

Comparative Efficacy Studies Of Herbal & Synthetic Choline Supplements On Broiler Growth And Performance

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Citation

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Abstract

An experimental study in one hundred & eighty VenCobb 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 was observed in synthetic and herbal fed groups. The findings also recorded significant ($P < 0.05$) improvement in FCR 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 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.

NAME OF PLACE WHERE THE RESEARCH WORK WAS CARRIED

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INTRODUCTION

Choline is a rediscovered critical amino acid for poultry. Supplementation of choline in poultry ration is well established to improve growth, performance & carcass quality in broilers. (Attia et al., 2005). It has three chemically reactive methyl groups attached to nitrogen atom of glycine molecule. Therefore it can be used as a methyl donor partially to replace methionine in poultry & pigs. In poultry cholines methyl group is available after conversion into Betaine in liver. Research studies indicate that choline has a energy sparing role by reducing maintenance requirement & thus improving overall growth & productivity. (Schrama & Gratis, 2000). Constant efforts to regulate synthetic vitamins and enzymes supplements are being made under organic poultry production programme all around the world so as to minimize the deleterious effects upon excessive & indiscriminate usage (Workel et al., 1999). This experimental study is designed with an aim to evaluate comparative efficacy of synthetic & herbal preparation on growth & performance of broiler. 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 supplement in enhancing nutrient retention and any benefit in serum activities.

MATERIALS AND METHODS

The experimental study was conducted on one hundred & Eighty day old broiler chicks (Vencobb) at the poultry farm, veterinary college Bidar, Karnataka, India. These were randomly divided into three groups with one control and two treatments having 60 birds in each group with 4 replicates of 15 broilers each. The control (T0) was offered low choline feed whereas, other two groups were supplemented with synthetic choline (supplied by Mebros, Chembur, Mumbai, India) (T1) and Repchol (polyherbal formulation) (T2) at the rate of 500gm/tonne of feed of feed from day old age till the end of trial, respectively. The polyherbal formulation, Repchol 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 1. 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 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.

Figure 1

Table 1: Feed formulation & Cost of feed for evaluation of comparative effects of feeding of synthetic & herbal choline to broiler chickens.

S.No.	Ingredient	Broiler starter	Broiler finisher
		Mixing %	
1.	Maize	62.25	67.75
2.	Soybean meal	34.00	29.00
3.	Common salt	00.25	00.25
4.	D.C.P.	02.00	02.00
5.	Vit. Premix	00.15	00.15
6.	Trace minerals	00.15	00.15
7.	Lime stone	01.20	01.20
	Total	100.00	100.00

RESULTS AND DISSCUSION

The results of the experiemental study revealed a significant improvement in weekly & final body weight & FCR in broilers. Final body weight of treatment groups T1 & T2 was significantly higher (1.23 & 1.28kg) than untreated control (1.12kg). A similar trend in weekly body weight gain among three groups was observed. Feed conversion ratio of T2 (Repchol) supplemented group was observed to be significantly lower (1.90) than T1 (1.93) & control (2.15). Herbal ingredients of Repchol namely Trigonella foenumgraecum, Nigella sativum & Citrullus colocynthis & many more, are found to be rich source of choline & are scientifically well proven for improving growth, productivity & hepatoprotection (Al-Ghamdi & Türkdo?an, 2003). The data of total body weight, body weight gain and FCR (table no. were indicative of the fact that herbal constituents of Repchol might have lead to better nutrient utilization in broiler birds. The proximate analysis of feed as per AOAC, 1990 , (table no.4) indicate that the broiler chicks were fed ration as per the standard NRC recommendations.

Figure 2

Table 2: 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 ^{ab} ± 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 ^{ab} ± 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)

Figure 3

Table 3: 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 ^a ±0.72	306.15 ±1.38	575.56 ±1.94	1.88 ^c ±0.83	307.87 ±1.30	557.24 ±2.11	1.81 ^b ±0.63
4	328.00 ±2.04	813.44 ±2.15	2.48 ^c ±0.33	327.00 ±1.93	729.21 ±1.92	2.23 ^b ±0.78	328.10 ±1.60	721.82 ±2.25	2.20 ^b ±0.14
5	344.00 ±1.81	1021.68 ±1.94	2.97 ^a ±0.13	424.00 ±1.83	1072.72 ±2.01	2.53 ^b ±0.66	460.10 ±1.96	1154.85 ±2.05	2.51 ^b ±0.11
AV.	--	--	2.15 ^a ±0.26	--	--	1.93 ^b ±0.31	--	--	1.90 ^c ±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)

Figure 4

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

The blood biochemical parameters were evaluated during 5th week of experimental period. The results of liver marker enzymes Aspartate aminotransferase and alanine aminotransaminase (SGOT and SGPT), total triglycerides & cholesterol revealed a significant decrease in treated groups than untreated control; however a non-significant difference in total serum protein values was observed (table 5). It is well known that requirement of choline is critical for regulating lipid metabolism & deficiency symptoms are well

evident in untreated control group. Kaviarasan et al., 2007 also reported similar hepatoprotective, hypocholesterolemic & lipid lowering activities of some herbs in experimental chicken models. The addition of herbal choline supplement Repchol in the diet of poultry significantly contributed in reducing serum 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 liver marker enzyme levels.

Figure 5

Table 5: Comparative effects of feeding of synthetic & herbal choline on serum activities in broiler chickens.

Parameters	T0	T1	T2
SGOT (μ /Lit)	218.80 \pm 9.33	161.00 \pm 8.26	138.60 \pm 7.89
SGPT (μ /Lit)	37.40 \pm 3.33	35.00 \pm 2.93	27.00 \pm 2.22
Protein (g/dl)	5.04 \pm 0.05	5.06 \pm 0.07	5.38 \pm 1.01
Glucose (mg/dl)	196.10 \pm 5.77 ^a	202.10 \pm 2.88 ^a	223.40 \pm 3.83 ^b
Cholesterol (mg/dl)	242.40 \pm 29.20	231.10 \pm 21.63	211.50 \pm 26.83
Triglycerides (mg/dl)	162.00 \pm 18.02	143.40 \pm 16.13	126.00 \pm 13.11

It can be concluded that polyherbal formulation Repchol can replace synthetic choline chloride as evident by the comparable hypocholesterolemic effect & absence of fatty liver in treatment groups (II, III). Supplementation of both

synthetic and polyherbal formulation Repchol resulted in overall improvement of broiler performance, nutrient balance and biochemical parameters when compared with control and birds fed with synthetic choline.

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