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Raj Kumar
Ph. D Scholar, Animal Husbandry, SVPUA&T, Meerut, Uttar Pradesh, India

Nazim Ali
Professor, Dept. of Animal Husbandry, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, Uttar Pradesh, India

RA Siddique
Associate Professor, Veterinary Biochemistry, College of Veterinary Science, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, Uttar Pradesh, India

Rajbir Singh
Professor, Dept. of Animal Husbandry, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture &Technology, Meerut, Uttar Pradesh, India

Rajkumar
Professor, Dept. of Animal Husbandry, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture &Technology, Meerut, Uttar Pradesh, India

DS Sahu
Associate Professor, Dept. of Animal Husbandry, College of Agriculture, Sardar Vallabhbhai Patel University of Agriculture &Technology, Meerut, Uttar Pradesh, India

Debashis Roy
Associate Professor, Department of Animal Nutrition, College of Veterinary Science, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, Uttar Pradesh, India

Ahmad Fahim
Assistant Professor, Department of Livestock Production and Management, College of Veterinary Science, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, Uttar Pradesh, India

Correspondence
Raj Kumar
Ph. D Scholar, Animal Husbandry, SVPUA&T, Meerut, Uttar Pradesh, India

The effect of different level of mushroom (*Agaricus bisporus*) and probiotics (*Saccharomyces cerevisiae*) on sensory evaluation of broiler meat

Raj Kumar, Nazim Ali, RA Siddique, Rajbir Singh, Rajkumar, DS Sahu, Debashis Roy and Ahmad Fahim

Abstract
A study was conducted to evaluate the effect of the optimum level of incorporation of mushroom (*Agaricus bisporus*) and probiotics (*Saccharomyces cerevisiae*) as feed additives on sensory evaluation of broiler meat. Three hundred and sixty, day-old broiler chicks of strain (Cobb 400) were divided randomly into eight groups. Each represented a treatment (45 birds/ treatment) with 3 replicates in a completely randomized design. Chicks were reared for 42 days. The aim of this study was to evaluate the use of different levels of mushroom and probiotics on poultry meat. The experimental diets were designed as- T1: control, T2: T1+ 0.4% mushroom powder, T3: T1 + 0.8% mushroom powder, T4: T1+ 1.2% mushroom powder, T5: T1 + 0.1% probiotics, T6: T1+ 0. 2% probiotics, T7: T1 + 0.3% probiotics and T8: T1 + 0.8% mushroom powder + 0.2% probiotics levels. Results of the present study showed that broilers receiving the mushroom and probiotics supplemented diet had a significant improvement in meat Color/appearance, juiciness, taste, odor and overall acceptability were used as the sensory parameters of all groups; we found that there was statistically significant difference (P<0.05) within treatment group. Application of mushroom in group (T4) and probiotics in group (T7) in feed improved the meat quality. The overall acceptability and best meat quality was observed in group (T7) contain 0.3% probiotics.

Keywords: Broilers, mushroom, probiotics, sensory

Introduction
Feed additives are commonly described as non-nutrient substances which accelerate growth, efficiency of feed utilization, beneficial for health or metabolism of the animals (Church and Pond, 1988) [2]. The range of feed additives used in animal production industry is very broad ranging from growth promoters to disease preventing agents. Supplementation of these agents is aimed to improve digestibility and bioavailability of various nutrients, thereby, enhancing the productivity and economic gains by reducing the input costs. Mushrooms are fruiting bodies of fungi that are known to offer several benefits such as fast growth, improved health, and increased resistance and protection from pathogens (Guo *et. al.* 2003) [5]. This fungal kingdom possesses certain natural advantages in terms of their dietary superiority over the rest of the vegetarian platter: (a) good protein content (20%–30% of dry matter) with all the essential amino acids, making them capable of substituting for meat; (b) chitinous wall to act as a source of dietary fiber; (c) high vitamin B content; (d) low fat content; and (e) virtually no cholesterol (Ghorai *et al.* 2009) [4]. Total lipid content varies between 0.6% and 3.1% of the dry weight in the commonly cultivated mushrooms, The adverse effects of hot weather on the growth performance of broilers are overcome by using Mushroom (*Agaricus bisporus*) and probiotics (*Saccharomyces cerevisiae*). Although the beneficial effects of some mushroom species have been well documented, there remain doubts about the optimum level of mushroom addition to bird diets. Most studies that have evaluated the addition of mushrooms to bird diets have emphasized the micro biotic effects and changes in animal performance. Probiotics are live microbial feed supplements and beneficially affect the host animal by improving its intestinal microbial balance, have been used as the alternative tools for helping newly hatched chicks to colonize normal micro flora as conventionally as hatched chicks do (Fuller 1989) [3]. Generally two types of micro flora (viz. beneficial and harmful) colonize the gastrointestinal tract in animals. Beneficial microbes' colonize gut surfaces in a symbiotic relationship with the host and harmful microbes are potentially pathogenic.

Under normal physiological conditions, the beneficial organisms predominate, which are essential to normal physiological functions such as nutrient supply to host, help in digestion of dietary nutrients and compete with potential pathogens.

Material and Methods

A total 360, day old broiler chicks (Cobb 400) were purchased from Venky's India Limited Saharanpur, Uttar Pradesh, India. The experiment was conducted at the Poultry Research and Training Center under the Department of Animal Husbandry, Sardar Vallabhbhai Patel University of Agriculture & Technology, Modipuram, Meerut-250110, to investigate the effect of mushroom powder and probiotics in broiler production. The chicks were reared at brooder house to adjust with the environmental condition up to 7 days. After 7 days, chicks were randomly allocated eight dietary treatment groups of 45 chicks each; each treatment was composed of three replications with 15 birds. Standard feed was prepared and used throughout the experimental study. The experimental period was divided into three phases (broiler-Pre-starter, broiler-starter and broiler-finisher). Broiler pre starter diet was provided between 0 and 14 days, broiler-starter was 15 to 27 days and broiler finisher was fed from 28 to 42 days. Composition of the experimental starter and finisher diets fed to broilers are shown in Table 1 and Proximate composition of Starter and finisher feeds of broilers are shown in Table 2. Mushroom powder and probiotics were incorporated into the experimental diets manually in appropriate dosage. Different levels of mushroom powder and Probiotics were mixed with different treatment. Cross mixing was applied during the time of mixing. Mixing was done manually and no coccidiostat or any other feed additives were added to the formulated diets in order to obtain clear-cut effect of the test-diet. The initial weights of chicks were recorded before placing them in a brooding pen. The brooding area was thoroughly cleaned and disinfected prior to the arrival of chicks to eliminate possible pathogenic organisms that may cause diseases. Water and feeds were provided in *ad libitum*. After brooding, the birds were weighed before putting into the experimental pens, and then the experimental feeding was started. The pens were installed with feeding devices, drinking troughs, and lighting facilities. Feeding management system varied based on the proposed treatment of the study. Sanitation was observed at all times in the birds' house. All materials and surrounding were cleaned regularly. The temperature was set at 36 °C during the first day, 34 °C during the first week, and was gradually reduced by 3 °C per week to reach a minimum 22 °C at 28 d of age. Relative humidity was between 65 to 75%.

Sensory evaluation of meat

Sensory evaluation was performed to evaluate the effect of mushroom and probiotics supplementation in broiler feed on meat sensory quality parameters. At 42 days of age, one bird from each group was selected randomly. Ten panelists were used as the replicates for the sensory evaluation. Breast meat samples from each treatment groups were used without adding salt or spice to evaluate the sensory qualities according to the Jayasena *et al*. (2013) [6]. Five-point hedonic scale (1=dislike very much, 2=dislike slightly, 3=neither like nor dislikes, 4=like slightly and 5=like very much) was used as the sensory index for evaluating the meat sensory qualities. Color, appearance, juiciness, taste, odor and overall acceptability were used as the sensory parameters. All the samples were coded with three digit numbers when presented to panelists in order to minimize the bias of panelist during the evaluation (Nuwan *et al*. 2016) [8].

Table 1: Composition of the experimental pre starter, starter and finisher diets fed to broilers:

S.N.	Feed ingredients	Amount (kg/100kg feed)		
		Pre-Starter (1 to 14days)	Starter (15 to 27days)	Finisher (28 to 42days)
1	Maize	36.00	37.00	39.00
2	Rice Polish	34.00	35.00	38.00
3	Soybean Meal	9.00	9.00	7.00
4	Groundnut Cake	9.00	8.00	7.00
5	Fish Meal	9.00	8.00	6.00
6	Mineral Mixture	2.00	2.00	2.00
7	Common Salt	1.00	1.00	1.00
	Total	100.0	100.0	100.0

Mushroom powder and probiotics were added to the experimental diets (except control diet) at required amount according to each treatment.

Table 2: Proximate composition of pre- starter, starter and finisher feeds

S. No.	Chemical constituents	Pre- Starter feed	Starter feed	Finisher feed
1.	Moisture	10.01	10.40	9.80
2.	Dry Matter	89.99	89.60	90.20
3.	Ash	6.59	5.20	5.38
4.	Organic Matter	93.41	94.80	94.62
5.	Crude Protein	22.75	22.50	20.00
6.	Ether Extract	4.36	4.75	4.851
7.	Calcium	0.96	0.98	0.97
8	Phosphorus	0.65	0.45	0.40
9	Metabolisable Energy (Kcal/Kg)	3250	2810	2890

Results and Discussion

Data on sensory evaluation parameters are summarized in Table 3. In this experiment different level of mushroom (*Agaricus bisporus*) and probiotics (*Saccharomyces cerevisiae)* supplementation of broilers was recorded. All treatment group of sensory evaluation were significantly ($P<0.05$) higher than control group. There were no significance difference ($P>0.05$) among T2, T3, T4, T4, T5 and T6 although difference were noted significant (($P>0.05$)) among T1, T2 and T7 in colour parameters. There were no

significant difference (P>0.05) among T2, T3 and T5 in overall acceptability of broiler meat. The colour, flavor and overall acceptability of meat were improved in the probiotics supplemented group (T7) than the control group (T1). While the best odor of meat sample was recorded in the probiotics supplemented group (T6) whereas poor odor in control group (T1). Though the highest juiciness of meat sample was recorded in the combination of mushroom and probiotics supplemented group (T8) whereas lowest juiciness in control group (T1). The overall acceptability and best meat quality was observed in group (T7) contain 0.3% probiotics. According to the previous studies, there was widespread agreement about sensory quality and the intramuscular lipid content (Park *et al*. 2016). The present study also similar to Kabir *et al.* (2005) who evaluated the effects of probiotics on the sensory characteristics and microbiological quality of dressed broiler meat and reported that supplementation of probiotics in broiler ration improved the meat quality both at pre-freezing and post-freezing storage. Likewise, Zhang *et al*. (2005) conducted an experiment with 240, day-old, male broilers to investigate the effects of *Saccharomyces cerevisiae* (SC) cell components on the meat quality and they also reported that meat tenderness could be improved by the whole yeast or *Saccharomyces cerevisiae* extract. Findings encountered in this study is in agreement with that of Pelicano *et al.* (2003) [9] who found that significant (P<0.05) improvement in meat flavor fed with probiotics. In a study by Ceslovas *et al.* (2005) [1] stated that probiotic supplementation significantly (P<0.05) increased the meat tenderness and meat quality.

Table 3: Sensory evaluation of meat of broiler chicks fed diets supplemented with different levels of mushroom and probiotics

Treatments	Parameters				
	Appearance/ colour	Flavor/ taste	odor	juiciness	Overall acceptability
T_1	4.06^{a}	4.16^{a}	4.06^{a}	4.35^{a}	4.16^{a}
T_2	4.27^{b}	4.23^{ab}	4.32^{bc}	4.50^{ab}	4.33^{b}
T_3	4.35^{bc}	4.32^{bc}	4.32^{bc}	4.67^{bcd}	4.42^{bc}
T_4	4.46^{bc}	4.50^{d}	4.39^{cd}	4.62^{abc}	4.50^{cd}
T_5	4.30^{b}	4.34^{c}	4.26^{b}	4.67^{bcd}	4.39^{b}
T_6	4.33^{bc}	4.40^{cd}	4.57^{e}	4.77^{cde}	4.52^{d}
T7	4.52^{c}	4.66^{e}	4.34^{bc}	4.93^{de}	4.61^{e}
T8	4.27^{b}	4.20^{cd}	4.45^{d}	4.99^{e}	4.53^{d}
SEM	0.059	0.031	0.028	0.080	0.029
P-value	<0.05	<0.05	<0.05	<0.05	<0.05

a,b,c Means with different superscripts within the same column are significantly different (P<0.05); SEM: Standard error of mean. Treatment: T_1 (control) = not supplemented; T_2= 0.4 percent Mushroom powder; T_3 = 0.8 percent Mushroom powder; T_4= 1.2 percent mushroom powder; T_5= 0.1 percent Probiotics, T_6= 0.2 percent Probiotics, T7=0.3 percent Probiotics and T8=0.8 per cent Mushroom powder+0.2 percent Probiotics

Conclusion

Broilers ration supplemented with mushroom powder (*Agaricus bisporus)* and probiotics (*Saccharomyces cerevisiae*) revealed significant improvement in different parameters like colour, flavor, odor, juiciness and overall acceptability of sensory evaluation of broiler meat. The overall acceptability and best meat quality was observed in group (T7) containing 0.3% probiotics.

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References

1. Ceslovas J, Vigilijus J, Almantas S. The effect of probiotic and phytobiotics on meat properities and quality in pigs. Veterinarija IR Zootechnika., 2005; 29:80-84.
2. Church DC, Pond WG. In: Basic Animal Nutrition and Feeding. 3rdEdn. John Wiley and Sons, Toronto, 1988, 267-275
3. Fuller R. Probiotics in man and animals. Journal Applied. Bacteriology, 1989; 66:365-378
4. Ghorai S, Samudra PB, Deepak V, Sudeshna C, Soumya M, Suman K. Fungal biotechnology in food and feed processing. Food Res Int., 2009; 42:577-587.
5. Guo FC, Savelkoul HFJ, Kwakkel RP, Williams BA, Verstegen MWA. Immunoactive, medicinal properties of mushroom and herb polysaccharides and their potential use in chicken diets. World's Poultry. Science. Journal. 2003; 59:427-440.
6. Jayasena DD, Jung S, Kim HJ, Bae YS, Yong HI, Lee JH *et al*. Comparison of quality traits of meat from Korean native chickens and broilers used in two different traditional Korean cuisines. Asian-Australasian Journal of Animal Sciences, 2013; 26(7):1038-1046
7. Kabir SML, Rahman MM, Rahman MB. Potentiation of probiotics in promoting microbiological meat quality of broilers. Journal of the Bangladesh Society for Agricultural Science and Technology. 2005; 2:93-96
8. Nuwan KS, Wickramasuriya SS, Jayasena DD, Tharangani RH, Song ZYJ, Heo JM. Evaluation of growth performance, meat quality and sensory attributes of the broiler fed a diet supplemented with curry leaves (*Murraya koenigii*). Korean Society of Poultry Science. 2016; 43:169-176.
9. Pelicano ERL, Souza PA, De SHBA, De OA, Norkus EA, Kodawara LM *et al*. Effect of different probiotics on broiler carcass and meat quality. Revista Brasileira de Ciência Avícola, 2003; 5(3):207-214.
10. Zhang AW, Lee1 BD, Lee1 KW, Song KB, An GH, Lee CH. Effects of Graded Levels of Dietary *Saccharomyces cerevisiae* on Growth Performance and Meat Quality in Broiler Chickens. Asian-Aaustralian Journal of Animal Science. 2005; 18(5):699-703.