The Pharma Innovation Journal 2019; 8(12): 79-82

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(12): 79-82

www.thepharmajournal.com
Received: 22-10-2019
Accepted: 24-11-2019

Vishal Sharma
Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Devender Singh Bidhan
Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Sanjay Yadav
Department of Livestock Products Technology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Sandeep Dhillod
Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

YC Bangar
Department of Animal Genetics and Breeding, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Corresponding Author:
Vishal Sharma
Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana, India

Effect of phytogenic mixture supplementation on meat quality and survivability of broilers during winter season

Vishal Sharma, Devender Singh Bidhan, Sanjay Yadav, Sandeep Dhillod and YC Bangar

Abstract
An experiment was conducted to study the effect of phytogenic mixture supplementation on the meat quality and survivability of broilers in winter season. Two hundred eighty eight day-old commercial chicks were subjected to eight dietary treatments consisting of three replicates of twelve chicks in each replicate were reared for a period of 6 weeks in winter season to find the effect of following treatments, namely; T_0- Negative control, T_1-control, T_2-0.5% Amla + 0.5% Ashwagandha + 0.25% Turmeric powder,T_3-0.25% Amla + 0.5% Ashwagandha + 0.25%Turmeric powder, T_4-0.125% Amla + 0.5% Ashwagandha + 0.25% Turmeric powder, T_5- 0.5% Amla + 0.25% Ashwagandha + 0.25% Turmeric powder, T_6-0.5% Amla + 0.125% Ashwagandha +0.25% Turmeric powder and T_7-0.5% Amla + 0.5% Ashwagandha + 0.125% Turmeric powder. The meat quality and survivability of broilers were studied. Standard managemental practices were followed during the experimental period. Supplementation of phytogenic mixture improved the meat quality and survivability in winter season. Better values were recorded in treatment groups supplemented with 0.5% amla and 0.5% ashwagandha with 0.25% or 0.125% turmeric powder (T_2 and T_7).
Addition of phytogenic mixture consisting of 0.5% amla and 0.5% ashwagandha with 0.25% or 0.125% turmeric powder can be effectively supplemented as an alternative to antibiotics growth promoter in poultry ration in winter for the production of lean and herbal meat with improved effect on the survivability of birds.

Keywords: Broilers, phytogenic mixture, amla, ashwagandha, turmeric, season

Introduction
Poultry production in India has undergone a paradigm shift, growing at around 8-12% annually over the last three decades with broiler meat volumes growing at more than 10%.The focus of modern broiler farming is on the production of quality meat with improved livability. Antibiotics, the major growth promoters also improve the production parameters and utilization of nutrients in meat producing chicks. But, due to negative effects on health, use of antibiotics in poultry is banned in many countries [1, 2, 3, 4]. In view of this, herbal and plant derivatives shall be valuable alternatives to promote growth and health in poultry as there is no residual toxicity. Phytogenics are derived from herbs, spices or aromatic plants and have shown antimicrobial, antifungal, antiviral, antioxidant or sedative properties. These are generally recognized as safe both for animals as well as humans; environmentally friendly; can be applicable in the diets of poultry and thus, address organic livestock production [5]. Amla (*Emblica officinalis*), Ashwagandha (*Withania somnifera*) and Turmeric (*Curcuma longa*) have been a valuable ingredient of various medicines in India since times immemorial. Keeping in view the facts stated above, the present study was planned to observe the effects of supplementation of phytogenic mixture on the meat quality and survivability of broilers.

Materials and Methods
Location of study
The present investigation was conducted at the Poultry Farm of the Department of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar. The experiment was approved by the Institutional Animal Ethics Committee.

Experimental design

288 one-day-old broiler chicks of Ven-Cobb strain-400 were purchased from a reputed local hatchery. The chicks were randomly distributed into eight treatment groups each having 36 chicks namely; T_0- Negative control, T_1-control, T_2-0.5% Amla + 0.5% Ashwagandha + 0.25% Turmeric powder,T_3-0.25% Amla + 0.5% Ashwagandha + 0.25% Turmeric powder, T_4-0.125% Amla + 0.5% Ashwagandha + 0.25% Turmeric powder, T_5- 0.5% Amla + 0.25% Ashwagandha + 0.25% Turmeric powder, T_6-0.5% Amla + 0.125% Ashwagandha +0.25% Turmeric powder and T_7-0.5% Amla + 0.5% Ashwagandha + 0.125% Turmeric powder. Further each group was further divided into three replicates of 12 chicks each.

Experimental procedure

The chicks were reared under strict hygienic conditions. Chicks were vaccinated against new castle disease (F1 strain) on 5th day and Infectious Bursal disease (IBD) on 14th day of experiment through intra-ocular route. Standard managemental practices including brooding, proper lighting, raking of litter, cleaning of feeders, waterers, etc. were followed. Before formulation of broiler rations, the feed ingredients were analyzed [6] for proximate composition. Based upon the proximate composition of feed ingredients, the broiler pre-starter, starter and finisher rations were formulated according to BIS [7] specifications (Table 1).

Table 1: Quantity of ingredients and chemical Composition (% DM basis) of experimental diet (kg/100 kg feed)

Name of Ingredients	Quantity		
	Pre-starter (0-1 week)	**Starter (2-3 weeks)**	**Finisher (4-6 weeks)**
Maize	55	55.5	60
Soyabean meal	20	17	15
Ground nut cake	12.5	13.5	10
Fish meal	8	8	8
Mineral mixture	2	2	2
Vegetable oil	2.5	4	5
Feed additives (g/100kg of ration)	**0-1 week**	**2-3 weeks**	**4-6 weeks**
Spectromix (g)	10	10	10
Spectro BE (g)	20	20	20
Cocciwin (g)	50	50	50
Choline chloride (g)	50	50	50
Lysine (g)	50	50	50
DL - methionine (g)	80	80	80
Chemical composition	**Pre-starter**	**Starter**	**Finisher**
Moisture%	10.54	10.83	10.87
Crude protein%	23.05	22.05	20.09
Crude fibre%	3.63	3.60	3.31
Ether extract%	6.96	8.38	8.99
Total ash%	6.32	6.18	5.87
Nitrogen free extract%	49.50	48.96	50.87
Metabolizable energy (Kcal/Kg)	2950	3055	3160

1. Mineral mixture (salt free): Ca (32%), P (6%), Mn (0.27%), Zn (0.26%), Iodine (0.01%), Fe (1000 ppm), Cu (100 ppm), and Co (50 ppm).
2. Intermix regular: Each gm contained Vitamin A-82,500 IU, Vit. B_2-50 mg, Vit. D_3-16,500 IU, and Vit. K-10mg.
3. Intermix BE (DS) Powder: Each gm contained Vit.B_1-8 mg, Vit.B_6-16 mg, Vit.B_{12}-80 mg, Niacin- 120mg, Vit. E-80 mg, folic acid-6 mg and Calcium pentothenate -80 mg.
4. Coxicheck: Amprolium-200 mg, vitamin K_3-10 mg
5. Lysine: Contained 98 per cent lysine.
6. DL- methionine: Contained 98 per cent methionine.
7. Choline chloride: Contain 60 percent choline.

Observations recorded

Meat quality

Samples of breast and thigh muscles were taken from each of the slaughtered birds and stored in deep-freeze separately for further analysis. These samples were analyzed for moisture, ash, protein and ether extract (fat) as per AOAC [6] and for WHC [8] & pH [9].

Mortality rate

The birds were reared with special care to observe any sign of stress and regular observations were made to record the occurrence of mortality in experimental birds to estimate the rate of mortality in percentage relative to different treatments. The dead birds were sent to the Department of Pathology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar for post-mortem examination to know the cause of mortality.

Statistical analysis

Data obtained were subjected to statistical analysis as per Snedecor and Cochran [10] using Completely Randomized Design (CRD). The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a level of ($P< 0.05$) was used as the criterion for statistical significance [11].

Results and Discussion

Meat quality of broiler meat

The meat quality of broiler meat (leg and breast portion) supplemented with phytogenic mixture is presented in Table 2.

In leg meat, moisture, ash, WHC and pH values were non-significantly ($P<0.05$) different ranging from 74.12 (T_0) to 74.82 (T_7), 1.21 (T_0) to 1.31 (T_2), 28.14 (T_4) to 28.80 (T_7) and 5.29 (T_5) to 5.36 (T_1) respectively. Protein and fat contents of leg portion differ significantly ($P<0.05$) among treatment groups ranging from 15.93 (T_1) to 17.02 (T_4) and 6.17 (T_4) to

7.66 (T_1), respectively. Similarly, in breast portion moisture, ash, WHC and pH values were non-significantly (P<0.05) different ranging from 75.31 (T_0) to 75.88 (T_2), 1.61 (T_0) to 1.81 (T_4), 27.40 (T_0) to 29.30 (T_2) and 5.13 (T_0) to 5.45 (T_4) respectively. Protein and fat contents of breast portion differ significantly ($P< 0.05$) among treatment groups ranging from 20.05 (T_0) to 21.10 (T_7) and 1.12 (T_1) to 1.90 (T_0), respectively. The mean values of protein and fat in leg portion of birds in T_2, T_3, T_4, T_5, T_6 and T_7 were significantly better than T_1. The mean values of fat in breast portion of birds in T_2, T_3, T_4, T_5, T_6 and T_7 were significantly better than T_1. The mean values of protein in breast portion of birds in T_2 and T_7 were significantly better than T_1. While the mean values of protein in breast portion of birds in T_3, T_4, T_5, T_6 were comparable to T_1.

Table 2: Effect of phytogenic mixture on mean meat quality of broiler meat (leg and breast) in winter season

Portion	Parameter	Treatments							
		T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Leg	Moisture	74.12±0.85	74.43±0.82	74.79±0.93	74.52±0.81	74.71±0.84	74.57±0.93	74.66±0.85	74.82±0.81
	Ash	1.21±0.12	1.24±0.11	1.31±0.13	1.29±0.13	1.29±0.15	1.26±0.14	1.29±0.12	1.28±0.12
	Fat	7.78^{e}±0.07	7.66^{e}±0.07	6.14^{a}±0.06	6.74^{cd}±0.05	6.48^{b}±0.08	6.55^{bc}±0.09	6.93^{d}±0.05	6.13^{a}±0.07
	Protein	15.89^{a}±0.31	15.91^{a}±0.33	17.08^{c}±0.34	16.35^{b}±0.34	16.58^{b}±0.37	16.67^{b}±0.36	16.52^{b}±0.36	17.11^{c}±0.35
	WHC	28.52±0.71	28.31±0.77	28.19±0.85	28.66±0.87	28.14±0.76	28.50±0.81	28.33±0.74	28.80±0.73
	pH	5.33±0.21	5.36±0.22	5.33±0.23	5.30±0.26	5.33±0.24	5.29±0.25	5.32±0.29	5.30±0.25
Breast	Moisture	75.31±0.85	75.76±0.78	75.88±0.83	75.61±0.72	75.43±0.81	75.39±0.94	75.71±0.81	75.78±0.92
	Ash	1.61±0.52	1.73±0.42	1.71±0.49	1.78±0.53	1.81±0.44	1.77±0.55	1.65±0.43	1.79±0.43
	Fat	1.90^{d}±0.07	1.87^{d}±0.03	1.12^{a}±0.04	1.17^{a}±0.04	1.25^{ab}±0.02	1.34^{bc}±0.05	1.43^{c}±0.02	1.13^{a}±0.02
	Protein	20.05^{a}±0.49	20.31^{ab}±0.47	21.00^{cd}±0.48	20.54^{bc}±0.51	20.34^{bc}±0.47	20.78^{bc}±0.53	20.69^{bc}±0.42	21.10^{d}±0.46
	WHC	27.40±0.86	28.11±0.88	29.30±0.91	28.40±0.84	28.80±0.96	27.90±0.85	28.10±0.87	29.00±0.86
	pH	5.13±0.45	5.33±0.41	5.38±0.56	5.22±0.42	5.45±0.51	5.31±0.41	5.38±0.44	5.42±0.47

Values are means ±standard errors.
Means bearing different superscripts, differ significantly ($P< 0.05$) row wise.

Analogous to the findings of the present study Daneshyar *et al*. (2011) observed non-significant differences between the treatments for pH and ash of the thigh meat [12]. Furthermore, as compared to the control diet, turmeric rhizome powder supplementation increased the protein content of thigh meat. Mondal *et al*. (2015) observed a significant decrease in fat content of broiler with supplementation of turmeric powder in diet [13].

Divergent to present findings Al-Sultan (2003) observed non-significant difference in protein percent of breast and thigh in birds receiving diet containing 0.5% turmeric. Daneshyar *et al*. (2011) [14] observed non-significant differences between the treatments for concentrations of fat of the thigh meat in turmeric rhizome powder supplemented diet [12].

It may be inferred that the better meat quality parameters are observed due to better utilization of feed due to antistress, anti-oxidative and immunomodulatory properties of phytogenic mixture. The decreased fat content in meat of phytogenic supplemented treatment groups support the beneficial properties such as anti-cholesterogenic, anti-lipidemic etc. of phytogenic mixture while increased protein content may be attributed to increased muscle mass formation facilitated by anabolic properties of phytogenic mixture supplementation.

Mortality

The birds were observed regularly for any abnormal behaviour and mortality during the experimental period. Post-mortem findings of dead birds were recorded. The dead birds were sent to the Department of Pathology, College of Veterinary Sciences, LUVAS, Hisar for post-mortem examination to know the cause of mortality. Per cent mortality recorded has been presented in Table 3.

Table 3: Effect of phytogenic mixture on mortality of broilers in winter season

Treatments	Age in weeks						Total Mortality	Mortality Percentage
	I	II	III	IV	V	VI		
T_0 (Negative Control)	2	-	-	-	1	-	3	8.33
T_1 (Control)	-	-	-	-	2	-	2	5.55
T_2 (0.5% Amla + 0.5% Ashwagandha+ 0.25% Turmeric powder	-	-	-	-	-	-	0	0
T_3 (0.25% Amla + 0.5% Ashwagandha+ 0.25%Turmeric powder)	-	-	-	-	1	-	1	2.78
T_4 (0.125% Amla + 0.5%Ashwagandha+ 0.25% Turmeric powder)	-	-	-	-	-	-	0	0
T_5 (0. 5% Amla + 0.25% Ashwagandha+0.25% Turmeric powder)	-	-	-	-	-	-	0	0
T_6 (0.5% Amla + 0.125%Ashwagandha+0.25% Turmeric powder)	-	-	-	-	-	-	0	0
T_7 (0.5% Amla + 0.5% Ashwagandha + 0.125% Turmeric powder)	-	-	-	-	-	-	0	0
Total	2	0	0	0	4	0	6	2.08

The results of present study are comparable to that of Pande (2000) and Rajeshwar *et al*. (2001) who recorded better livability in polyherb supplemented birds [15, 16]. Narahari and Ahmed (2003) and Narayanswamy and Santhosh Kumar (2004) reported reduced mortality in the birds supplemented polyherbal mixture [17, 18]. The results of the present experiment revealed that supplementation of phytogenic mixture in the ration of broilers had improved effect on survivability as compared to the control group. Mortality in control group is higher than the phytogenic supplemented diets.

Conclusion

It can be concluded that supplementation of phytogenic mixture improved the meat quality and survivability in winter season. Better values were recorded in treatment groups supplemented with 0.5% amla and 0.5% ashwagandha with 0.25% or 0.125% turmeric powder (T_2 and T_7). So, the Phytogenic mixture consisting of 0.5% amla and 0.5% ashwagandha with 0.25% or 0.125% turmeric powder can be effectively supplemented as an alternative to antibiotics growth promoter in poultry ration in winter for the production of lean and herbal meat with improved effect on the survivability of birds.

Acknowledgments

Authors are thankful to the Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, for providing facilities to carry out the present study.

References

1. Owens B, Tucker L, Collins MA, Mc Cracken KJ. Effects of different feed additives alone or in combination on broiler performance, gut microflora and ileal histology. Brit. Poult. Sci. 2008; 49:202-212.
2. Alcicek A, Bozkurt M, Cabuk M. The effect of a mixture of herbal essential oils, an organic acid or a probiotic on broiler performance. S. Afr. J Anim. Sci. 2004; 34:217-222.
3. Botsoglou, Fletouris. Drug residues in foods: pharma, food safety and analysis, 2001.
4. Hertrampf JW. Alternative antibacterial performance promoters. Poult. Int. 2001; 40:50-55.
5. Cabuk M, Bozkurt M, Alcicek A, Akbas Y, Kucukyilmaz K. Effect of a herbal essential oil mixture on growth and internal organ weight of broilers from young and old breeder flocks. South African J Anim. Sci. 2006; 36:135-141.
6. AOAC. Official methods of analysis, 18th edition. Association of official analytical chemists. Gaitherburg, Maryland, USA, 2005.
7. BIS. Requirement for chicken feeds. IS: 1374-2007, Manak Bhavan, 9 Bahadurshah Zafar Marg, New Delhi-110001, 2007.
8. Wardlaw FR, McCaskill LH, Acton JC. Effects of postmortem changes on poultry meat loaf properties. Journal of Food Science. 1973; 38:421-423.
9. Trout ES, Hunt MC, Johson DE, Clans JR, Castner CL, Kroff DH. Characteristics of low fat ground beef containing texture modifying ingredients. Journal of Food Science. 1992; 57(1):19-24.
10. Snedecor GW, Cochran WG. Statistical method. 8th edition. Oxford and IBG publication co., New Delhi, India, 1994.
11. Duncan DB. Multiple range and multiple F tests. Biometrics. 1955; 11:1-42.
12. Daneshyar M, Ghandkanlo M, Bayeghra F, Farhangpajhoh F, Aghaei M. Effects of dietary turmeric supplementation on plasma lipoproteins, meat quality and fatty acid composition in broilers. South African J Ani. Sci, 2011, 41(4).
13. Mondal MA, Yeasmin T, Karim R, Siddiqui M, Raihanun-Nabi SM, Sayed MA *et al*. Effect of dietary supplementation of turmeric (*Curcuma longa*) powder on the growth performance and carcass traits of broiler chicks. SAARC J Agri. 2015; 13(1):188-199.
14. Al-Sultan SI. The effect of *Curcuma longa* (turmeric) on overall performance of broiler chickens. Int. J Poult. Sci. 2003; 3:333-340.
15. Pande CB. Zeestress-A promising adaptogenic, antistress and immunomodulator–A review. Pashudhan. 2000; 15:4.
16. Rajeshwar NR, Pande CB, Kiran A. Effect of Zeestress on broiler performance–A study. Pashudhan. 2001; 16:4.
17. Narahari D, Ahmed M. Relative efficacy of herbal growth promoters on broiler performance. Poult. Fortune, 2003, 32-33.
18. Narayanswamy HD, Santhosh Kumar B. Beneficial Effects of Geriforte (Vet Liquid) as an Adaptogen in Commercial Broilers for Summer Stress. Poult. Line, 2004, 27-30.