

An Evaluation of comparative effects of feeding synthetic and herbal choline on broiler performance, nutrient balance and serum activities

Jadhav N. V., V. Nagbhushana, Shivi Maini ¹ and S. M. Kartikesh

Veterinary College,
KVAFSU, Nandinagar, Bidar-585401, India.

Abstract

An experiment in broiler chickens was conducted to evaluate comparative efficacy of herbal and synthetic choline on body weight, weight gain, FCR, nutrient balance serum activities and economic benefit for 35 days on deep litter. A significant ($P<0.05$) increase in body weight gain (110, 181 & 149 g) was observed in synthetic and herbal fed groups. The findings also recorded significant ($P<0.05$) improvement in FCR (1.93, 1.88 & 1.90) in choline supplemented broilers when compared with low choline diet fed (control) birds. The results indicated significant ($P<0.05$) elevation in serum glucose levels (212.6 223.4 mg/dl) and notable reduction in serum cholesterol levels in herbal choline incorporated broilers. The herbal choline added birds noted enhanced nutrient retention and boosted overall economy of broiler raising.

Key words: Broiler chickens, economy, synthetic and herbal choline, nutrient balance, serum activities.

Introduction

Efforts to replace synthetic vitamins and enzymes by herbal preparations are always being made through research to avoid the side effects of them in livestock and poultry. It has been reported that a herbal product lactogen galacta-gogue had effectively maintained the egg production in pullets affected with coccidiosis (Jadhav *et al.*, 1997). Further, it has been recorded that herbal products like Livifit and AV/HTP/36 improved performance and carcass characteristics in broilers (Jadhav *et al.*, 2004). Herbal liver preparations such as Toxiroak & Vilocym Z has been found much beneficial in not merely counteracting the ill effects of toxic principles in poultry feed but also acted as performance promoters (Narahari, D., 1992). Daljeet Kaur *et al.*, (2007) observed significantly ($P<0.05$) better body weight, body weight gain, FCR, energy and protein utilization along with superior immune status and hemato-biochemicals studied in broiler chickens with supplementation of herbal methionone. The objectives of the current investigation were: i) to assess beneficial effects of herbal choline over synthetic one in improving performance of broilers ii) to evaluate the economy of broiler rearing and iii) to find out comparative added advantages of herbal choline in enhancing nutrient retention and any benefit in serum activities.

Materials and Methods

One hundred & Eighty broiler chicks of day old age were randomly divided into three groups with one control and three treatments having 60 birds in each group with 4 replicates of 15 broilers each. The control (T0) was offered low choline feed whereas, other three groups were supplemented with synthetic choline (T1) and AV/BCP/15 (polyherbal formulation) (T2) at the rate of 0.5 g per kg of feed from day old age till the end of trial. The polyherbal formulation, Repchol (AV/BCP/15) was supplied by M/S Ayurved Ltd., Baddi, Solan (H.P.), India. The birds were reared on deep litter with *ad-libitum* feeding and watering. They were fed with broiler starter & finisher rations as per the formulae depicted in table 6. Individual body weights and group feed consumption were recorded at weekly intervals to calculate F.C.R. Feed was analyzed as per (AOAC, 1990) to estimate proximate principles. The nutrient balance was calculated by conducting a metabolic trial of 3 days from 31st. to 33rd days of age. The serum profile was determined as per Mukharjee (1989). The data was statistically analyzed (Snedecor and Cochran, 1980) by pooling the data of replicates together since there was no difference in observations.

Results and Discussion

The findings on weekly body weight, weight gain

1. Dabur Ayurved Ltd. Baddi, India.

Table-1 Comparative effects of feeding synthetic and herbal choline on average body weights of broiler chickens.

Age (Weeks)	To	T1	T2
0	42.06 ± 0.39	42.30 ± 0.38	42.60 ± 0.63
1	75.38 ± 0.46	77.23± 0.56	78.22 ± 0.62
2	171.04 ^a ± 0.73	176.85 ^{ab} ± 0.50	187.23 ^b ± 0.52
3	452.00 ^a ± 0.41	483.00 ^b ± 0.45	495.10 ^b ± 0.42
4	780.00 ^a ± 0.26	810.00 ^{ab} ± 0.40	823.23 ^b ± 0.23
5	1124.00 ^a ± 0.15	1234.00 ^b ± 0.10	1283.30 ^c ± 0.12

Note: The figures bearing minimum one common superscript in a row do not differ significantly (P<0.05)

Table 2: Comparative effects of feeding synthetic & herbal choline on body weight gain and F.C.R. in broiler chickens

Age (wks.)	To			T1			T2		
	BWG	FC	FCR	BWG	FC	FCR	BWG	FC	FCR
1.	32.32±0.21	60.38±0.24	1.81±0.18	34.93±0.33	54.49±0.25	1.56±0.06	35.62±0.41	55.21±0.32	1.55±0.23
2.	95.66±0.27	144.44±0.16	1.51±1.21	99.62±1.51	146.44±2.06	1.47±0.14	109.01±2.12	160.24±1.37	1.47±0.83
3.	280.96±2.04	567.53±1.33	2.02±0.72	306.15±1.38	575.56±1.94	1.88±0.83	307.87±1.30	557.24±2.11	1.81±0.63
4.	328.00±2.04	813.44±2.15	2.48±0.33	327.00±1.93	729.21±1.92	2.23±0.78	328.10±1.60	721.82±2.25	2.20±0.14
5.	344.00±1.81	1021.68±1.94	2.97±0.13	424.00±1.83	1072.72±2.01	2.53±0.66	460.10±1.96	1154.85±2.05	2.51±0.11
AV.	—	—	2.15±0.26	—	—	1.93±0.31	—	—	1.90±0.38

B W G: Body weight gain (g), F C : Feed consumption (g), F C R: Feed conversion ratio

Note: The figures bearing minimum one common superscript in a row do not differ significantly (P<0.05)

and FCR are depicted in table 1 & 2. It can be understood from these results the weekly body weights (110 & 149 g) were significantly (P<0.05) enhanced in treated birds at the end of trial as compared to control i.e. low choline feed. The synthetic choline and herbal ingredients in AV/BCP/15 might have elevated metabolic and conversion rate for effective utilization of leading to improvement in these parameters. The observations tallied the similar noting of Sapkota *et al.*,(2007) who reported that supplementation of herbal growth promoters namely AV/LTP/13, 23 and 33 developed by Ayurved Ltd. did improve weight gain and FCR in broilers. Further, findings also matched with the recordings of Bhanja *et al.*,(2007) who stated that the herbal choline supplemented pullets produced significantly (P<0.021) more percent hen day eggs (84.72) along with significantly (P<0.013) better feed efficiency (1.34 vs 1.54) during 33-36 weeks of age as compared to pullets fed with commercial feed grade choline. The observations of nutrient composition and their balance are tabulated in table 4 and 5 respectively. It can be assessed from these figures that the retention of nutrients such as protein, energy, fibre, fat, NFE, Ca, P and TDN showed numerical but notable improvement in broilers fed with AV/BCP/15. The herbal constituents might have stimulated the metabolic

activities in respect of assimilation and absorption to digest more nutrients. The better figures of body weights, body weight gain and FCR were indicative of these facts. The recording of blood biochemical parameters (aver. values of 5 weeks) is compiled in table 3. It was evident that there was numerical decrease in SGOT and SGPT in treated groups whereas the triglycerides significantly (P<0.05) in those birds when compared with control. The protein level was not affected by the supplementation but the cholesterol levels in treated broilers were significantly reduced, the lowest being in herbal choline supplemented group. The glucose level was significantly (P<0.05) elevated in treated birds again. The addition of herbal choline supplement Repchol (AV/BCP/15) in the diet of poultry significantly contributed in reducing cholesterol, triglycerides & regulating the fat metabolism in broilers in addition to improvement in growth performance & other haematobiochemical parameters. Data of liver enzymes indicated that use of herbal and synthetic products protected the liver function as evident by normalization of ALT & AST enzyme levels. It can be concluded that polyherbal formulation Repchol can replace synthetic choline chloride as evident by the comparable hypocholesterolemic effect & absence

Table 3: Comparative effects of feeding of synthetic & herbal choline on serum activities in broiler chickens.

Parameters	T0	T1	T2
SGOT (μ/Ltr)	218.80±9.33	161.00±8.26	38.60±7.89
SGPT (μ/Ltr)	37.40±3.33	35.00±2.93	27.00±2.22
Protein (g/dl)	5.04±0.05	5.06±0.07	5.38±1.01
Glucose(mg/dl)	196.10±5.77 ^a	202.10±2.88 ^a	23.40±3.83 ^b
Cholesterol (mg/dl)	242.40± 29.20	31.10±21.63	1.50±26.83
Triglycerides (mg/dl)	162.00±18.02	43.40±16.13	6.00±13.11

Table-4 Nutrient composition of experimental diets in feeding of synthetic and herbal choline to broiler chickens (%)

Nutrient	To	T1	T2
DM	96.64	96.69	96.58
OM	89.94	90.12	90.98
CP	20.32	20.21	20.65
TA	06.70	06.57	05.60
CF	03.91	03.96	04.22
EE	02.52	02.18	02.69
NFE	66.55	67.08	66.84

of fatty liver in treatment groups (II, III). The economic impact analysis also revealed that the birds fed polyherbal formulations recorded higher net returns when compared with control as well as synthetic choline inclusion (table 6 & 7). Supplementation of both synthetic and polyherbal formulation resulted in overall improvement of broiler performance, economy, nutrient balance and biochemical parameters when compared with control and birds fed with synthetic choline.

Acknowledgement

The authors are thankful to M/S Ayurvet Ltd. Officials to sponsor the investigation. Similarly our thanks are also due to the authorities of KVAFSU and Dean, Veterinary College, Bidar for providing infrastructure facilities to conduct the research.

References

1. AOAC.(1990): *Official methods of analysis*. 13thEdn. Association of Official Analytical Chemists.

2. Bhanja, S. K., Agarwal, S. K., Elangovan, A. V., Bhattacharyya and Verma, J.(2007): *Proceed. XXIV IPSACON*, 25-27th April, Ludhiana: 109:5-49.

3. Daljeet Kaur, Sodhi Sandeep, Dwivedi P.N. and Nagra S .S. (2007):*Proceed.XXIV IPSACON*,25-27th April, Ludhiana: 94:5-11and12.

4. Jadhav, N.V.(1997): *Indian Vet. J.*, January. 74:19-21.

5. Jadhav, N .V.,Waghmare P. G., Madhavprasad C.B., Ramchandra B., Biradar U. S. and Honnappagol S. S. (2004): *Indian J. Poult. Sci.* 39(2): 175-178.

6. Mukharjee Kanai L. (1989): *Medical Lab. Technoogy*. Vol.3, 1st Edn., Tata McGraw Hill Publishing Co., New Delhi.

7. Narahari, D. (1992): *Poult. Adviser*. 25:37-38.

8. Sapkota D., Baruah K.K. and Upadhyay T.N. (2007):*Proceed. XXIV IPSACON*, 25-27th April, Ludhiana: 112:5-56.

9. Snedecor G. W. and Cochran W. G.(1980): *Statistical methods*.8th Edn Iowa State Univ. Press.Ames, Iowa-50010.

Table-5. Percent Nutrient balance in feeding of synthetic and herbal choline to broiler chickens

Nutrient	To	T1	T2
DMI, Kg/day	0.59	0.64	0.78
OMI, Kg/day	0.53	0.58	0.70
DM	77.63	77.26	77.65
OM	77.55	78.99	79.48
CP	72.47	74.62	76.09
CF	36.08	33.56	44.73
FE	61.42	64.81	79.06
NFE	80.64	91.99	83.16
Ca	40.50	47.81	54.89
P	81.99	88.76	91.34
DCP(Kg) Intake/day	0.1088	0.0954	0.1295
DCP, %	15.11	15.38	15.41
TDN(Kg) intake/day	0.4860	0.4428	0.5703
TDN,%	74.39	75.05	77.07
ME(Mcal) intake/day	1.75	1.59	2.05
ME(Kcal/kg)	2678	2702	2724

Table-6: Feed formulation & Cost of feed for evaluation of comparative effects of feeding of synthetic & herbal choline to broiler chickens.

Sl.No.	Ingredient	Cost/kg(Rs.) Mixing %	Broiler starter (Rs)	Cost/Quintal	Broiler finisher Mixing %	Cost/Quintal (Rs)
1.	Maize	6.00	62.25	373.50	67.75	404.50
2.	Soybean meal	11.00	34.00	374.00	29.00	319.00
3.	Common salt	8.00	00.25	002.00	00.25	002.25
4.	D.C.P.	21.00	02.00	042.00	02.00	042.00
5.	Vit. Premix	320.00	00.15	048.00	00.15	048.00
6.	Trace minerals	35.00	00.15	005.25	00.15	005.25
7.	Lime stone	01.20	01.20	001.42	01.20	001.44
	Total	—	100.00	846.19	100.00	821.44

Table-7: Economic impact analysis for feeding of synthetic and herbal choline to broiler chickens (Benefit over feed cost)

Sl.No.	Particulars	T0	T1	T2
1.	Average body weight at disposal (kg)	1.12	1.23	1.28
2.	F.C.R	2.15	1.93	1.90
3.	Income from extra gain in weight @ Rs. 35.00/kg of live weight (Rs.)	—	3.85	5.60
4.	Saving from improved F.C.R. @ Rs.8.35, average feed cost/kg, (Rs.)	—	1.83	2.08
5.	Net gain per bird (Rs, 3+4)	—	5.68	7.68
6.	Net gain as compared to synthetic choline (Rs.)	—	—	2.00

Correction

Volume 1, No.8, August 2008, Page No.237 : Please read as " Prevalence and antibiogram profile of bacterial isolates from clinical bovine mastitis" - Sumathi, B.R., **Shrikrishna Isloor**, Veeregowda, B.M. and Amitha R. Gomes instead of " Prevalence and antibiogram profile of bacterial isolates from clinical bovine mastitis" - Sumathi, B.R., Veeregowda, B.M. and Amitha R. Gomes.

Volume 1, No.8, August 2008, Page No.241 : Please read as " Effect of Estrogen and Progeterone on seed germination" - Nirmala, G.C., Veena, T., **Mohan, K.**, Jyothi, M.S. and **Pavankumar, K. N.** instead of " Effect of Estrogen and Progeterone on seed germination"- Nirmala, G.C., Veena, T., Jyothi, M.S and Suchitra, B. R