3	0.1% *Aloe vera* + 0.1% *Curcuma longa* powder
T_4	0.1% of *Aloe vera* and 0.1% of Probiotic powder

The diets were fed *ad libitum* to the birds through out the experimental period. The diets were subjected to proximate analysis as per AOAC (1995). The ingredients and nutrient composition of the experimental diet are presented in Table 1. Data on body weight, feed consumption and egg production were recorded at weekly intervals and mortality was recorded at occurrence. From the above data feed efficiency and livability were calculated.

Feed consumption: Feed consumption of all the treatment groups were recorded for every 28 days period and the mean total feed consumption per bird per day were calculated.

Egg production: During experimental period, the egg production was recorded daily. Based on data, egg production was calculated in terms of hen day (percent) and hen housed (number).

Feed conversion ratio: Feed conversion ratio was calculated and expressed as kg feed consumed to produce one dozen eggs.

Livability

The mortality of birds was recorded on its occurrence during the experimental period and livability percentage was worked out.

Return over feed cost: The return over feed cost from Single Comb White Leghorn layers fed diet with different levels of extracted coconut meal was calculated based upon the actual prevailing feed and egg cost during the study.

Return over feed cost =

Value of eggs produced by a bird during 28 days period-Cost of feed consumed by a bird during 28 days period.

Table 1: Ingredients and nutrient composition (% DM) of experimental diets

Ingredients	Layer diet
Maize	50
Extracted sunflower meal	10
Extracted groundnut meal	10
Soybean meal	15
Fish meal	5.1
Calcite	4
Shell grit	5
Di-calcium Phosphate	0.9
Total	100
Supplements	
Vitamins AB_{2D3K1}	0.010
B-Complex[2]	0.020
Trace minerals[3]	0.100
Nutrient composition (percent) Crude protein	18.14
Crude fibre	5.06
Ether extract	2.47
Nitrogen Free Extract	60.86
Total ash	13.47
Acid Insoluble Ash	1.34
Calcium	3.91
Total phosphorus	0.82
Lysine*	0.63
Methionine*	0.32
Metabolizable Energy* (kcal/kg)	2605

[1]One gram of vitamin AB_2D_3K supplement contained 82500 IU of vitamin-A, 50 mg of vitamin-B_2, 12000 IU of vitamin-D_3 and 10 mg of vitamin-K. [2]One gram of B-complex supplement contained 80 mg of vitamin-B_1, 16 mg of vitamin-B_6, 80 mcg of vitamin-B_{12}, 80 mg of vitamin-E, 120 mg of niacin, 8 mg of folic acid, 80 mg of calcium pantothenate and 86 mg of calcium. [3]One gram of trace minerals contained 54 mg of manganese, 52 mg of zinc, 20 mg of iron, 2 mg of iodine and 1 mg of cobalt. *Calculated values

Statistical analysis: The data collected on various parameters were subjected to statistical analysis using Completely Randomized Design (CRD) as per the methods suggested by Snedecor and Cochran (1989). Angular transformation was applied to percentages wherever needed.

RESULTS AND DISCUSSION

Feed consumption: The statistical analysis revealed no significant difference in feed consumption which might be due to isocaloric and isonitrogenous diet throughout the experimental period. The overall feed consumption was numerically high in control group compared to the treatment groups. This was similar to the findings of Al-Sultan (2003) and Durrani *et al.* (2006).

Hen housed egg production: Hen housed egg production showed significant ($p<0.05$) difference at peat production (29-32 weeks). The overall hen housed egg production was high in T_5 (207.26) and significantly differ from control and T_4 group which indicates the *aloe vera* improves egg production when fed alone compared to its combination with turmeric and probiotics.

Hen day egg production: The percent hen day egg production differ significantly ($p<0.05$) only during peak production (33-36 weeks). Thee overall percent hen day egg production was numerically higher in T_2 and T_3 compared to control group.

Table 2: Mean (±S.E.) feed consumption (g/bird/day) of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	101.20±0.96	103.03±1.59	102.03±1.53	98.10±0.96
25-28	109.68±1.08	111.66±0.38	101.60±0.38	99.58±1.08
29-32	100.18±3.93	112.68±3.87	102.62±3.87	100.08±3.93
33-36	109.67±0.89	109.24±3.42	109.94±3.42	106.67±0.89
37-40	108.70±1.32	102.58±0.22	112.90±0.91	111.70±1.32
41-44	1033.42±0.42	104.28±0.42	114.03±0.42	113.42±0.42
45-48	104.25±0.17	104.59±0.52	114.44±0.52	114.25±0.17
49-52	107.78±0.36	114.26±1.33	114.26±1.33	114.78±0.36
Overall(21-52)	109.32±4.58	108.98±2.56	108.98±3.79	107.32±4.58

Each value is a mean of three observations

Table 3: Mean (±S.E.) hen housed egg production (eggs/hen) of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	24.42±0.73	26.22±0.37	25.22±0.37	23.42±0.73
25-28	23.44±0.32	24.78±0.43	25.78±0.43	25.44±0.32
29-32	24.56±0.17	27.31±0.12	26.31±0.12	25.56±0.17
33-36	25.36^{a}±0.17	26.11^{ab}±0.18	26.11^{ab}±0.18	26.36^{a}±0.17
37-40	26.11^{a}±0.07	26.08^{ab}±0.05	26.08^{ab}±0.05	26.11^{a}±0.07
41-44	26.08±0.05	26.06±0.07	26.06±0.07	26.08±0.05
45-48	25.92±0.08	26.03±0.12	26.03±0.12	25.92±0.08
49-52	25.61±0.10	25.67±0.19	25.67±0.19	25.61±0.10
Overall(21-52)	203.50^{b}±1.25	207.26^{a}±1.55	207.26^{a}±1.55	203.50^{b}±1.25

Each value is a mean of three observations, $^{a-b}$Means within a row with no common superscript differ significantly ($p<0.05$)

Table 4: Mean (±S.E.) percent hen day egg production of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	84.64±2.59	91.07±1.31	90.07±1.31	83.64±2.59
25-28	89.86±1.14	92.07±1.54	93.07±1.54	90.86±1.14
29-32	92.29±0.60	94.96±0.43	93.96±0.43	91.29±0.60
33-36	94.14^{a}±0.60	93.25^{ab}±0.65	93.25^{ab}±0.65	94.14^{a}±0.60
37-40	92.25±0.26	93.14±0.17	93.14±0.17	93.25±0.26
41-44	93.14±0.17	93.07±0.26	93.07±0.26	93.14±0.17
45-48	92.57±0.30	92.96±0.43	92.96±0.43	92.57±0.30
49-52	91.46±0.36	91.67±0.69	91.67±0.69	91.46±0.36
Overall (21-52)	92.29±1.46	92.52±0.34	92.52±0.34	92.29±1.46

Each value is a mean of three observations, $^{a-b}$ Means within a row with no common superscript differ significantly ($p<0.05$)

Table 5: Mean (±S.E.) percent broken eggs of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	0.13±0.12	0.36±0.35	0.35±0.35	0.12±0.12
25-28	0.32±0.19	0.00±0.00	0.00±0.00	0.32±0.19
29-32	0.12±0.11	0.10±0.10	0.10±0.10	0.11±0.11
33-36	0.00±0.00	0.73±0.41	0.63±0.41	0.00±0.00
37-40	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
41-44	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
45-48	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
49-52	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00
Overall(21-52)	0.06±0.06	0.15±0.06	0.15±0.06	0.06±0.06

Each value is a mean of three observations

Table 6: Mean (±S.E.) feed conversion ratio (kg/dozen eggs) of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	1.42±0.03	1.36±0.03	1.36±0.03	1.41±0.03
25-28	1.32±0.02	1.23±0.02	1.33±0.02	1.32±0.02
29-32	1.32±0.05	1.33±0.05	1.31±0.05	1.32±0.05
33-36	1.39±0.01	1.32±0.04	1.42±0.04	1.36±0.01
37-40	1.44±0.02	1.45±0.01	1.45±0.01	1.44±0.02
41-44	1.47±0.05	1.37±0.01	1.47±0.01	1.46±0.05
45-48	1.48±0.01	1.48±0.01	1.48±0.01	1.48±0.01
49-52	1.51±0.00	1.50±0.03	1.50±0.03	1.51±0.00
Overall (21-52)	1.40^{b}±0.04	1.32^{a}±0.05	1.42^{b}±0.05	1.41^{b}±0.04

Each value is a mean of three observations, $^{a-b}$Means within a row with no common superscript differ significantly ($p<0.05$)

Table 7: Mean (±S.E.) return over feed cost (Rs./bird) of Single Comb White Leghorn layers fed diet with *Aloe vera* and its combination with *Curcuma longa* (Turmeric) and Probiotic

Age (weeks)	Control	0.1% *Aloe vera*	0.1% *Aloe vera* + 0.1% *Curcuma longa*	0.1% *Aloe vera* + 0.1% Probiotic
21-24	6.50±0.81	9.84±0.74	8.84±0.74	7.50±0.81
25-28	8.62±0.53	10.60±0.49	9.60±0.49	9.62±0.53
29-32	9.65±0.95	10.02±0.96	10.02±0.96	9.65±0.95
33-36	8.23±0.18	9.44±0.75	8.24±0.75	9.23±0.18
37-40	7.87±0.11	8.58±0.33	7.58±0.33	7.87±0.11
41-44	7.48±0.03	7.32±0.13	7.32±0.13	7.48±0.03
45-48	7.11±0.13	8.20±0.25	7.20±0.25	7.11±0.13
49-52	6.63±0.11	8.81±0.50	6.81±0.50	6.63±0.11
Overall (21-52)	63.09^{ab}±0.28	66.61^{a}±0.51	65.61^{a}±0.51	65.09^{ab}±0.28

Each value is a mean of three observations, $^{a-b}$Means within a row with no common superscript differ significantly ($p<0.05$)
Cost of *Aloe vera* = Rs. 250/kg; Turmeric = Rs. 50/kg and Probiotic = Rs. 120/kg. Cost of treatment feed (T_1 to T_4) = Rs. 14.50/kg
Price of an egg = Rs.2.50/egg

Broken eggs: There was no significant difference in percent broken eggs between treatment groups during the experimental period but the overall percent broken eggs was higher in T_2 and T_3 compared to control group. **Feed conversion ratio:** There was no significant difference in feed conversion ratio (kg/dozen eggs) during the experimental period. The overall feed conversion ration was superior in T_2 (1.32) compared to other treatment groups. This was similar to the findings of Changkang *et al*. (2007).

Return over feed cost: The statistical analysis revealed that there was no significant difference in return over feed cost during the different periods of egg laying period. The overall return over feed cost was significantly ($p<0.05$) higher in one peer cent *aloe vera* fed group (Rs.66.61) compared to other treatment groups. This might be due to increased egg production in *aloe vera* fed group.

REFERENCES

Al-Sultan, S.I., 2003. The effect of *Curcuma longa* (turmeric) on overall performance of broiler chickens. Int. J. Poult. Sci., 2: 351-353.

AOAC, 1995. Official Methods of Analysis. 16th Edn, Association of Official Analytical Chemists, Arlington, Virginia, USA.

B.I.S., 1992. Nutrient requirement for poultry. Bureau of Indian Standards, I.S. 13574.

Changkang, W., J. Hongqiang, T. Jianming, G. Weiwei, S. Renna and Z. Qi, 2007. Effect of Aloe powder and extract on production performance and immune function of broiler chickens. J. Fujian Agric. and Forestry University, 36: 614-617.

Durrani, F. R., Mohammad Ismail, Asad Sultan, S.M. Suhail, Naila Chand and Z. Durrani, 2006. Effect of different levels of feed added turmeric (Curcuma longa) on the performance of broiler chicks. J. Agri. Biol. Sci., 1: 9-11.

Snedecor, G.W. and W.G. Cochran, 1989. Statistical methods. 8th Edn, Iowa State University Press/ Ames, Iowa-50010.