

EFFECT OF SUPPLEMENTATION *Occimum sanctum* (TULSI) LEAF AND *Zinziber officinale* (GINGER) POWDER AS FEED ADDITIVES ON NUTRIENT UTILIZATION OF BROILER CHICKS

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Abstract: The objective of the study was to evaluate the effect of *Occimum sanctum* (tulsi) and *Zinziber officinale* (ginger) as feed additives alone or in combination on nutrient utilization of feed for broiler chicks. Two hundred and ten day-old chicks were purchased from local market and divided into seven treatment groups, with three replicates having 10 chicks each in a completely randomized design for 42 day. Control group was fed on basal diet and T1 & T2 treatment group were supplemented with 0.5% & 1% of Tulsi leaf powder in the experimental broiler starter and finisher ration, respectively. Likewise, G1 & G2 treatment group were supplemented with 0.5% & 1% of Ginger powder in the experimental broiler starter and finisher ration, respectively. T1G1 and T2G2 treatment groups were supplemented with 0.5% & 1% of both herbs ie mixture of tulsi and ginger powder in combination, respectively. The supplementation tulsi and ginger alone and in combination had significant effect ($P < 0.01$) on the digestibility of DM, OM, CP and EE. However, digestibility of crude fibre showed no significant effect. These results suggest that supplementation *Occimum sanctum* (Tulsi) Leaf and *Zinziber officinale* (Ginger) Powder as Feed Additives improves nutrient utilization of broiler chicks.

Keywords: Tulsi, ginger, broiler, DM, OM, EE, PER, PI.

Introduction

Indian Poultry industry has appeared as one of the fastest growing segments of the agriculture sector. Broiler production in India is yet very low and has vast scope for growth. Furthermore, the successfulness of poultry industry depends upon its fast growth and low mortality during first two weeks of life, which can be managed by good hygienic and feeding conditions. The prophylactic use of antibiotics as growth promoters in animal feeds has made commercial farming possible, improved efficiency of feed utilization and controlled the diseases in these animals. Recently, in many countries the use of in-feed antibiotics has been banned due to their residual side effect in animal product and the development of antibiotic resistant bacteria pathogen (Hosseinzadeh *et al.*, 2014). For this reason, some authors have investigated alternatives to antibiotics (Yahya *et al.*, 2014; Joseph *et al.*, 2015). Herbs, spices, and various plant extracts have received increased attention as feasible antibiotic growth

promoter replacements. In this view, the plants identified with properties of secondary metabolites became fascinating due to their antimicrobial, antioxidant effects and their stimulating effects on animal performance and digestive enzymes.

Tulsi (*Ocimum sanctum*) is considered to be the “Queen of herbs” due to its greater medicinal values. Tulsi, known for its bactericidal, immuno-modulatory, narcotic, anti-inflammatory, anti-pyretic, anti-asthmatic, antidiabetic, anti-hypertensive and pain reliver activities. Chaudhary *et al.*, (2010) reported the main constituents responsible for these properties are eugenol, ascorbic acid, b-carotene, b-sitosterol, palmitic acid and tannins. The major chemical constituent of dried leaves is eugenol, associated with its treatment potential (Prakash *et al.*, 2007). Ginger spice, a natural growth promoter, consist several important compounds such as gingerdione, gingerol, shogaols, phenolic and gingerdiol (Zhao *et al.*, 2011) which have the ability to stimulate enzymes of digestive system, microbial activity and having antioxidative activity (Dieumou *et al.*, 2009). Ali *et al.*, (2008) reported that these compounds in ginger enhanced weight gain and had pharmacological effects on broiler chicken’s health.

The main objective of this study is to gain more information about effect of Tulsi (*Ocimum sanctum*) and Ginger (*Zingiber officinale*) on nutrient utilization of broiler chicks.

Materials and Methods

The study was carried out on two hundred and ten day-old chicks were purchased from local market and divided into seven treatment groups, with three replicates having 10 chicks each in a completely randomized design for 42 day. Routine vaccination against Ranikhet disease (F1 strain) and Infectious Bursal Disease were carried out on 7th and 14th day of procurement of chicks. Commercially available readymade broiler starter and broiler finisher rations were procured and feed additives such as *Ocimum sanctum* (Tulsi) and *Zingiber officinale* (Ginger) were supplemented. Control group was fed on basal diet and T1 & T2 treatment group were supplemented with 0.5% & 1% of tulsi leaf herb in the experimental broiler starter and finisher ration, respectively. Likewise, G1 & G2 treatment group were supplemented with 0.5% & 1% of ginger herb in the experimental broiler starter and finisher ration, respectively. T1G1 and T2G2 treatment groups were supplemented with 0.5% & 1% of both herbs in combination, respectively. Metabolic trial was conducted using six chicks from each group for 5 days at the end of feeding trial and 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 (7.30 AM) every day during the trial period. The mixed droppings were collected at the end of every 24 hours and pooled to get the total excreta voided during the trial period. Representative feed samples were drawn from the bulk, finally ground and stored in sample bottles for analysis. The experimental feed and excreta was analyzed for proximate constituents by procedures of AOAC (2016). Statistical analysis will be performed according to the method described by Snedecor and Cochran (1994) and results will be interpreted.

Table-1: Proximate composition of broiler starter and finisher ration

S.No.	Proximate Principle	Broiler starter	Broiler Finisher
1.	Dry Matter (%)	91.33	92.30
2.	Crude Protein (%)	23.08	20.12
3.	Ether Extract (%)	04.40	04.86
4.	Crude Fibre (%)	05.55	05.25
5.	Total Ash (%)	07.51	06.61
6.	Nitrogen Free Extract (%)	59.46	63.16

Table-2: Proximate composition of *Ocimum sanctum* (Tulsi) and *Zinziber officinale* (Ginger)

S.No.	Proximate Principle	Tulsi (<i>Ocimum sanctum</i>)	Ginger (<i>Zinziber officinale</i>)
1.	Dry Matter (%)	91.30	88.40
2.	Crude Protein (%)	6.29	5.90
3.	Ether Extract (%)	6.96	1.40
4.	Crude Fibre (%)	16.90	3.25
5.	Total Ash (%)	9.55	2.45
6.	Nitrogen Free Extract (%)	60.30	87.00

Results and discussion

The statistical analysis of variance revealed highly significant ($P < 0.01$) effect of supplementation of *Ocimum sanctum* (Tulsi) and *Zingiber officinale* (Ginger) alone and in combination on average daily retention (%) of dry matter, organic matter, crude protein, ether extract and non-significant improvement in crude fiber retention of feeds for broiler chicks. The average dry matter digestibility was recorded to be highest in T2G2 group and lowest digestibility was observed in control. These results obtained in study in text corroborate well with the findings of Minh *et al.*, (2010) reported that significantly ($p < 0.05$) higher retention of the DM for broilers fed ginger diet as compared to control group. Rakesh kumar (2016)

observed that dry matter digestibility was significantly improved in the treatment groups of supplementation with garlic powder and holy basil leaf powder. Yadav (2018) reported significantly ($P < 0.01$) higher digestibility of dry matter in treatment group supplemented with 1 % tulsi and group supplemented with 1 % tulsi and 0.1 % organic acid group than control group. In contrast El-Matty et al., (2014) reported non-significant effect of ginger powder on dry matter retention.

Table 3: Average daily DM, OM, CP, CF and EE retention (%) by broilers fed tulsi and ginger powders supplemented feed during metabolic trial

Parameter	Treatments							CD
	C	T1	T2	G1	G2	T1G1	T2G2	
DM	59.44 ^b ±1.90	73.91 ^a ±4.09	73.88 ^a ±1.45	73.93 ^a ±1.11	75.16 ^a ±0.88	76.01 ^a ±1.60	77.03 ^a ±2.30	9.04**
OM	62.26 ^b ±1.26	76.62 ^a ±3.52	76.12 ^a ±1.70	76.86 ^a ±1.13	78.60 ^a ±0.97	78.53 ^a ±1.49	79.92 ^a ±2.08	8.06**
CP	67.543 ^b ±0.74	81.413 ^a ±3.80	80.28 ^a ±0.50	79.78 ^a ±1.16	83.60 ^a ±1.13	83.96 ^a ±1.98	85.70 ^a ±2.39	8.34**
CF	43.59 ±2.32	52.92 ±5.88	53.94 ±4.67	55.69 ±1.53	57.08 ±3.21	59.61 ±2.53	61.28 ±3.31	NS
EE	83.76 ^c ±1.31	93.48 ^{ab} ±0.98	90.73 ^b ±0.83	92.04 ^{ab} ±1.05	93.01 ^{ab} ±1.06	93.21 ^{ab} ±0.33	94.59 ^a ±0.50	3.88**

NS- non significant

Note: The means bearing different superscript (a, b and c) in the row differ significantly **($P < 0.01$)

Organic matter retention (percent) was found to be highly significant ($P < 0.01$) in T2G2 group supplemented with combination of 0.5% tulsi and 0.5% ginger which was comparable with T1, T2, G1, G2, T1G1 and lowest organic matter digestibility was observed in control group which was supplemented with basal diet. The Present results were in accordance with Hasan *et al.*, (2015) reported that adding phyto-genic feed additives significantly improves organic matter retention in broilers. However EL-Matty *et al.*, (2014) revealed that non-significant differences but numerically highest organic matter retention was observed in ginger and turmeric powder supplementation group in compared to control group.

Crude protein and ether extract retention of feed for experimental broiler birds differed significantly from control group and no significant differences were found among the

treatment groups. Jadhav (2016) observed significant effect on crude protein and ether extract retention with incorporation of ginger powder in basal diet as compared to control. Similarly EL-Matty *et al.*, (2014) reported significantly higher utilization of CP and EE in broilers received the diet containing ginger powder as compared to control. Crude fiber retention of feed was found no significant difference between treatment groups, but numerically highest CF retention was observed T2G2 followed by T1G1, G2, G1, T2, T1 and Lowest in Control group. The Present results were in accordance with EL-Matty *et al.*, (2014), Jadhav (2016) observed that no significant effect on CF utilization among the treatment groups but numerically slightly high in ginger supplemented group than control.

Conclusion

It could be concluded that supplementation of *Occimum sanctum* (Tulsi) leaf and *Zinziber officinale* (Ginger) powder as feed additives alone or in combination at 0.5% & 1% of both herbs improved nutrient utilization of feeds for broiler chicks.

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