Haryana Vet. (December, 2021) **60(2),** 238-240

Research Article

EFFECT OF AMLA SUPPLEMENTATION ON GROWTH PERFORMNCE AND SERUM BIOCHEMICAL PARAMETERS IN NEW ZEALAND WHITE RABBITS

M.K. MEGHNATHI[1], SANTOSH MARANDI[2]*, DEENDAYAL GARG[3], VIVEK KUMAR SINGH[4], M.D. ODEDRA[5] and MUMTAJ ALI[5]

[1]Riddhi Polytechnic in Animal Husbandry, Himatnagar, [2]*Department of Livestock Farm Complex, Faculty of Veterinary and Animal Sciences, Banaras Hindu University, Varanasi-221005, India

[3]Department of Instructional Livestock Farm Complex, [4]Department of Veterinary Physiology and Biochemistry, [5]Department of Livestock Production Management, College of Veterinary Science and Animal Husbandry, Junagadh Agricultural University, Junagadh-362001, India

Received: 07.04.2021; Accepted: 09.06.2021

ABSTRACT

Twenty four weaned New Zealand White rabbits were randomly divided into four groups and fed experimental diets for a period of 8 weeks. The four treatments were –T_1: basal diet without Amla supplementation (control), T_2: basal diet + Amla supplementation @ 0.5 % of concentrate feed, T_3: basal diet + Amla supplementation @ 1.0 % of concentrate feed and T_4 basal diet + Amla supplementation @ 1.5 % of concentrate feed. The net body weight gain was significantly ($p<0.05$) higher in T_2 (1230.67g), T_3 (1218.83g) and T_4 (1193.83g) than T_1 (1185.83g). The feed conversion ratio was better in T_2 (4.15), T_3 (4.19) and T_4 (4.23) Amla supplemented groups compared to the control T_1 (4.33) group. The return over feed cost at the 12th week was the highest in T_2 (Rs. 282.58) followed by T_3 (Rs. 273.94) compared to control group T_1 (Rs. 264.55) and T_4 (Rs. 264.50). No significant differences were observed in blood metabolites except serum glucose and cholesterol which reduced significantly ($p<0.05$) in Amla supplemented groups as compared to the control . The results indicated that dietary supplementation of Amla (@ 0.5 g/kg of concentrate feed) in weaner rabbits improved body weight gain, feed conversion ratio and reduced serum glucose and cholesterol level and higher return from sale of rabbit @ Rs 300/kg.

Keywords: Amla, Blood metabolites, Economic traits, Rabbit

How to cite: Meghnathi, M.K., Marandi, S., Garg, D., Singh, V.K., Odedra, M.D. and Ali, M. (2021). Effect of amla supplementation on growth performnce and serum biochemical parameters in New Zealand white rabbits. *Haryana Vet.* **60(2)**: 238-240.

Rabbit farming is an important enterprise in many countries including India which also contributes in economy. As per 19th Livestock census 2012, total population of rabbit in India was around 5,91,685 and in Gujarat, total population was around 8,638. Rabbits have several advantages as a meat producing animal in view of their smaller body size, high prolificacy, shorter generation interval and ability to convert low quality roughages into nutritious meat fats. They have average body weight of 4.5–5.4 kg with the does being slightly larger than the bucks (Pathak *et al.*, 2014).

The European Union Commission banned the use of antibiotics as a growth promoter in animal diet (European Union Commission, 2005), because of issues with antibiotics resistance and antibiotic chemical residues in animal products which may cause problems for human health (Bach, 2001; Smith *et al.*, 2002). The ban on using antibiotics as growth promoters in the European Union posed a serious challenge for rabbit meat producers (Laukova and Marekova, 2001; Marounek *et al*., 2003).

Amla (*Phyllanthus emblica*) is a member of the small genus of *Emblica* (Euphorbiaceae). The fruit is rich in quercetin, phyllaemblic compounds, gallic acid, tannins, flavonoids, pectin and vitamin C and also contains various polyphenolic compounds. (Tamta and Saxena, 2018).

*Corresponding author: drsantoshlpm@gmail.com

However, the study on effect of Amla supplementation on growth, serum biochemical and economics of New Zealand White rabbit has not been reported. In view of the scanty information available, it is deemed imperative to conduct systematic scientific studies on this aspect.

MATERIALS AND METHODS

The study was carried out at Instructional Livestock Farm Complex and Department of Livestock Production Management, College of Veterinary Science & Animal Husbandry, Junagadh Agricultural University, Junagadh. Twenty four weaner (28 day-old) New Zealand White rabbits were randomly divided into four groups and fed commercial diet for a period of 8 weeks (March-April, 2020). The commercial feed contained dry matter (96.50 %), crude protein (21.44 %), crude fibre (11.75 %), ether extract (3.40 %), nitrogen free extract (58.31 %) and total ash (5.10 %). The three treatments were – T_1: basal diet without Amla supplementation (control), T_2: basal diet + Amla @ 0.5 % of concentrate feed and T_3: basal diet + Amla @ 1.0 % of concentrate and T_4: basal diet + Amla @ 1.5 % concentrate feed. Amla powder was mixed properly in concentrate mixture and offered to the rabbits. During the experimental period, body weight and feed consumption were measured weekly. The chemical composition of feeds were analyzed for dry matter, total ash, crude protein, crude fibre and ether extract as per

AOAC (2005). Blood samples were taken from the marginal ear vein at the start of experiment (4th week) and at the end of the experimental period (12th week). Serum was separated and stored at -20 ºC till analysis. Glucose, total protein, cholesterol, triglyceride, ALT and AST were determined by using commercial diagnostic kits. The data were analyzed by one-way analysis of variance and the significant mean differences were tested by Duncan's multiple range tests (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The average body weights were higher in T_2, T_3 and T_4 compared to T_1 during 4th to 12th weeks of age. The final body weights and net live body weight gain were higher ($p<0.01$) in Amla supplemented groups than the control (Table 1).

The improvement in body weight gain could be due to beneficial effects of tannic acid and flavonoids in the Amla fruit powder which helped in enhancing feed digestion and absorption. Similar results were reported in growing chickens fed Amla (Gaikwad *et al.*, 2014). Feed intake also decreased in Amla supplemented group as compared to control group. Similar results were reported by Kumar *et al.* (2013) in broilers. The present finding is in agreement with the reports furnished by Patel *et al.* (2016), Tiwari *et al.* (2016), Dalal *et al*. (2018),who reported that supplementation of diet with Amla showed significant effect ($P<0.05$) on body weight as compared to control diet.

The feed conversion ratio was better in Amla supplemented groups as compared to the control. Similarly, Kumari *et al.* (2012) and Chaudhary *et al.* (2015) also reported better feed conversion ratio in broilers supplemented with Amla. The improved feed conversion ratio in Amla supplemented groups could be due to the better feed conversion efficiency of nutrients. Similar reports were furnished by Mandal *et al.* (2017), Aljumaily *et al.* (2019) who reported that supplementation of diet with Amla showed significant effect ($P<0.05$) on body

Table1

Effect of amla supplementation (Mean and SE) on growth performance and economics in New Zealand white rabbits

Factor	Treatments				p value
	T_1 (basal diet without Amla)	T_2 (basal diet + Amla @ 0.5 % of concentrate)	T_3 (basal diet + Amla @ 1.0 % of concentrate)	T_4 (basal diet + Amla @ of 1.5 % of concentrate)	
Initial body weight (g)	478.33± 3.62	479.83± 3.37	479.33± 1.78	478.67± 2.48	0.98
Final body weight (g)	1664.17± 4.80	1710.00± 6.38	1698.17± 6.39	1672.50± 9.81	0.003
Net body weight gain (g)	1185.83±5.35	1230.67± 8.12	1218.83± 7.96	1193.83± 12.76	0.009
Total feed intake (g)	5134.72± 30.18	5103.76±37.17	5101.40± 22.14	5045.76± 29.88	0.24
Feed conversion ratio	4.33± 0.03	4.15± 0.03	4.19± 0.02	4.23± 0.06	0.03
Feed cost (Rs.)	228.45	226.77	228.68	225.60	-
Amla cost (Rs.)	-	3.65	7.38	10.90	-
Total feed cost (Rs.)	228.45	230.45	236.06	236.50	-
Feed cost (Rs.)/kg gain	137.27	134.73	138.86	141.62	-
Return (Rs.) from sale of rabbits @ 300/kg	269.55	282.58	273.94	264.50	-

Table 2

Effect of Amla supplementation (Mean and SE) on serum biochemical parameters in New Zealand White Rabbits

Factor	Treatments				p value
	T_1 (basal diet without Amla)	T_2 (basal diet + Amla @ 0.5 % of concentrate)	T_3 (basal diet + Amla @ 1.0 % of concentrate)	T_4 (basal diet + Amla @ of 1.5 % of concentrate)	
Glucose (mg/dl)	107.42± 0.62	96.15± 3.18	96.49± 5.50	95.89± 4.98	0.005
Total protein (g/dl)	6.90± 0.16	7.00± 0.32	7.09± 0.44	6.96± 0.89	0.99
Cholesterol (mg/dl)	45.64± 3.00	26.39± 1.15	28.35± 1.88	23.65±1.01	0.0001
Triglyceride (mg/dl)	108.53±2.02	105.48±1.35	106.48±2.37	106.33± 2.00	0.73
ALT	85.61± 0.89	82.83± 2.32	80.93± 1.81	80.22±2.22	0.21
AST	50.75±2.89	52.13± 0.73	55.34± 2.17	52.28± 3.77	0.66

weight as compared to control.

Economic returns in terms of live weight gain was higher in T_2 and T_3 than T_1 and the income over feed cost were Rs. 269.55, 282.58, 273.94 and 264.50 in T_1, T_2, T_3 and T_4, respectively. Thus better economic efficiency was observed in Amla supplemented group (T_2 and T_3) as compared to control group T_1. No differences were observed in total protein, triglycerides, ALT and AST levels among the groups (Table 2). Khanna *et al.* (2016) also reported similar kind of results during their study on the effect of *Emblica officianalis* and *Spirulina platensis* on New Zealand White rabbits.

Glucose level and Cholesterol level was significantly ($p<0.05$) reduced in Amla supplemented groups than the control, indicating that Amla has positive impact on glucose and cholesterol. Qureshi *et al.* (2009) also reported significant reduction of glucose and cholesterol level in blood serum during their research on effect of dietary Amla supplementation on serum glucose in rats. Similarly, Lama and Saikia (2013) reported significant reduction ($p<0.05$) of serum cholesterol in their study involving dietary Amla supplementation among groups in rats. Results indicated that dietary supplementation of Amla @ 0.5 % and 1.0 % of concentrate feed in weaner rabbits significantly improved body weight gain, feed efficiency and serum glucose and cholesterol level along with more economic returns.

CONCLUSIONS

Overall, it is concluded that feeding of Amla @ 0.5% of feed is beneficial in New Zealand White rabbits in terms of growth performance and comparative economics.

ACKNOWLEDGEMENT

The authors thank Instructional Livestock Farm Complex, College of Veterinary Science and A.H. JAU, Junagadh for providing space and all facilities to conduct this experiment. The authors also thank Principal and Dean, Veterinary College, JAU, Junagadh for providing necessary support for conducting this experiment.

REFERENCES

Aljumaily, T.K.H., Kamil, Y.M. and Taha, A.T. (2019). Effect of addition amla (*Phyllanthus emblica*) and vitamin C powder on some physiological and production performance of broiler. *Plant Archives.* **19(1)**: 1117-1120.

AOAC (2005). Official methods of analysis of the association of official analytical chemist. (18th Edn.), Horwitz William Publication, Washington DC, USA.

Bach, K.E. (2001). Development of antibiotic resistance and options to replace antimicrobials in animal diets. Paper published in proceedings of nutrition society, Ireland, June 27-30. pp. 291-299.

Chaudhary, R.K.; Singh, V.K.; Singh, S.P.; Gautam, S. and Tewari (2015). Effect of herbal supplements of *Curcuma longa*, *Emblica officinalis* and *Nigella sativaon* performace of broilers. *Indian J. Anim. Nutr.* **32(1)**: 90-95.

Dalal, R., Ahlawat, P.K., Panwar, V.S., Tewatia, B.S. and Sheoran, N. (2018). Effect of amla fruit powder on haemato-biochemical parameters of broiler poultry chicken. *Pharma Innovation.* **7(4)**: 20-24.

European Union Commission (2005). Ban on antibiotics as growth promoters in animal feed enters into effect. Regulation 1831/2003/ec on additives for use in animal nutrition, replacing directive 700/524//333c on additives in feedstuffs, Brussels, 22 December.

Gaikwad, D.S., Manwar, S.J., Nage, S.P., Chavan, S.D., Jadhav, D.B. and Wade, M.R. (2014). Effect of supplementation of shatavari root and amla fruit powder on performance of broilers. *Ind. J. Poul. Sci.* **49(3)**: 334-335.

Khanna, S.; Gulati, H.K.; Kumar, S. and Kapoor, P.K. (2016). Effect of *Emblica officinalis* and *Spirulina platensis* on growth performance and serum biochemical parameters in rabbits. *Haryana Vet*. **55(1)**: 50-52.

Kumar, M., Sharma, R.K., Chaudhari, M. and Jakhar, A. (2013). Effect of Indian gooseberry and multi-enzyme supplementation on the performance of broilers during hot weather. *Haryana Vet.* **52**: 66-68.

Kumari, M., Wadhwa, D. and Sharma, A.M. (2012). Effect of Amla (*Emblica officinalis*) pomace feeding on growth performance of commercial broilers. *Indian J. Anim. Nutr.* **29(4)**: 388-392.

Lama, A. and Saikia, H. (2013). Effects of *Emblica officinalis* (Amla) on serum lipids and atherogenesis in albino rats fed with high fat diet. *Indian Med. Gaz.* **147(7)**: 271-275.

Laukova, A. and Marekova, M. (2001). Production of bacteriocins by different enterococcal isolates. *Folia Microbiol.* **46**: 49-50.

Mandal, A.B., Kulkarni, R., Rokade, J.J., Bhanja, S.K. and Singh, R. (2017). Effect of dietary addition of Amla (*Emblica officinalis*) on performance and HSP70 gene expression in coloured broiler chicken during extreme summer. *J. Anim. Sci.* **7(2)**: 233-241.

Marounek, M., Skrivanova, E. and Rada, V. (2003). Susceptibility of *Escherichia coli* to C2- C18 fatty acids. *Folia Microbiol.* **48**: 731-735.

Patel, A.P., Bhagwat, S.R., Pawar, M.M., Prajapati, K.B., Chauhan, H.D. and Makwana, R.B. (2016). Evaluation of *Emblica offinalis* fruit powder as a growth promoter in commercial broiler chickens. *Vet. World.* **9(2)**: 207-210.

Pathak, N., Mehra, U. and Baruah, K.K. (2014). Rabbit production. Delhi, Satish Serial Publishing House. p. 27.

Qureshi, S.A., Asad, W. and Sultana, V. (2009). The effect of *Phyllanthus emblica* Linn on Type–II diabetes, triglycerides and liver – specific enzymes. *Pak. J. Nutr.* **8(2)**: 125-128.

Smith, D.L., Harris, A.D., Johnson, J.A., Silbergeld, E.K. and Morris, J.G. (2002). Animal antibiotic use has an early but important impact on the emergence of antibiotic resistance in human commensal bacteria. In: Proceedings of the National Academy of Sciences, U.S.A., April, 30. pp. 6434-6439.

Snedecor, G. and Cochran, W.G. (1994). Statistical methods (8th Edn.). Oxford & IBH Publishing Co., New Delhi.

Tamta, M. and Saxena, A. (2018). Effect of Amla (*Emblica officinalis*) on the hematology and serum biochemical parameters of rohufingerlings in tarai conditions of Uttarakhand, India. *Int. J. Curr. Microbiol. App. Sci.* **7(10)**: 2188-2194.

Tiwari, A.K., Neeraj, Shinde, K.P. and Gupta, S.K. (2016). Effect of different levels of amla powder (*Emblica officinalis*) on performance of broilers. *Res. J. Anim. Hus. Dai. Sci.* **7(1)**: 16-19.