



## EFFECT OF ADDITION AMLA (*PHYLLANTHUS EMBLICA*) AND VITAMIN C POWDER ON SOME PHYSIOLOGICAL AND PRODUCTION PERFORMANCE OF BROILER

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### Abstract

This study aiming effects of Amla and ascorbic acid on sum physiology properties and production performance of broiler. A total of 90 one-day chick (Ross 308) randomly distributed into three treatments with tree replicates ten birds per each. Group T1 received standard diet. Group T2 received standard diet supplemented with vit. C 250 mg / kg diet. Group T3 received standard diet supplemented with Amla powder 1g/kg diet. The results showed significant increase in RBC, PCV%, Hb and WBC in vitamin C and Amla treatments. Significantly decreasing concentration of GOT, GPT and triglyceride in Amla and vitamin C group and observed significant decrease for the cholesterol and glucose level in Amla group. The supplementation of Amla powder and vitamin C recorded significant improvement in all production parameters. Live body weights, weekly body weights gain and feed conversion ratio.

**Keywords:** Amla, physiology, broiler, performance.

### Introduction

In recent years herbal supplementation used us phytogetic feed additives, immune protectant and growth enhancer is on rise in poultry nutrition for prevention of various residual effect of chemical and drugs in chicken (Khetmalis *et al.*, 2018). Amla or Indian gooseberry is one of these additives; species is native to India grows in tropical and subtropical regions (Charmkar, & Singh, 2017). Amla has been many therapeutic indicated for anemia, asthma, bleeding gums, diabetes, chronic lung disease, hyperlipidemia (Eevuri and Putturu, 2013).

Amla well known for its nutritional qualities. It is rich in polyphenols, minerals and regarded as one of the richest source of vitamin C (200-900mg/100g of edible portion), that amla is a more potent antioxidant than vitamin. Indian gooseberry or Amla, has superior value in entirely indigenous traditional system of medicine (Variya *et al.*, 2016).

Therefore, Amla can improved red blood cells count and protect it and plasma proteins from the reactive oxygen species induced oxidative damage. Presence of gallic acid and quercetin as the major constituents in Amla (Packirisamy *et al.*, 2018). Therefore, the aim of this study to undertaken to define the effect of dried Amla powder and vit. C supplementation on blood hematology traits and production of broiler (Ross 309).

### Materials and Methods

#### Experimental Design

A total of 90-day-old unsexed broiler chicks (ROSS-308 strain) weighed and randomly assigned to one of three treatments with three replicates of 10 chicks based on a completely randomized design. Three treatments were as follows – T1: Basal diet standards T1 (Control); T2: Basal diet supplemented with vit. C 250 mg/kg; and T3: Basal diet supplemented with Amla fruit powder 1gm/kg.

#### Production performance and management of birds.

Broilers raised on in floor pens with sawdust (5-7 cm) for 6 weeks. Feed and water were provided *ad libitum* throughout the experiment. Chick were fed in three phases, starter (1-10 days), grower (11-21 days), and finisher (22-42 days) All diets met the National Research Council (NRC,1994) , specifications(table 1) recommendations for broilers. Chicks individually weighed at weekly intervals. Feed consumption and FCR (FCR=feed intake/weight gain) were calculated at 21 and 42 day of age.

#### Blood collection and hematology analysis.

Blood samples were collected at the end of the end of experiment (42 day) .blood were collecting from the wing vein by tow type of tube with anticoagulation to estimation the blood hematology procedure (RBC, PCV, Hb, MCV, MCH and MCHC which evaluation as (Campbell, 1995). The other tubes without anticoagulation were centrifuged at 3000 rpm for 20

minutes and serum obtained was stored at  $-20\text{C}^{\circ}$  until analysis. Serum parameters determined by auto analyzer using commercial kits. Serum samples were analyzed for different serum variables like cholesterol, glucose, GOT, GPT, uric acid, Triglyceride, albumin, globulin, and total protein.

### Statistical Analysis

General Linear Model method were used to analyze the results of the study and compare the means,

**Table 1** : Ingredients and chemical composition of basal diet used during starting (1-10 day), growing (11-24) day and finishing (25-42 day) of the experiment.

Ingredients	Starting (1-10) day	Growing (11-24)day	Finishing (25-42)day
Yellow maize	48.53	52.06	54.85
Soybean 44%	39.5	35.4	32.59
Protein	5	5	5
Vegetable oil	4.57	5.66	5.87
Limestone	1.34	1.1	1.08
Salt	0.3	0.3	0.3
Di calcium phosphate	0.7	0.48	0.31
Methionine	0.06	0	0
Total	100	100	100
Chemical composition			
ME, kcal/kg	3025	3150	3200
Crude protein	23.5	22	21
Phosphor	0.50	0.46	0.42
Lysine	1.38	1.28	1.21
Methionine	0.58	0.50	0.49
Methionine+cysteine	0.94	0.84	0.81
Calcium	1.05	0.90	0.85
Crude fibers	3.90	3.7	3.6

### Results and Discussion

#### Production performance

The data of production performance presented in (Table 2) from 1-21 day old of chicks was no significant different in Performance production indicators (body weight, body weight gain, Feed intake and FCR), after 21 day and at the end of the 42 days of age there was significantly ( $p < 0.05$ ) improvement body weight, weekly body weight gain and FCR in T2 and T3 as compared with control group.

The higher body weight and body weight gain observed in amla supplemented group due to attributed to anabolic and antioxidant effect of gallic acid and tannic acids present in Amla (Patel *et al.*, 2016; Patil

with Complete Random Design (CRD) by using Statistical Analysis Software package (SAS, 2010). Duncan test (Duncan, 1955), performed to determine the significance of the differences between the means of the factors on the studied traits at the probability ( $p \leq 0.05$ ).

*et al.*, 2012; Kumari *et al.*, 2012 and Kumar *et al.*, 2013) and the improvement in the body weight of the birds after the supplementation might be due to the beneficial effect of vitamin C on the gut flora. (Nosrati *et al.*, 2017). About the Feed intake there were no significant ( $p > 0.05$ ) differences among the treatment groups (Table 2). Our findings are in agreement with (Kumar *et al.*, 2013; Sanjyal and Sapkota, 2011) which perceived that supplementation of amla had no effect of feed intake. During the period 21-42 day we observed FCR differences among treatments, improvement appeared in favor of amla and vitamin C treatments. This finding agree with (Mandal *et al.*, 2017) who use Amla fruit powder in diets observed beneficial to improve FCR.

**Table 2 :** Effect of addition Amla and vitamin C on production performance of broiler chick ROSS-308

Traits		Body weight (gm)		
Age		1-21	22-42	
Treatments	T1(control)	694.33 ± 1.76		2151.67B ± 28.91
	T2(Vit. C)	3 ± 2.400.969		2295.00A ± 34.64
	T3( Amla )	696 ± 1.00		2306.67A ± 36.55
Body weight gain (gm)				
Treatments	Age	1-21	22-42	1-42
	T1(control)	654.3 ± 1.76	1521.7 b ± 28.9	2111.7 b ± 28.9
	T2(Vit. C)	655.0 ± 2.30	1585.3 a ± 10.8	2248.3 a ± 28.9
	T3( Amla )	656.1 ± 1.0	1610.7 a ± 36.7	2266.7 a ± 36.5
Feed intake (gram/ bird)				
Treatments	Age	1-21	22-42	1-42
	T1(control)	1004.3 ± 7.8	2787.7 ± 68.6	3792.0 ± 66.8
	T2 (Vit. C)	± 4.21002.0	2808.3 ± 38.4	3800.0 ± 57.7
	T3( Amla )	1014.0 ± 7.8	2795.0 ± 46.1	3809.0 ± 38.9
Feed Conversion ratio				
Treatments	Age	1-21	22-42	1-42
	T1(control)	1.53 ± 0.01	1.91 a ± 0.01	1.79 a ± 0.01
	T2 (Vit. C)	1.55 ± 0.02	1.74 b ± 0.01	1.68 b ± 0.02
	T3( Amla )	1.54 ± 0.01	1.74 b ± 0.02	1.68 b ± 0.01

- a, b, c In each column, means with different superscripts are significantly different (p<0.05).
- T1: control group T2: supplemented with vit. C 250 mg/km diet .T3: supplemented with Amla fruit powder 1gm/km diet.

### Hematology Traits

Data pertaining to hematological traits of the experimental birds under different dietary treatments presented in Table 3, revealed significant increase RBC and Hb concentration in T2 and T3 compared with control group. Value of red blood cell indicators MCV, MCH and MCHC under different dietary treatments no significant difference was observed between Amla

supplemented with control group and Vit. C treatment. That is represent the positive effect of Amla and Vitamin C to the RBC generation. Because of two new tankmins, Amla have a very strong antioxidant action. The two emblicanins A and B found to preserve erythrocytes against oxidative stress (Kumar *et al.*, 2018). There is non-significant deferent in MCV, MCH and MCHC between the treatments.

**Table 3 :** Effect of addition Amla and vitamin C on some hematology traits for broiler chick ROSS-308

Traits	RBC (mm <sup>3</sup> × 10 <sup>6</sup> )	PCV%	Hb (g/100ml)	MCV (micron) <sup>3</sup>	MCH (Pico/cell)	MCHC%
T1(control)	2.40b ± 0.21	26 ± 0.57	9.41b ± 0.36	110.07 ± 10.02	39.63 ± 2.17	36.23 ± 1.31
T2 (Vit. C)	3.23a ± 0.28	27.33 ± 0.88	11.16a ± 0.19	85.42 ± 4.99	35.17 ± 3.73	40.95 ± 1.99
T3 (Amla)	2.75a ± 0.15	27.74 ± 0.81	10.69a ± 0.38	101.64 ± 7.33	39.02 ± 1.75	38.56 ± 1.20

- a,b,c In each column, means with different superscripts are significantly different (p<0.05).
- T1: control group T2: supplemented with vit. C 250 mg/km diet .T3: supplemented with Amla fruit powder 1gm/km diet.

### Blood biochemical indicators

From our results (Table 4) significant decrease in GOT, GPT and Triglyceride concentration, in Vitamin C and Amla treats compared with control group. As clear that blood sample (T3) had significant lowering of cholesterol level as compared with control group, may be due to the effect of Amla composition Tannin, which has several effects, as it is a depressant factor on the

cholesterol level and other types of body fat (Sairam *et al.*, 2003).

the glucose levels was a significant decreased in Amla treated revealed the fact role of Amla to lowering glucose levels by stimulating insulin, may be due to Phenolic compounds in the fruit of Amla which affect to the receptors of the insulin hormone leading to increased association with these receptors (Patel *et al.*, 2013).

**Table 3 :** Effect of addition Amla and vitamin C on sum blood biochemical indicators broiler chick ROSS-308

Traits Treatments	GOT( IU/l)	GPT( IU/l)	Triglyceride (mg/100ml)	Cholesterol (mg/100ml)	Glucose (mg/100ml)
T1(control)	157a±3.46	29.33a±3.92	73.81a±2.1	138.99a±4.64	195.36a±3.15
T2 (Vit. C)	128.33b±2.6	16.21b±3.21	48.71b±4.11	125.89a±5.59	186.01a±5.33
T3( Amla )	124.66b±3.54	19b±1.52	51.28b±9.24	109.79b±1.69	151.17b±4.87

- a,b,c In each column, means with different superscripts are significantly different (p<0.05).
- T1: control group T2: supplemented with vit. C 250 mg/km diet .T3: supplemented with Amla fruit powder 1gm/km diet.

### Conclusion

- Increase RBC and Hb when addition Amla or vitamin C and Decrease the concentration of GOT, GPT and triglyceride.
- Amla have the ability to Decrease cholesterol and glucose when supplementation.
- Improved the production performance when addition Amla and vitamin C.

### Acknowledgement

The authors gratefully acknowledge the financial support of Tikrit University of Iraq.

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