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

In the present study a feeding trial of six weeks followed by metabolism trials were conducted, using 300 broiler chicks (cobb-400) in 5x2 factorial design. The ten treatments were designated as C i.e. control group fed on unsupplemented diet and B1, B2 and B3 treatment group supplemented with 0.5%, 1% and 1.5% level of Rosemary in the experimental broiler starter and finisher ration, respectively. Likewise G1, G2 and G3 treatment group were supplemented with 0.5%, 1% and 1.5% level of Fenugreek in the experimental broiler starter and finisher ration, 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. All the treatment groups were further divided in two replicates namely R1 and R2. Significant effect of dietary treatments i.e. incorporation of Rosemary, Fenugreek and their combination at different levels on dry matter digestibility and nitrogen balance were observed. The findings of present study in respect with all parameters included in the study indicated that incorporation of Rosemary and Fenugreek alone and in combination could be effectively used in the ration of broiler chicks to improve dry matter digestibility and nitrogen balance. The optimum levels adjudged from present study were 0.5% for Rosemary, 1.0% for Fenugreek and 1% for Rosemary and Fenugreek combination.

Key words: Broiler, Fenugreek, Rosemary, dry matter digestibility and nitrogen balance.

Introduction

In developing countries, the increasing cost and decreasing supply of traditional feedstuffs are expected to constrain the future expansion of poultry production. As a primary source of animal protein, the poultry sector offers a valuable repository to bridge the gap between demand and the availability of balanced nutrition. Poultry production, particularly broiler production is the quickest way to increase the availability of high quality protein for human consumption. Some valuable nutrients in feed are wasted because the birds are not able to utilize them. This may be due to several reasons like lack of digestive enzymes, insufficient time for digestive activity, sub clinical infection and inadequate processing of feed ingredients. Therefore, feeding aspect needs to be carefully guarded to allow the growth of industry. To ensure more net return and to minimize high expenditure on feed are the main challenges, for which many research strategies have been practiced such as introducing feed supplements and feed additives (Khan et al., 2011). Feed additives are generally used to improve feed intake and to increase the growth rate in broilers (Fadlalla et al., 2010; Bali et al., 2011 and Abouelhefouha and Moussa, 2012). The use of chemical products especially hormones and antibiotics, may cause unfavourable side effects due to their residues in meat. Moreover, there is evidence indicating that these products could be considered as pollutants. Various plants extracts can improve feed conversion ratio, increase carcass quality, decrease the market age of broiler and reduced their rearing cost (Javed et al., 2009). Rosemary, needle-like leaves and white, pink or blue flowers, belonging to the Lamiaceae family, it contains phenolic acids; phenolic diterpenoid bitter substances; terpenoid acids; flavonoids; volatile oil and tannins (Newall, 1996). 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) and egg quality (Galobart et al., 2001). Fenugreek is cultivated worldwide as a semi-arid crop and its seeds are a common ingredient in dishes from the Indian Subcontinent. It is a good source of dietary protein, fatty acids which are predominantly linoleic, linolenic, oleic acid, palmitic acids and 45-65% total carbohydrates with 15% of galactomannan (Schryver, 2002). It contains minerals, B complex, iron, phosphates, PABA (Para-Amino Benzoic Acid), vitamins (A, D), lecithin and choline that help to dissolve cholesterol and fatty substances (Dixit et al., 2005).

Materials and Methods

Three hundred-day-old, unsexed, apparently healthy broiler chicks (Cobb-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 and B3G3 that were supplemented with 30 chicks in each. Each group of 30

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chicks was further subdivided into two subgroups having 15 chicks each and were designated as CR1, CR2, B1, B2, G1, G2, G3, B1, B2, B3, G1, G2, G3, B1, B2, B3, G1, G2, G3, B1, B2, B3, G1, G2, G3. The experimental starter and finisher rations contained 22.40 and 21.10% CP, respectively. Dry matter digestibility and nitrogen balance studies were conducted using 5 chicks from each group for 7 days during feeding trial. During this period the five birds from each treatment subjected to balance study were transferred to metabolic cages. Polythene sheet of appropriate size was spread over the dropping trays for collection of mixed excreta in each group. The chicks were offered a weighed amount of experimental ration at a fixed morning hour (9:30 AM) every day during the trial period. The mixed droppings were collected at the end of each 24 hours and pooled to get the total excreta voided during the trial period. Daily feed intake was calculated after deducting the left over from the feed offered.

Representative feed samples were drawn from the bulk, finally ground and stored in sample bottles for analysis. The group wise aliquots from droppings after thorough mixing with the help of spatula were drawn for dry matter and nitrogen estimation. Dry matter determination of excreta was done in duplicate for each group by keeping the weighed bottles and kept in refrigerator. Dry matter determination of excreta in each group. The chicks were offered a weighed amount of experimental ration at a fixed morning hour (9:30 AM) every day during the trial period. The mixed droppings were collected at the end of each 24 hours and pooled to get the total excreta voided during the trial period. Daily feed intake was calculated after deducting the left over from the feed offered.

Results and Discussion

Besides the physiological form, quantitative and qualitative attributes of feed, the effect on dry matter digestibility is essential parameter to assess the nutritional worth of the phytoadditive or feed additive such as Rosemary and Fenugreek used to improve feed utilization in living system. The digestibility of dry matter was determined in various treatment groups to determine the effect of supplementation of Rosemary and Fenugreek alone and in combination in ration of broilers on digestibility of feed.

Dry matter digestibility

The mean values of digestibility coefficient of dry matter for various treatment groups have been presented in Table 1. The results showed highly significant (P<0.01) effect of supplementation of Rosemary and Fenugreek alone and in combination in ratio of broilers on digestibility of feed.

Nitrogen balance

The overall intake and balance of nitrogen, which could be considered as the indices of overall well-being of the animal were estimated in all the treatment groups as g/d and the mean values have been depicted in Table 1. All broilers in various treatment groups were found to have positive nitrogen balance. The statistical analysis of variance revealed highly significant (P<0.01) effect of supplementation of Rosemary and Fenugreek in terms of nitrogen voided and nitrogen balance but non-significant in nitrogen intake. Further, on comparison of means significant differences were recorded among treatment groups with maximum intake in B1.

Regarding excretion of nitrogen in droppings, maximum excretion was noticed in B1 followed by G2, G3, B2, G1, B3, G1, G2, and B3. In respect of nitrogen balance, which is important for overall well being of broilers, the statistical analysis results and comparison of means revealed highest retention in B2. Nitrogen balance in B1 and B2 was though comparable with each other but significantly higher than rest of the groups and nitrogen balance in C was significantly lowest. These results of study in text in terms of nitrogen balance suggested that supplementation of Rosemary and Fenugreek improved the retention of nitrogen.

References


