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Effect of supplementation of *Moringa oleifera* leaves powder on sensory attributes of Giriraja poultry birds meat

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Abstract

The present work “Supplementation of *Moringa oleifera* Leaves Powder on Sensory Attribution of Giriraja Poultry Meat” was conducted at Poultry Unit, Department of Poultry Science, PGIVAS, MAFSU under Deptt. A.H. & D.S., Dr. P.D.K.V, Akola to evaluate the effect of supplementation of Moringa leaves powder in the diet of Giriraja poultry birds. For present study 240 day old chicks were divided in eight treatments having three replication, each replicates has ten birds. The treatments were (T₁) control with no supplementation, (T₂) standard ration plus 0.4% MOLP, (T₃) standard ration plus 0.6% MOLP, (T₄) standard ration plus 0.8% MOLP, (T₅) standard ration plus scavenging, (T₆) standard ration plus 0.4% MOLP with scavenging, (T₇) standard ration plus 0.6% MOLP with scavenging, (T₈) standard ration plus 0.8% MOLP with scavenging. Data on sensory evaluation of Giriraj poultry meat revealed that the highest score for colour T₈ (8.23), appearance T₂ (7.83), flavour T₇ (8.43), juiciness T₇ (8.60), tenderness T₇ (8.46), texture T₅ (8.77) and overall acceptance T₆ (8.14) scores values based on 9 point hedonic scale respectively.

Keywords: Giriraja, *Moringa oleifera* leaves powder, poultry meat acceptability

Introduction

Chickens constitute one of the most commonly eaten animal species in developed countries as well as developing country, where WHO recommended animal protein intake of 60 gm/day per person. Poultry production has been traditionally practiced in many developing countries for many generations as an important source of nutrition and sustainable income (Anderson, 2011) [2]. The production of eggs and broilers is continuously marked high as it has been rising at the rate of 8 to 10% /annum compare to 1.5% to 2% /annum crop production. From the status of commercial poultry farm to small scale backyard ventures, Indian poultry industries have made remarkable progress, where backyard poultry farming plays a significant role for the livelihood of many rural families particularly the rural women. The type of feed is the key element that affects the net return from the poultry enterprise. Any attempt to improve commercial poultry production and increase its efficiency therefore needs to focus on searching alternative and better utilization of feed resources (Udedibie and Asoluka, 2008) [11]. The use of antibiotic as growth promoter in poultry industry has been banned because of harmful effects on human health. However the misuse or continuous use of antibiotics has led to the emergency of the antibiotic residues and drug resistance. Now a day use of antibiotics as growth promoters in animal nutrition is facing reduced social acceptance and their use has been banned or curtailed in many countries. Due to loss of public image of use of antibiotics as feed additives, it has led to investigation of alternative feed additives in animal production. *Moringa oleifera* is one of best alternative as it most widely known feeds constituent as Moringa seed and leaves have a broad use in the food industry and therapeutic issues. There are about 13 species of Moringa trees in the family of Moringaceae and all are native of India. The leaves are highly nutritious and contain significant quantities of vitamins (A, B and C), calcium, iron, copper, sulphur and protein. Moringa leaves have a relatively high protein content which varies from 25% to 32%. A high proportion of this protein is potentially available for digestion due to high proportion of pepsin soluble nitrogen (82-91%) and low proportion (1-2%) of acid detergent insoluble protein (Makkar and Becker, 1997). Furthermore, metals such as mercury, arsenic and cadmium which are potentially toxic are absent.

The effect of Moringa leaves and seeds were also examined by researchers for increasing immunity response and improving physiological and productive performance (Kakengi *et al.*, 2007) [5] and has a positive effect on meat quality (Waskar *et al.*, 2009) [12] especially lipid peroxidation which is a major cause of meat quality deterioration, affecting colour, flavour, texture and nutritional value (Giannenas *et al.* 2010) [4]. Meanwhile, meat related study indicate that the carcass quality of livestock, specially non-ruminant livestock is directly affected by the type of feed given and inclusion rates of the various feed ingredients Teye *et al.*, 2006, Lawrie and Ledward, 2006) [10, 6]. Also, according to Okine *et al.*, 2009 [8], some feed ingredients contain anti-nutritive factors

which results in adverse effect on carcass yield, eating qualities of poultry and sensory characteristics of the meat.

Material and Methods

The experiment was conducted at the poultry unit of the Post Graduate Institute (PGI), VAS, MAFSU, Akola, Maharashtra during 2017-18 to 2018-19 using 240, day old Giriraja chicks, which were obtained from Government hatchery, Nagpur, Maharashtra. The birds were from the same hatch and were reared under uniform management condition. On arrival, the chicks were weighed individually and randomly divided into eight treatments with three replications, each replication has ten birds.

Table 1: The details of dietary treatments and levels of compositions

SN	Particulars	MOLP levels	System of management
T ₁	Std. Ration	Control	
T ₂	Std. Ration	0.4%	
T ₃	Std. Ration	0.6%	
T ₄	Std. Ration	0.8%	
T ₅	Std. Ration	Control	Scavenging
T ₆	Std. Ration	0.4%	Scavenging
T ₇	Std. Ration	0.6%	Scavenging
T ₈	Std. Ration	0.8%	Scavenging

Where, Std. Standard, MOLP- *Moringa oleifera* Leaves Powder

The feed material consists of commercial pre-starter, starter and finisher feed used as basal diet with MOLP. The fresh *Moringa oleifera* leaves were collected from the field of Department of Horticulture, Dr. P.D.K.V., Akola during the present experimentation with the objectives to judge the consumer awareness about chicken quality, a sensory panel of semi trained judges drawn from staff were requested to evaluate the chicken quality attributes *viz.* appearance, flavor, juiciness, tenderness and overall acceptability as given in score sheet.

Result and Discussion

The effect of *Moringa oleifera* leaves powder (MOLP) on overall average sensory attributes (score on 9 point hedonic scale) of Giriraja poultry birds meat with or without scavenging were studied and the result is summarized in Table 2 and graphically depicted in Fig 1. From the table, the mean score of sensory evaluation differ significantly in all treatment groups. In case of Giriraja chicken the significantly higher values found in treatment T₈ (8.23), T₂ (7.83), T₇ (8.43), T₇ (8.60), T₅ (8.77), T₇ (8.46), and T₆ (8.14) in respect of colour, appearance, taste/flavour, juiciness, texture tenderness and overall acceptability, respectively.

The significantly lower values for colour, appearance, taste/flavour, juiciness, texture, tenderness and overall acceptability were found in treatment T₅ (6.17), T₄ (6.50), T₁ (6.80), T₁ (6.70), T₄ (6.70), T₁ (7.07), and T₁ (6.87), respectively. Whereas, the average value of sensory evaluation of chicken for obtained in treatment T₁, T₂, T₃, T₄, T₅, T₆, T₇ and T₈ were 6.88, 7.83, 7.78, 7.34, 7.28, 8.14, 8.03 and 7.80, respectively. The treatment T₆ (8.14) has found significantly more acceptable than other treatment, as followed by treatment T₇ with 8.03 score on 9 point hedonic scale.

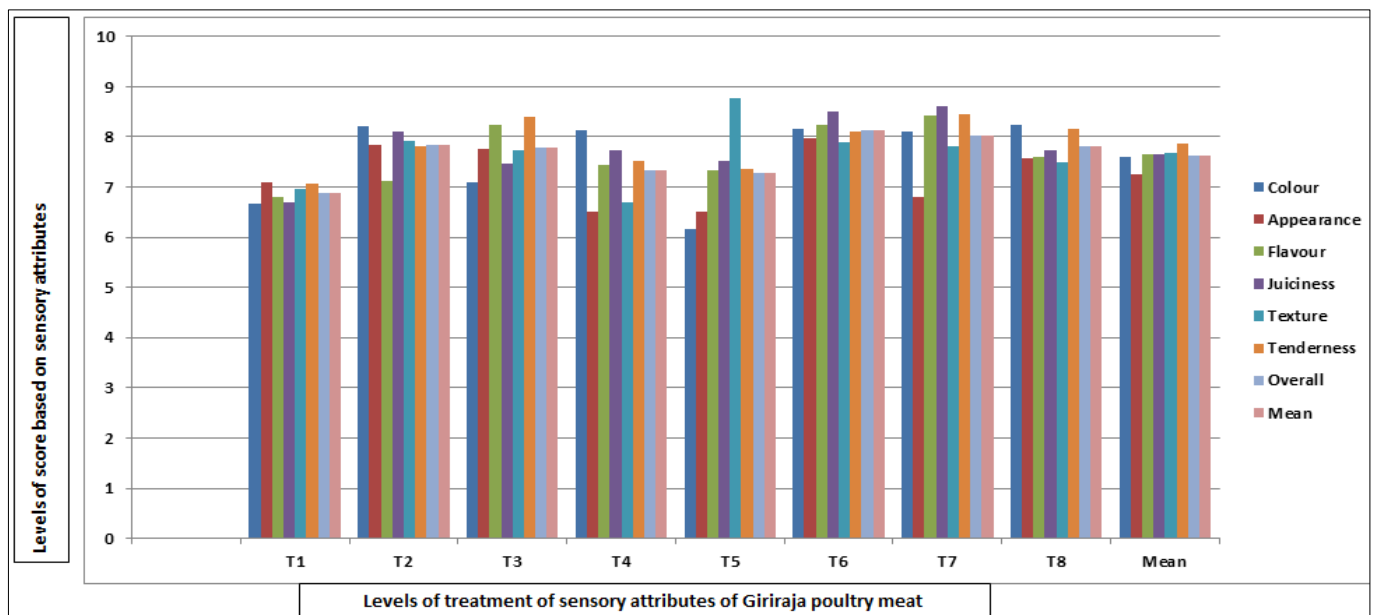
These results findings are in agreement with earlier studies of Cheng *et al.* (2014) [3], who reported that the meat sensory

scores of flavour, chewiness and overall acceptability of both thigh and breast meat of the free-range group were significantly ($p < 0.05$) better than cage and floor-pen system. Similarly, Olaifa *et al.* (2016) [9] reported that the organoleptic parameters tested with the exception of colour, which was rated higher in those reared on semi-intensive system with 8.23 score, but lower in those reared on intensive system.

Organoleptic evaluation values of cooked meat in terms of color, odour, taste, texture, flavor and overall acceptance as indicated showed control negative and dietary moringa powder groups significantly ($P \leq 0.05$) achieved lower values of color, taste, Odor, texture, flavor and overall acceptance. Meanwhile, *Moringa oleifera* leaves extract groups 0.04% MOLP with scavenging appeared significantly ($P \leq 0.05$) a good feed additive for color, odour, taste and overall acceptance. Generally, the best values of overall acceptance with 8.49 score value, had been significantly ($P \leq 0.05$) recorded by birds group fed diets supplemented with (100ml/l) *Moringa oleifera* leaves ethanolic extract using 0.04% MOLP with scavenging followed by 0.06% with scavenging (8.09) when compared with its control negative (7.87). The worst value (6.89) was achieved by birds fed dietary 5% *Moringa oleifera* leaves meal (MLM). These results may be due to presence of phenolic antioxidants in moringa extract which improve the physical and chemical properties of meat (Ranadheera *et al.*, 2012). These results are in agreement with those obtained by Abou Sekken *et al.* (2013b) [1] who found that the best value of overall acceptance being 8.17 sensory score had been recorded by birds fed diets supplemented with (1%) ethanolic extract. Meanwhile, the worst one having 6.88 scale score was achieved by birds fed diets with BHT supplementation. In contradict results, Hayat *et al.* (2010) reported that antioxidant supplementation (vitamin E or BHT) did not enhance the acceptability of eggs by trained panelists, color, odor, taste and overall acceptance were decreased.

Table 2: Effect of Moringa leaves powder on overall average sensory attributes of meat (score on 9 point hedonic scale) Giriraja poultry birds with or without scavenging

Treatments	Colour	Appearance	Flavour	Juiciness	Texture	Tenderness	Overall Acceptability	Mean
T ₁	6.68	7.10	6.80	6.70	6.97	7.07	6.87	6.88
T ₂	8.20	7.83	7.13	8.10	7.93	7.80	7.83	7.83
T ₃	7.10	7.77	8.23	7.47	7.73	8.40	7.78	7.78
T ₄	8.13	6.50	7.43	7.73	6.70	7.53	7.33	7.34
T ₅	6.17	6.50	7.33	7.53	8.77	7.36	7.27	7.28
T ₆	8.17	7.96	8.23	8.50	7.90	8.10	8.14	8.14
T ₇	8.10	6.80	8.43	8.60	7.80	8.46	8.03	8.03
T ₈	8.23	7.57	7.60	7.73	7.50	8.17	7.80	7.80
Mean	7.59	7.25	7.64	7.66	7.68	7.86	7.63	
SE ±(m)	0.092	0.009	0.092	0.092	0.012	0.092	0.011	
CD at 5%	0.029	0.027	0.029	0.029	0.038	0.029	7.80	
Significance	Sig	Sig	Sig	Sig	Sig	Sig	7.63	

**Fig 1:** Graphical representation effect of Moringa leaves powder on overall average sensory attributes of meat (score on 9 point hedonic scale) Giriraja poultry birds with or without scavenging

Conclusions

From the study, it is concluded that the poultry feed standard ration diet supplemented with different levels of MOLP (0.00, 0.04, 0.06 and 0.08%) along with scavenging and intensive system of rearing in poultry does not exert any detrimental effect on the health of Giriraja poultry birds. However, the optimum level of MOLP 0.04% with scavenging rearing poultry system found to be superior for obtaining highest meat quality. When, Giriraja poultry birds derived chicken analysed based sensory attributes, it has found that in case of treatment having standard ration with inclusion 0.04% MOLP under scavenging system of rearing found superior. The mean score of sensory evaluation did not differ significantly in treatment group and control. In respect of colour 8.23, appearance 7.83, taste/flavor 8.43, juiciness 8.60, texture 8.77, tenderness 8.46 and overall acceptability with 8.14 score value on 9 point scale in Giriraja chicken.

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