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RESEARCH ARTICLE

EFFECT OF BLACK TEA EXTRACT (POLYPHENOLS) ON PERFORMANCE OF BROILERS

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Abstract

An experiment was run to evaluate the performance of polyphenols present in black tea extract (BTE) in diets on the growth rate, feed consumed, feed conversion ratio (FCR), and health performance of broilers. Forty cob broilers day old were housed in PCSIR experimental station and raised over 0 to 6 weeks. Four groups with two replicates of 5 chicks in each were kept under four diets A B C D which were commercially formulated. A starter diet from day 1 to 21 and grower diet from day 22 to 42 were fed. Weight gain and cumulative feed consumed were measured and feed conversion ratio (FCR) was calculated at the end. Results showed that positive control with BTE(C) has significantly higher weight gain, feed intake and FCR.

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Introduction

It is well known that plants and plant extracts are continuously used as treatment against bacterial diseases and have been known to have antibacterial and antifungal properties. Number of researches have proved tea leaves and their extracts are beneficial to human beings (Dufresne and Farnworth, 2001; Ferrara *et al.*, 2001 Kobayashi *et al.*, 2006; Pastore and Fratellone, 2006; Zhu *et al.*, 2006; Hsieh and Chen, 2007; Khan and Mukhtar, 2007; Chen *et al.*, 2008; Wang *et al.*, 2008). Decline effect on increased serum triglyceride levels in mice treated with olive oil have been reported in some pharmacological studies (Yoshikawa *et al.*, 2005). No toxicity signs have reported in humans by polyphenols, present in tea (Dini *et al.*, 2001; chow *et al.*, 2003; Knight *et al.*, 2004; Sparg *et al.*, 2004). Bitterness of saponins is approved which is present in the plant and their medicinal properties (e.g., cancer-related activity and antiallergic, antibacterial, anti inflammatory, and anti hepatotoxic effects) have again tested (Yi *et al.*, 2000). Many oils extracted from plants have activity against bacteria, yeasts, dermatophyte, and Aspergillus strains (Janssen *et al.*, 1987; Rios *et al.*, 1988; Griffin *et al.*, 1999). Whereas micro nutrient vitamin E which has higher cost

resulted from the increasing cost of raw materials in recent years and the potential environmental impact related to the manufacturing of it (Feed info News Service, 2008, 2009), ensure the need of research on cost effective but functionally equivalent alternatives of vitamin E.

Materials and Methods

Black tea Extract preparation

Black tea leaves 50 grams were collected from authenticated commercial source and were soaked in 200 ml methanol and were extracted at 40 degree centigrade by rotary distillation apparatus.

Birds Management

Forty cob broilers day old were housed in PCSIR experimental station and raised over 0 to 6 weeks experimental period. Four groups with two replicates of 5 chicks in each were kept under four diets A B C D which were formulated according to commercial feed industry. One diet A was positive control having vitamin E (VE), selenium, but negative control B was not carrying these additives. Two treatments were carrying positive control C with 2 ml BTE per kg of feed and negative control D with 2 ml BTE per kg of feed. The birds were kept at 30 + 5 degree centigrade in total growing and finishing

period. A starter diet from day 1 to 21 and grower diet from day 22 to 42 were fed to birds. Weight gain and cumulative feed consumed were measured and feed conversion ratio (FCR) was calculated at the end of sixth week.

Slaughtered Birds Carcass yield Data

Three birds from each replicate were slaughtered; their total carcass weight, carcass percentage and liver weight were measured.

Statistical Analysis

Data was analyzed by using M- state software.

Results:

Results showed that positive control with BTE C has significantly higher weight gain and feed intake and FCR is also best in this treatment. Negative control with BTE D has also higher weight gain and feed intake than A and B. But D has significantly good FCR than B but no significant difference in FCR between D and A.(Table 1).

Table 1: Complete trial data (0 to 6 weeks)

| Group | Type of feed | Total no of alive birds | Total Weight (grams) | Total feed consumed (grams) | Average wt. per bird (grams) | Avg. feed consumed (grams) | Feed conversion ratio |
|-------|----------------|-------------------------|----------------------|-----------------------------|------------------------------|----------------------------|-----------------------|
| A | Positive | 10 | 16980 | 37125 | 1698 | 3712 | 2.186 |
| B | Negative | 10 | 16392 | 37400 | 1639 | 3740 | 2.281 |
| C | Positive + BTE | 9 | 16760 | 34080 | 1862 | 3786 | 2.033 |
| D | Negative + BTE | 9 | 16730 | 35700 | 1859 | 3966 | 2.13 |

Table 2: Slaughtered birds carcass yield Data after 6 weeks

| Group | Type of feed | Total birds slaughtered | Live weight (Grams) | Carcass weight (Grams) | Meat/live Carcass wt. % | Average liver wt. (Grams) | Mortality |
|-------|----------------|-------------------------|---------------------|------------------------|-------------------------|---------------------------|-----------|
| A | Positive | 3 | 4.70 | 3.1 | 66 | 112 | 0 |
| B | Negative | 3 | 4.80 | 3.03 | 63 | 180 | 0 |
| C | Positive + BTE | 3 | 5.04 | 3.42 | 67.9 | 130 | 1 |
| D | Negative + BTE | 3 | 4.62 | 2.95 | 63.9 | 142 | 1 |

Slaughtered data indicate that liver weight of negative control has significantly higher than positive control and positive and negative control + BTE. All other parameters have no significant difference (Table 2).

Discussion

Weight gain and feed intake of positive control and negative control with BTE is higher than positive and negative control feed which shows that BTE has positive effect on growth performance and FCR of broilers which also indirectly shows health status of birds and antibacterial activity of black tea. Human beings has got much benefits from black tea leaves and its bioactive substances (Dufresne and Farnworth, 2001; Ferrara *et al.*, 2001; Kobayashi *et al.*, 2006; Pastore and Fratellone, 2006; Zhu *et al.*, 2006; Hsieh and Chen, 2007; Khan and Mukhtar, 2007; Chen *et al.*, 2008; Wang *et al.*, 2008). (Khalaji

et al., 2011) proved black-cumin used in poultry feed which has significantly increased body weight and reduced FCR without any harm effects on feed intake. (Hossam *et al.*, 2011) showed that the immunity level enhanced because high erythrocyte count and increase in the hemoglobin count after offering black cumin oil. Black-cumin showed stimulatory roles toward T cell-mediated immune responses in one study and in other study its constituents suppress B cell-mediated immune responses (Swamy and Tan, 2000; Islam *et al.*, 2004). Al-Beitawi *et al.*, (2009) proved that crushed black-cumin seed instead of zinc bacitracin to broiler diets enhanced antibody titer against Newcastle disease and infectious bursal disease.

Conclusion

As BTE (polyphenols) treatments, may be it is positive or negative control shows significantly

higher results so it is concluded that good health and efficient weight gain and FCR by black tea extract has open a chapter to make new studies on broilers to evaluate its antibacterial activity and also its polyphenol activity for the replacement of Vitamin E, Selenium antibiotics, and synthetic antioxidant.

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