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Effect of feeding rosemary and fenugreek alone and in combination on the dry matter digestibility and nitrogen balance of broiler chicks

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Abstract

The aim of this study was to determine the optimum level of incorporation of Rosemary (*Rosmarinus officinalis*) and Fenugreek (*Trigonella foenum-graecum* L.) alone and in combination on performance (body weight gain, feed consumption, feed conversion ratio (FCR) and carcass weight of broiler chicks. 300 broiler chicks were divided into four groups of 30 chicks with two replicates R1 and R2 as i.e. control group fed on un-supplemented diet and B1, B2 and B3 supplemented with 0.5%, 1% and 1.5% level of Rosemary, respectively. B₁G₁, B₂G₂ and B₃G₃ treatment groups were supplemented with 0.5%, 1% and 1.5% level of both Rosemary and Fenugreek in combination, respectively. The findings of present study indicated that incorporation 0.5% for Rosemary, 1% for fenugreek and 1% for Rosemary and fenugreek combination could be effectively use in the ration of broiler chicks to improve performance.

Keywords: Rosemary and fenugreek alone, dry matter digestibility, nitrogen balance, broiler chicks

Introduction

Broiler production is the quickest way to increase the availability of high-quality protein for human consumption. The advantages of broiler farming are small initial investment, short generation interval, quick assured and better returns, no need of trained manpower, high nutritive value of poultry meat, high fertilizer value of poultry manure and economic feasibility. Feed is a major component, affecting net return from the poultry business, because 80% of the total expenditure in terms of cash is spent on feed purchase (Khan *et al.*, 2010) [8]. In the feed industry, herbal feed additives are a new class of growth promoters in feed industry. Supplementation of these agents are aimed to improve digestibility and bioavailability of various nutrients, thereby, enhancing the productivity and economic gains by reducing the input costs. Production of food must be safe for human consumption; it is highly desirable to use medicinal plants and natural resources having natural antibiotic properties. Medicinal plants are effective alternatives to antibiotics.

Effect of Fenugreek as natural feed additive on the performance of broiler chicks has also been widely noticed. Fenugreek (*Trigonella Foenum-Graecum* L.), is an annual plant in the family Fabaceae. It is a good source of dietary protein (approximately 20-30%) for consumption by human and animals, fatty acids (5-10%) which are predominantly linoleic, linolenic, oleic and palmitic acids and 45-65% total carbohydrates with 15% of galactomannan (Schryver, 2002) [13]. It contains neurin, biotin, trimethylamine which tends to stimulate the appetite by their action on the nervous system (Al-Habori and Roman, 2002) [11]. Rosemary, needle-like leaves and white, pink, purple or blue flowers, belonging to the Lamiaceae family, it contains phenolic acids; phenolic diterpenoid bitter substances; triterpenoid acids; flavonoids; volatile oil and tannins (Newall, 1996) [10]. It improve digestion and growth performance, prevent brain aging, protection against muscular degeneration, antispasmodic, diuretic, stomach relief sedative, also improve meat quality (Smet *et al.*, 2005) [11] and egg quality (Galobart *et al.*, 2001) [6].

Materials and Methods

Three hundred day-old, unsexed, apparently healthy broiler chicks (Cob-400 strain) were wing banded, individually weighed and randomly divided into ten groups of 30 chicks each having almost similar average body weight. Each group of 30 chicks was further subdivided into two groups having 15 chicks each and were reared in 20 separate, clean and disinfected deep litter

brooder houses (5x2 factorial experimental design). Routine vaccination against Ranikhet Disease (F1 strain) and Infectious Bursal Disease was carried out on 7th and 14th day of procurement of day-old chicks. Identical standard managemental practices regarding brooding, feeding, watering and disease control etc. were followed for each group. Commercially available readymade broiler starter and broiler finisher rations were procured and feed additives such as Rosemary and Fenugreek were supplemented. The Rosemary and Fenugreek were supplemented @ 0.5%, 1% and 1.5% alone and in combination in the experimental broiler starter and finisher rations subjected to 10 treatment groups i.e. C, B₁, B₂, B₃, G₁, G₂, G₃, B₁G₁, B₂G₂, B₃G₃ with 30 chicks in each. Each group of 30 chicks was further subdivided into two subgroups having 15 chicks each and were designated as CR₁, CR₂, B₁R₁, B₁R₂, B₂R₁, B₂R₂, B₃R₁, B₃R₂, G₁R₁, G₁R₂, G₂R₁, G₂R₂, G₃R₁, G₃R₂, B₁G₁R₁, B₁G₁R₂, B₂G₂R₁, B₂G₂R₂, B₃G₃R₁, B₃G₃R₂. The experimental starter and finisher rations contained 22.40 and 21.10% C.P., respectively. The chicks were offered a weighed amount of experimental ration at a fixed morning hour (9.30 AM) every day during the trial period. Group-wise feed consumption was recorded at weekly intervals. Weekly average body weight, average weight gain (g), average feed consumption (g) of each pan was recorded and average feed intake in gram/chick/week was calculated. FCR was calculated by dividing the cumulative feed intake by body weight gain of chicks for every week. For carcass traits *viz.*, dressed weight percentage and eviscerated weight percentage, three representative birds from each group were sacrificed for carcass study at the end of 6th week. Selected birds had live weight similar to the mean live weight of the population concerned

Results and discussion

Body weight gain

The highest mean body weight gain recorded for B₂G₂ was

statistically comparable with B₁ but significantly higher than rest of the groups. These results showed positive effect on body weight gain due to incorporation of extract from plant in the diet of broilers.

Feed Consumption

Overall highest mean feed consumption was recorded for B₁, which was significantly higher than B₃ and B₁G₁ and statistically comparable with others. Lowest feed consumption was recorded in B₁G₁ group. The results of study in text did not get support from the findings of Dwivedi (2013) [5] recorded non-significant effect in feed consumption on account of incorporation of herb Shatavari, Bael and Giloy, respectively in the diet of broiler chicks but get full support of Saini (2014) [9] recorded improvement in feed consumption on account of incorporation of herb as feed additive in the diet of broilers.

Feed Conversion Ratio

In total mean FCR of I-VI week lowest FCR was recorded in B₁ and highest in control group. The result obtained in present study fall in line with the findings of Ghazalah and Ali (2008) recorded improvement in FCR with inclusion of Rosemary at 0.5% and Awadein *et al.* (2010), and Mamoun *et al.* (2014) on inclusion of Fenugreek as well as Appusamy (2012).

Carcass Traits

Though statistically the results were non-significant for dressed weight but apparently on observing the data highest dressed weight was recorded in B₂G₂ followed by B₁, G₂, G₃, B₁G₁, B₃G₃, G₁, B₂, B₃ and C. These results obtained in study in text corroborate well with the findings of Alloui *et al.* (2012), Srivastava *et al.*, (2012) and Singh (2014) recorded similar findings upon inclusion of herbs in the ration of broilers. Highest eviscerated weight was recorded in B₁, which was comparable with G₂, B₂, G₁, B₃G₃ and B₂G₂ and lowest for C, *i.e.*, control.

Table 1: Shows Main Effects Body Weight Gain (g) Feed Consumption FCR Dressed Weight (%) Eviscerated Weight (%)

Main Effects	Body Weight Gain (g)	Feed Consumption	FCR	Dressed Weight (%)	Eviscerated Weight (%)
B ₁	1650.20 ^e	3392.59 ^b	1.991	79.05	71.33 ^d
B ₂	1526.15 ^{bc}	3325.73 ^{ab}	2.077	76.82	70.28 ^d
B ₃	1488.98 ^b	3261.65 ^a	2.092	76.02	67.64 ^{abc}
G ₁	1556.44 ^c	3270.36 ^{ab}	2.020	76.96	70.57 ^{bcd}
G ₂	1604.61 ^d	3341.88 ^{ab}	2.021	78.29	71.09 ^d
G ₃	1539.51 ^c	3304.27 ^{ab}	2.059	78.12	67.55 ^{ab}
B ₁ G ₁	1551.51 ^c	3221.02 ^a	2.047	77.54	67.39 ^{ab}
B ₂ G ₂	1654.73 ^e	3382.60 ^{ab}	2.006	79.63	69.30 ^{bcd}
B ₃ G ₃	1531.67 ^{bc}	3298.32 ^{ab}	2.066	77.15	69.73 ^{bcd}
C	1475.30 ^a	3344.42 ^{ab}	2.096	75.92	65.19 ^a
SEM	25.36617	16.23568	0.251935	0.487716	0.458477

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

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