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EFFECT OF DIETARY FEED SUPPLEMENTATION OF CINNAMON AND GINGER ON PROXIMATE COMPOSITION OF BROILERS MEAT

D. S. Gaikwad[1], Y. G. Fulpagare[2], D. K. Deokar[2], U. Y. Bhoite[2] and C. D. Nimablkar[2]

[1]Lovely Professional University, G. T. Road, Phagwara - 144 411 (Punjab), India.
[2]Department of Animal Husbandry and Dairy Science, PGI, Mahatma Phule Krishi Vidyapeeth, Rahuri - 413 722 (M.S.), India.

Abstract

The proximate composition of broilers meat by dietary feeding of ginger and cinnamon were investigated. The trial was conducted with 140, day old 'Vencob-400' chicks, which were divided into 7 treatment groups (five chicks per replicate) *i.e.* 20 chicks per treatment groups. Dietary treatments consisted of basal diet with no additives T_0 (Control), T_1, T_2, T_3, T_4, T_5 and T_6 receiving 1.0%, 2.0% and 3.0% cinnamon and 1.0%, 2.0% and 3.0% ginger, respectively. At the end of the experiment, 12 birds from each treatment were slaughtered and their carcasses were cut into breast and thigh for the analyses of proximate composition. The non-significant difference was observed in moisture, crude protein, ether extract and ash of breast meat while in contrast significant ($P \leq 0.05$) difference was observed in crude protein and ash of thigh meat the feed supplement ginger and cinnamon in the broilers diet.

Key words : Broiler, composition, cinnamon, ginger, proximate, supplementation.

Introduction

India is the fourth-largest chicken producer in the world after China, Brazil and the USA. The consumption of chicken meat in India increased from 400 g. per annum to 2.5 kg per annum in the last 5 years (Poultry Sector, 2017). As a result of the fast development, along with high productivity rates and relatively low production costs, chicken is, currently, the most consumed meat in the country. Antibiotic growth promoters have been widely and successfully used to promote growth and protect health of the poultry birds. However, their subclinical application in feed has arisen into a controversial issue worldwide because of appearance of residue resistant strain of bacteria (Toghyani *et al*., 2011; Owens *et al*., 2008). Consequently, their use in poultry feed has been banned in many countries (Hashemi *et al*., 2010). Natural medicinal products originating from herbs and spices have been used as feed additives for farm animals (Guo, 2003).

Ginger (*Zingiber officinale*) is a perennial herb, member of Zingibeacae that has different medicinal properties. This plant produces an orchid like flower with greenish yellow petals streaked with purple color. Ginger is cultivated in areas characterized by abundant rainfall. Even though, it is native to southern Asia, ginger is also cultivated in tropical areas such as Jamaica, China, Nigeria and Haiti and it is an important spice crop in India (Bajaj, 1980). Ginger rhizome (ginger root) is widely used as a spice or condiment (Larsen *et al*., 1999) and medical treatment for certain diseases. It acts as a stimulating tonic, stomachic and carminative, increasing the secretion of gastric juice. It is eminently useful in habitual flatulency, atonic dyspepsia, hysteria, and enfeebled and relaxed habits, especially of old and gouty individuals; and is excellent to relieve nausea, pains and cramps of the stomach and bowels and to obviate tenesmus and especially when those conditions are due to colds. Ginger is occasionally of value in fevers, particularly where the salivary secretions are scanty and there is pain and movement of gases within the intestines. Here, though a stimulant, it will assist in producing sedation by re-establishing secretion and relieving the distressing gastro-intestinal annoyances.

Cinnamon (*Cinnamomum cassia*) commonly known as "dalchini" is one of the oldest medicinal plants and

Author for correspondence : E-mail : dsgaikwad7@gmail.com

widely used as condiment in India. It belongs to the Lauracea family and is native of Sri Lanka and South India. Cinnamon is known to possess appetite- and digestion- stimulant properties. Many essential oils have been isolated from the cinnamon like cinnamic acid, cinnamaldehyde, cinnamate, caryophyllene oxide, eugenol, L-borneol. Cinnamaldehyde possess antibacterial properties (Chang *et al*., 2001), antioxidant properties and other medicinal properties like antiulcer, anti-diabetic, anti-inflammatory(Jakhetia, 2010).

Materials and Methods

In this experiment 140 day old, VenCobb-400 similar body weights broiler chicks were used. The present study was conducted in the Poultry Unit, Veterinary Polyclinic and AI Center MPKV, Rahuri-413 722, Dist. Ahmednagar, Maharashtra. The cinnamon Powder and Ginger powder was procured from local market of Rahuri (M.S.) as feed additives for conducting feeding trial on broilers. A total of 140 straight-run commercial chicks were used in trial. Which were divided into 7 treatment groups. There were 5 chicks per replicate *i.e.* 20 chicks/treatment were used. The birds were kept under deep litter system. The T_0 birds were fed on a basal ration (Control). T_1 Basal ration + 1% Cinnamon powder (*i.e.* 10 g/kg of feed), T_2 Basal ration + 2 % Cinnamon powder (*i.e.* 20 g/kg of feed), T_3 Basal ration + 3 % Cinnamon powder (*i.e.* 30 g/kg of feed), T_4 Basal ration + 1 % Ginger powder (*i.e.* 10 g/kg of feed), T_5 Basal ration + 2 % Ginger powder (*i.e.* 20 g/kg of feed) and T_6 Basal ration + 3% Ginger powder (i.e. 30 g/kg of feed). On arrival, chicks were weighed and distributed randomly into 7 treatment groups viz, T_0, T_1, T_2, T_3, T_4, T_5 and T_6 with 20 chicks in each group, on equal weight basis.

Proximate composition of meat

Analysis of feed and meat was carried out as per the method given in AOAC (2005).

Statistical analysis

Data emanated from different treatments were analyzed for statistical significance using completely randomized design (CRD) following standard methods (Snedecor and Cochran, 1994).

Results and Discussion

The present investigation was undertaken with a view to study the 'Effect of Dietary Supplementation of Ginger (*Zingiber officinale*) and Cinnamon (*Cinnamomum zeylanicum*) on Meat Quality of Broiler'. The data pertaining to growth performance and allied traits as influenced by dietary CNP (Cinnamon Powder) and GRP (Ginger powder) supplementation in broiler chickens are elucidated here under.

Table 1 : Per cent chemical composition of experimental broiler ration on dry matter basis.

Nutrients	Broiler ration	
	Starter	Finisher
Crude protein	23.00	20.00
Crude fiber	4.60	3.78
Ether extract	4.80	4.30
Total ash	7.20	6.85
Nitrogen free extract	60.40	65.15
Acid insoluble ash	1.25	1.44
ME (Kcal/kg)	2863.811	2939.75

Table 2 : Proximate composition (%) of experimental feed additives on dry matter basis.

Plant products	DM	CP	CF	EE	Ash	NFE
Ginger	89.00	9.20	17.30	3.00	4.10	66.40
Cinnamon	91.50	3.90	45.20	1.80	4.30	44.80

Chemical composition of experimental feed ingredients (% DM basis)

The experimental broiler starter and finisher were used as experimental feed, which was supplemented with cinnamon and ginger powder as per treatment details. The proximate composition of the experimental broiler starter and finisher rations are presented in table 1.

Starter ration

The crude protein, crude fiber, ether extract, total ash, nitrogen free extract and acid insoluble ash of starter ration were 23.00, 4.60, 4.80, 7.20, 60.40 and 1.25 per cent, respectively and calculated metabolizable energy (ME) of the diet was 2863.811 Kcal/kg.

Finisher ration

The crude protein, crude fiber, ether extract, total ash, nitrogen free extract and acid insoluble ash of finisher ration were 20.00, 3.78, 4.30, 6.85, 65.15 and 1.44 per cent, respectively and calculated metabolizable energy (ME) of the diet was 2939.75 Kcal/kg.

Composition of ginger powder observed in the present investigation was in agreement with Najafi *et al.* (2014), who reported that composition of ginger was 91.00, 10.20, 18.30, 3.20, 4.90 and 54.60 per cent of dry matter, crude protein, crude fiber, ether extract, ash and nitrogen free extract, respectively. Composition of cinnamon powder observed in the present investigation was similar to that reported by Najafi *et al*. (2014) as 92.50, 4.10, 45.30, 1.70, 4.40 and 37.00 per cent of dry matter, crude protein, crude fiber, ether extract, ash and nitrogen free extract,

Table 3 : Effect of supplementation of cinnamon and ginger on proximate composition of Breast Meat.

Treatments	T_0	T_1	T_2	T_3	T_4	T_5	T_6	Mean	CD @ 5%
Moisture %	74.70±2.10	73.67± 0.57	74.79±0.80	72.58±2.50	73.96±2.57	74.64±1.34	73.86±1.45	74.02±1.78	NS
Ash %	1.15±0.02	1.10±0.05	1.15±0.02	1.16±0.05	1.16±0.02	1.16±0.02	1.17±0.01	1.13±0.03	NS
CP %	22.67±0.35	22.80±0.64	22.60±0.06	22.44±0.05	22.33±0.27	22.81±0.24	22.08±0.16	22.53±0.32	NS
EE %	0.69±0.02	0.58±0.09	0.43±0.09	0.65±0.05	0.42±0.16	0.55±0.06	0.59±0.09	0.55±0.10	NS
NFE %	75.49±0.32	75.52±0.62	75.82±0.05	75.75±0.12	76.09±0.13	75.48±0.19	76.16±0.21	75.75±0.30	NS

Table 4 : Effect of supplementation of cinnamon and ginger on proximate composition of Thigh Meat.

Treatments	T_0	T_1	T_2	T_3	T_4	T_5	T_6	Mean	CD @ 5%
Moisture %	76.71±0.27	76.52±0.56	76.16±0.95	77.56±1.26	75.11±1.52	75.64±0.86	74.24±1.16	75.99±0.85	NS
Ash %	1.02±0.01	1.06±0.01	1.06±0.02	1.05±0.00	1.03±0.02	1.03±0.01	1.02±0.01	1.03±0.01	NS
CP %	18.73^{a}±0.09	19.20^{ab}±0.39	19.04^{ab}±0.28	19.23^{ab}±0.43	20.32^{c}±0.28	19.69^{bc}±0.14	19.59^{abc}±0.13	19.40±0.28	0.87
EE %	3.89^{b}±0.02	3.14^{b}±0.31	2.14^{a}±0.06	3.06^{b}±0.5	2.97^{ab}±0.21	3.02^{ab}±0.38	3.34^{b}±0.06	3.08±0.30	0.92
NFE %	76.51±0.14	76.6±0.69	77.6 ±0.4	76.66 ±0.07	75.68±0.47	76.26±0.36	76.05±0.08	76.47±0.38	NS

Values bearing different superscripts in column differ significantly (P≤0.05).

respectively. Ademola *et al*. (2009) reported that composition of ginger was 87.39, 1.35, 5.85, 2.93, 2.29 and 87.58 per cent of dry matter, ether extract, crude protein, crude fiber, ash and nitrogen free extract, respectively.

The mean values of proximate composition of breast meat namely moisture, crude protein, ether extract, total ash, calcium and phosphorus content of breast meat without skin for broilers are presented in table 3. There were no significance differences observed among treatments and control groups. These values were within the range reported by Macrae *et al*. (1993) in broilers.

The mean values of proximate composition of thigh meat namely moisture, crude protein, ether extract, total ash and nitrogen free extract content of thigh meat without skin for broilers are presented in table 4. The crude protein and ether extract are significantly (P<0.05) shown differences among the all treatment groups supplemented with cinnamon and ginger powder. Present results were in agreement with Puvaca *et al*. (2015) reported that effect of black pepper showed a positive and significant (P<0.05) influence on improving the protein content in breast meat (24 g/100 g). In contrast, Shirzadegan *et al.* (2014) reported non significant effect of herbal mixture (cinnamon, garlic, tea and chicory) on proximate composition of chicken thigh muscle. Moisture, ash and nitrogen free extract did not show significant differences among chicken samples.

Conclusion

On the basis of the above findings, it can be concluded that the dietary feed supplementation of cinnamon and ginger statistically improved the crude protein and ether extract in broilers thigh meat and hence feeding of 1 per cent ginger powder in broiler ration is recommended for obtaing better crude protein in broiler meat.

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