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Effect of dietary supplementation and different bedding materials on the performance index of Japanese quail

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Abstract

A study of 42 days was conducted on 360-dayold Japanese quail chicks, randomly divided in to 12 groups (T1-T12) and each group was replicated into two sub-groups (R₁ and R₂) to evaluate the effect of incorporation of Giloy and neem at 0.5% alone and in combination, along with effect of different bedding materials such as sand and saw dust on performance index of Japanese quail. The data was analysed by 3×4 factorial interaction design and performance index was calculated weekly. The results revealed that the group reared on saw dust and supplemented with Giloy herb (T₂₁) reported minimum and best performance index however if we compare between dietary incorporation then the overall best performance index was recorded in group fed with Giloy alone. Also between different bedding materials, saw dust and wheat straw as bedding materials proves to have better performance index as compared to sand.

Keywords: Giloy, neem, saw dust, interaction, minimum and performance index

Introduction

The poultry sector has undergone a paradigm shift in structure and operation during the last four decades. The success of poultry sector mainly depends on two major factors, i.e. feeding management and housing management. Around 70-80 percent of amount spent on feed purchase in a poultry industry. Feed is the main portion which affects the net return from the poultry industry (Khan *et al.*, 2010) [1]. Recent trend in broiler production is to provide feed containing the feed additives to improve efficiency and get maximum returns in shortest possible time. Various types of feed additives such as antibiotics, enzymes, hormones, prebiotics, probiotics, herbal products *etc.*, are being used as growth stimulants in poultry production. Therefore, in the present study the Giloy (*Tinospora cordifolia*) and Neem (*Azadirachta indica*) were used as feed additive.

Tinospora cordifolia, which is also commonly known as giloy, is an herbaceous vine of the family Menispermaceae indigenous to tropical regions of the Indian subcontinent (Sengupta *et al.*, 2011) [5]. *Tinospora cordifolia* (giloy) is a herbal plant and has promising properties as plant growth promoter (Raina *et al.*, 2013) [4], with potential benefits in poultry. *T. cordifolia* contains various phenolics, alkaloids, steroids, glycosides, diterpenoid lactones, polysaccharides and aliphatic compounds (Sharma *et al.*, 2013) [6]. *T. cordifolia* showed an ability to improve humoral and cell-mediated immunity against Newcastle disease, infectious anemia, gout, and aflatoxicosis.

Neem (*Azadirachta indica*) is an indigenous herb of Asian subcontinent known for its useful medicinal properties since ancient times. It is a fast-growing tree which can attain about 15–20 meters of height. It is called as Divine Tree, Life giving tree, Nature's Drug store, Village Pharmacy and Panacea for all diseases in India (Sharma and Vaquil, 2018) [7].

Among other management practices include bedding management plays an important role in terms of overall production. Common bedding materials include wood shavings, wheat straw, saw dust, peanut hulls, sugar cane straw, and other dry absorbent cheap organic materials used. Sand is also used sometimes as bedding materials. The quality of litter material directly affects the performance, health, carcass quality and welfare of poultry (Malone and Chaloupka, 1983) [2]. Litter serves many functions that include thermal insulation, moisture absorption and protective barrier from the ground.

Further, it permits bird's natural scratching behaviour. Proper litter selection exhibited through the direct contact increase production efficiency and broiler welfare (Skrbic *et al.*, 2012) [9].

Hence, the present experiment was planned to study performance of Japanese quail on different bedding materials such as sand, wheat straw and saw dust with dietary supplementation of giloy herb (*Tinospora cordifolia*) and neem and their combination.

Materials and Methods

Experimental procedure

The quail chicks were randomly allotted to twelve treatment groups with 30 chicks in each treatment in two replications with 15 birds per replication on the basis of feed supplements and bedding materials. Various treatment groups of interaction between supplements and bedding materials and their designations used in the experiment are given in Table 1.

Table 1: Random distributions of broiler chicks and experimental feeds offered in different treatment groups.

Bedding materials	Treatments Groups	No. of broiler chicks/ replication	Number of birds (Japanese quail)	
B ₁ (sand)	T ₁₀	T ₁₀ R ₁	Basal diet (Control)	15
		T ₁₀ R ₂	Basal diet (Control)	15
	T ₁₁	T ₁₁ R ₁	Basal diet + 0.5% Giloy powder	15
		T ₁₁ R ₂	Basal diet + 0.5% Giloy powder	15
	T ₁₂	T ₁₂ R ₁	Basal diet + 0.5% Neem leaves powder	15
		T ₁₂ R ₂	Basal diet + 0.5% Neem leaves powder	15
T ₁₃	T ₁₃ R ₁	Basal diet + 0.5% Giloy powder and 0.5% Neem leaves powder	15	
	T ₁₃ R ₂	Basal diet + 0.5% Giloy powder and 0.5% Neem leaves powder	15	
B ₂ (saw-dust)	T ₂₀	T ₂₀ R ₁	Basal diet (Control)	15
		T ₂₀ R ₂	Basal diet (Control)	15
	T ₂₁	T ₂₁ R ₁	Basal diet + 0.5% Giloy powder	15
		T ₂₁ R ₂	Basal diet + 0.5% Giloy powder	15
	T ₂₂	T ₂₂ R ₁	Basal diet + 0.5% Neem leaves powder	15
		T ₂₂ R ₂	Basal diet + 0.5% Neem leaves powder	15
T ₂₃	T ₂₃ R ₁	Basal diet + 0.5% Giloy powder + 0.5% Neem leaves powder	15	
	T ₂₃ R ₂	Basal diet + 0.5% Giloy powder + 0.5% Neem leaves powder	15	
B ₃ (wheat straw)	T ₃₀	T ₃₀ R ₁	Basal diet (Control)	15
		T ₃₀ R ₂	Basal diet (Control)	15
	T ₃₁	T ₃₁ R ₁	Basal diet + 0.5% Giloy powder	15
		T ₃₁ R ₂	Basal diet + 0.5% Giloy powder	15
	T ₃₂	T ₃₂ R ₁	Basal diet + 0.5% Neem leaves powder	15
		T ₃₂ R ₂	Basal diet + 0.5% Neem leaves powder	15
T ₃₃	T ₃₃ R ₁	Basal diet + 0.5% Giloy powder + 0.5% Neem leaves powder	15	
	T ₃₃ R ₂	Basal diet + 0.5% Giloy powder + 0.5% Neem leaves powder	15	
Total Birds			360	

Parameter studied

Performance Index (PI): PI is calculated on weekly basis as follows,
The performance index calculated in terms of weight gain per unit of feed conversion ratio.

$$\text{Performance Index} = \frac{\text{Avg. Weight Gain (g)}}{\text{FCR}}$$

Statistical Analysis

The experimental data were subjected to analysis of variance (3x4 factorial designs) (Snedecor and Cochran 1989). Means showing significant differences were compared by Duncan's New Multiple Range Test (DNMRT) (Duncan, 1955). Statistical significance was accepted at P<_0.05. The results were interpreted and expressed as means ± SEM.

Results and Discussion

Effect of dietary supplementation on performance index

The data of performance index of different groups based on dietary supplementation at weekly intervals as well as on an overall basis in the experiment have been summarized in Table 2 and illustrated in Fig. 1. The overall mean performance index for T₀, T₁, T₂, and T₃ groups were found to be 53.50, 64.69, 59.72 and 63.72, respectively.

The statistical analysis of variance revealed highly significant (P<0.01) effect of supplementation on cumulative

performance index of quail chicks was observed at 2nd and 4th week of experiment

Non-significant effect was observed at 1st and 5th week and significant effect was observed at 3rd, 6th week.

On the basis of DNMR test the cumulative performance index found highest for T₁ group and lowest for control group.

From the results of present experiment, it is clearly revealed that the group supplemented with Giloy as feed additives showed better for overall period noted in group supplemented with Giloy herb.

Significant improvement in performance index is in agreement with Singh (2014) [8] who reported significantly improved Performance Index in Giloy supplemented groups @ 0.5 to 1%.

Onyimonyi *et al.* (2009) [3] who recorded better performance of bird due to supplementation of NLE in the poultry ration.

Table 2: Effect of dietary supplements on Performance Index at different weeks

Supplement Effect	Age in Weeks						Cumulative
	1 st	2 nd	3 rd	4 th	5 th	6 th	
T ₀	11.64	15.33 ^a	19.60 ^b	8.08 ^a	5.96	4.37 ^a	53.50 ^a
T ₁	10.28	21.74 ^b	15.68 ^a	9.86 ^b	8.91	6.33 ^b	64.69 ^c
T ₂	11.17	19.39 ^b	17.97 ^{ab}	9.82 ^b	7.99	5.67 ^{ab}	59.72 ^b
T ₃	10.85	19.58 ^b	17.46 ^{ab}	7.99 ^a	9.44	6.60 ^b	63.72 ^{bc}
SEM	0.48	0.74	0.83	0.31	0.88	0.50	1.40

a, b, c- Means superscripted with different letters within a column differ significantly from each other.

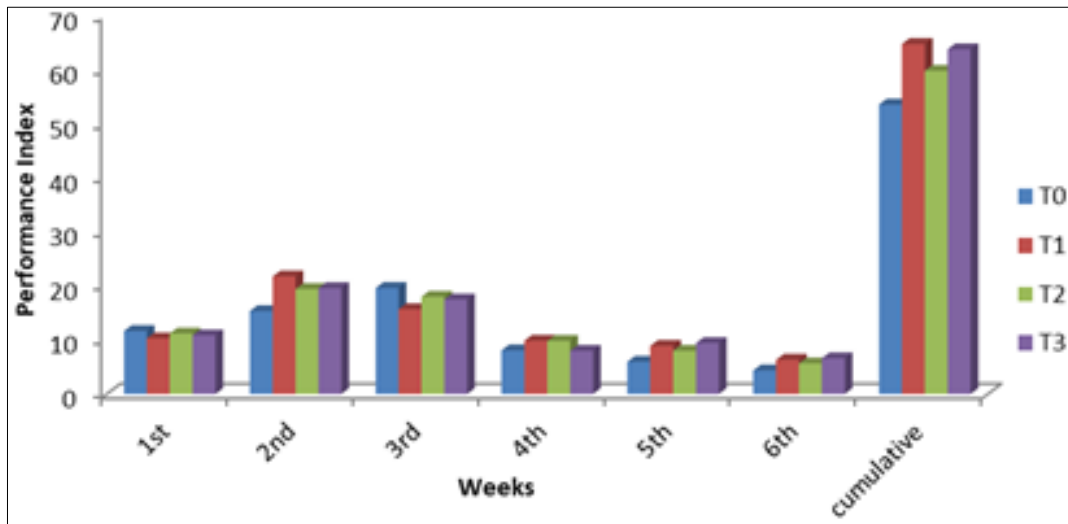


Fig 1: Effect of dietary supplements on Performance Index at different weeks

Effect of bedding materials on Performance index

Performance index of Japanese quail on the basis of different bedding materials at weekly interval subjected to various treatment groups are presented in Table 3, and illustrated in Fig. 2.

Highly significant effect of bedding materials was observed at 2nd, 4th, 6th week of experiment. Non-significant effect was observed during 1st, 3rd and 5th week of experiment.

The overall mean performance index according to bedding material for B₁, B₂ and B₃ groups were found to be 55.04, 63.89 and 62.29 respectively.

The statistical analysis of variance revealed highly significant (P<0.01) effect among different bedding materials on performance index in which B₂ (saw-dust) group showed

highest mean performance index as compare to rest of the groups.

From the results of the present experiment it was observed that saw dust showed better performance index as compare to sand and wheat straw.

Table 3: Effect of bedding materials on Performance Index at different weeks

Bedding Effect	Age in weeks						Cumulative
	1 st	2 nd	3 rd	4 th	5 th	6 th	
B ₁	11.28	18.18 ^a	16.60	8.88 ^a	7.38	3.86 ^a	55.04 ^a
B ₂	10.51	21.01 ^b	17.91	10.54 ^b	7.89	6.90 ^b	63.89 ^b
B ₃	11.16	17.85 ^a	18.51	7.41 ^a	8.94	6.46 ^b	62.29 ^b
SEM	0.42	0.64	0.72	0.27	0.76	0.43	1.21

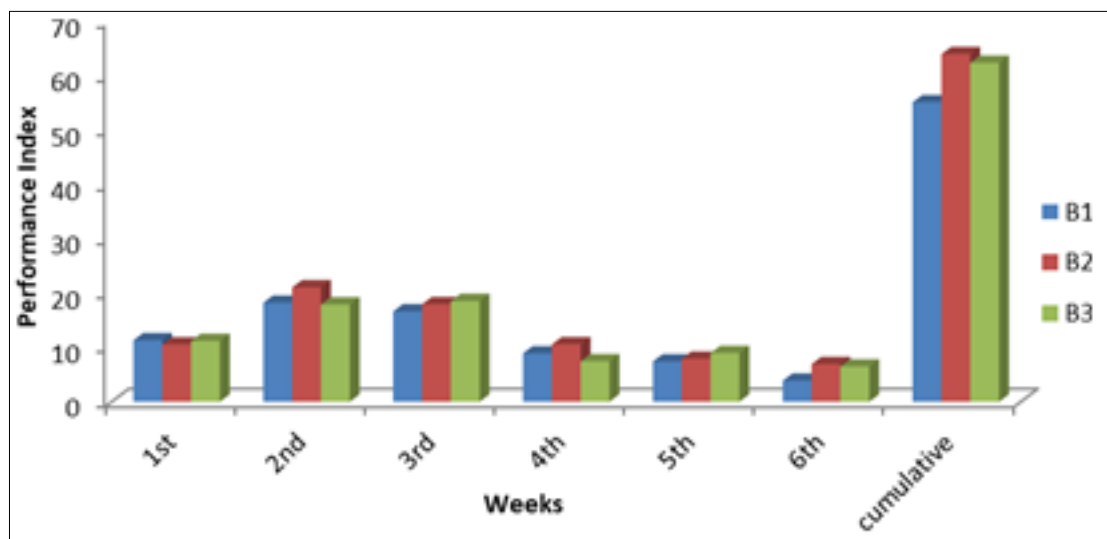


Fig 2: Effect of bedding materials on Performance Index at different weeks

Interaction effect of dietary supplements and bedding materials on Performance index

The mean performance index of Japanese quail on the basis of interaction between dietary supplements and different bedding materials subjected to various groups at different weeks of age have been presented in Table 4 and depicted in Fig. 3.

The cumulative performance index after end of experimental period was found to be 50.61 in group T₁₀, 57.06 in group T₁₁, 56.67 in group T₁₂, and 55.84 in group T₁₃ 55.55 in group T₂₀,

74.59 in group T₂₁, 60.73 in group T₂₂, 64.70 in group T₂₃, 54.36 in group T₃₀, 62.44 in group T₃₁, 61.74 in group T₃₂ and 70.63 in group T₃₃.

Highly significant effect (p<0.01) was observed on performance index at 2nd week of experiment. Significant effect was observed at 3rd and 6th week and non-significant effect observed at 1st, 4th, 5th week. However, T₂₁ group reported best cumulative performance index from 1st day to end of experiment (74.59).

Table 4: Effect of dietary supplements and bedding materials Interaction on Performance Index at different weeks

Interaction Effect	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week	Cumulative
T ₁₀	11.96	15.63 ^a	19.91 ^{cd}	7.26 ^{ab}	5.97	2.89 ^a	50.61 ^a
T ₁₁	10.27	22.22 ^{cd}	12.36 ^a	8.91 ^b	8.56	3.63 ^{ab}	57.06 ^{bc}
T ₁₂	11.12	18.57 ^b	15.24 ^{abc}	11.34 ^c	8.02	4.78 ^{ab}	56.67 ^{bc}
T ₁₃	11.77	16.29 ^{ab}	18.91 ^{bcd}	8.00 ^{ab}	6.98	4.16 ^{ab}	55.84 ^{ab}
T ₂₀	10.86	15.29 ^a	19.94 ^{cd}	8.79 ^b	7.77	5.04 ^{ab}	55.55 ^{ab}
T ₂₁	9.88	20.14 ^{bc}	19.23 ^{bcd}	13.86 ^d	8.89	9.51 ^d	74.59 ^e
T ₂₂	11.14	22.22 ^c	17.91 ^{bcd}	11.24 ^c	5.30	6.59 ^{bc}	60.73 ^{bc}
T ₂₃	10.18	26.39 ^d	14.57 ^{ab}	8.26 ^{ab}	9.62	6.44 ^{bc}	64.70 ^{cd}
T ₃₀	12.11	15.08 ^a	18.95 ^{bcd}	8.20 ^{ab}	4.14	5.17 ^{ab}	54.36 ^{ab}
T ₃₁	10.69	22.85 ^{cd}	15.45 ^{abc}	6.82 ^a	9.29	5.84 ^{ab}	62.44 ^{bc}
T ₃₂	11.24	17.39 ^{ab}	20.76 ^d	6.89 ^a	10.64	5.63 ^{ab}	61.74 ^{bc}
T ₃₃	10.60	16.07 ^{ab}	18.89 ^{bcd}	7.71 ^{ab}	11.71	9.20 ^{cd}	70.63 ^{de}
SEM	0.83	1.28	1.43	0.53	1.53	0.86	2.42

a, b, c- Means superscripted with different letters within a column differ significantly from each other.

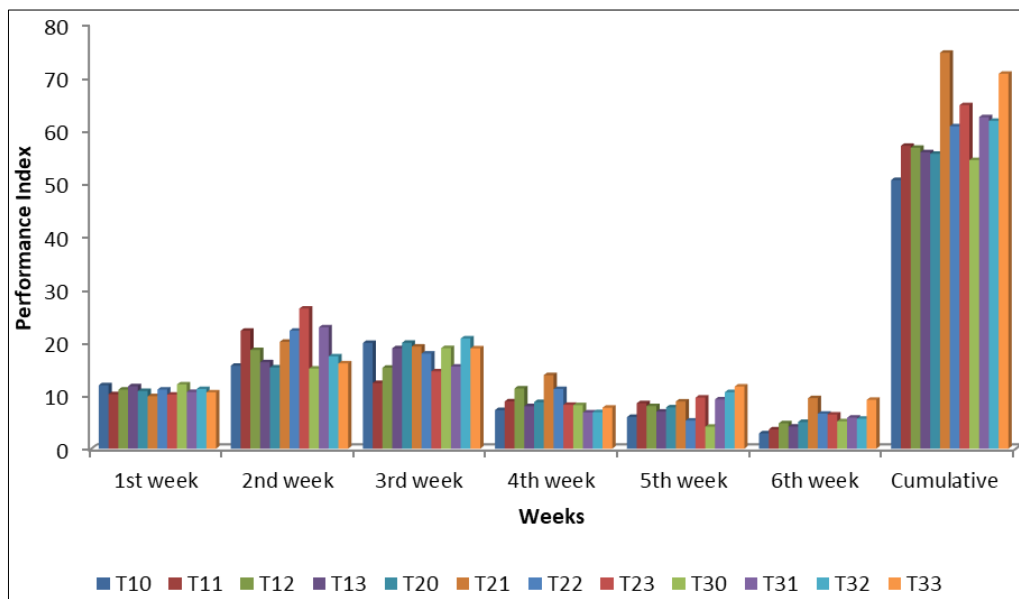


Fig 3: Effect of dietary supplements and bedding materials Interaction on Performance Index at different week

Conclusion

It can be concluded that the overall best performance index in Japanese quail was recorded in group fed with Giloy alone if we compare effect of dietary supplementation alone. Moreover saw dust and wheat straw as bedding materials proves to have better performance index as compared to sand between three different bedding materials. Also interaction of dietary supplementation and different bedding materials revealed that the minimum and best performance index was observed in the groups supplemented with Giloy (T₂₁) with saw dust as bedding material when compared to rest of the groups.

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Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. Khan RU, Durrani FR, Chand N, Anwar H. Influence of

feed supplementation with Cannabis sativa on quality of broilers carcass. Pakistan Vet J. 2010;30(1):34-38.
 2. Malone GW, Chaloupka GW. Influence of litter type and size on broiler performance. 2. Processed newspaper litter particle size and management. Poultry Science. 1983;62(9):1747-1750.
 3. Onyimonyi AE, Olabode A, Okeke GC. Performance and economic characteristics of broilers fed varying dietary levels of neem leaf meal (*Azadirachta indica*). International Journal of Poultry Science. 2009;8(3):256-259.
 4. Raina MTN, Arora M, Madan S. Standardization and evaluation of formulation parameters of *Tinospora cordifolia* tablet. J Adv. Pharm. Edu. Res. 2013;3:440-449.
 5. Sengupta M, Sharma GD, Chakraborty B. Hepatoprotective and immunomodulatory properties of aqueous extract of Curcuma longa in carbon tetra chloride intoxicated Swiss albino mice. Asian Pacific journal of tropical biomedicine. 2011;1(3):193-199.
 6. Sharma P, Velu V, Indrani D, Singh RP. Effect of dried guduchi (*Tinospora cordifolia*) leaf powder on rheological, organoleptic and nutritional characteristics of cookies. Food Res. Int. 2013;50:704-709.
 7. Sharma V. A review on medicinal properties of Neem (*Azadirachta indica*). 2018.

8. Singh A. Effect of Feeding *Aegle marmelos* and *Tinospora cordifolia* Herbs alone and in combination on the Performance of Broiler Chicks (Doctoral dissertation, Rajasthan University of Veterinary and Animal Sciences, Bikaner-334001).
9. Skrbic Z, Pavlovski Z, Lukic M, Petricevic V, Milic D. The effect of lighting program and type of litter on production and carcass performance of two broiler genotypes. *Biotechnology in Animal Husbandry*. 2012;28:807-816.