Carcass characteristics of broilers fed diets containing different supplements

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ABSTRACT: The experiment was conducted to examine the effect of different supplements on meat composition and processing losses in Ven Cobb[400] broilers. Two hundred and fifty two chicks were divided into seven groups. The first treatment was designated as control (T_0) in which no supplement was added to the feed, while in treatments T_1; organic mineral mixture (Organomin forte), T_2; organic mineral mixture (Vannamin), T_3; probiotics (Microguard), T_4; enzyme (Brozyme -XPR) and probiotics, T_5; emulsifier (Lipigon) were provided through the feed. In the T_6 group, 3 percent less energy was given through feed from 1st to 6th weeks of age, respectively. There were non-significant differences (in the moisture, ether extract and total ash content) among different treatments in the thigh and breast meat in comparison to control. There was a significant difference (in crude protein content) among different treatments in the thigh and breast meat in comparison to control. The processing losses were statistically significant amongst different treatments. The results indicated that different supplements and their combination can be recommended to increase crude protein levels and to produce designer broilers meat.

Key words: Meat composition, processing loss, supplements, Ven Cobb[400] broilers

Poultry is one of the fastest growing segments of the agricultural sector in India. The Indian Poultry sector has been growing at around 8-10 % annually over the last decade with broiler meat volumes growing more than 10 % while table eggs at 5-6 % driven by increased domestic consumption (Mani and Ezhilvalavan, 2018). The industry has not only grown in size but also productivity. With rapidly changing lifestyles, affluent culture, and a conscious need for general wellness, Indian consumers are now opting for a more protein-rich diet (CARI VISION 2050). These changing trends are a boon for the poultry sector in India. Feed additives or growth promoters have been used to improve growth rate, feed efficiency, and product quality and to reduce the production cost in poultry Craig *et al.* (2008). Various antibiotics, anthelmintics, anticoccidials, and hepato-protectants are used for increasing production. They not only increase the cost of production but have adverse effects on long term usage. Due to the prohibition of most of the antimicrobial feed additives in animal feed and their residual effects in animals (Singh *et al.,* 2014) enzymes and probiotics are becoming more popular (Chuka, 2014). Chicken muscles is an important component of a modern healthy diet, and consumers demand both wholesomeness and a desirable flavor. Consumer's demand for food products of superior quality has renewed interest in modifying their composition of poultry meat. Therefore the present study was carried out to study the effect of dietary supplementation of enzymes and probiotic on meat composition *i.e.* thigh and breast muscle composition and processing losses in Ven Cobb broilers.

MATERIALS AND METHODS

Two hundred fifty two, day-old chicks of mixed sexes (broilers) were weighed and randomly assigned to seven treatment groups with 3 replicates of 12 chicks each. The first treatment was designated as control (T_0) in which no supplement was added to the feed, while in treatments T_1; organic mineral mixture (Organomin forte), T_2; organic mineral mixture (Vannamin), T_3; probiotics (Microguard), T_4; enzyme (Brozyme -XPR) and probiotics, T_5; emulsifier (Lipigon) were provided through the feed. In the T_6 group, 3 percent less energy was given through feed from 1st to 6th weeks of age, respectively. At the end of the feeding trial on 42nd day, two chicks from each replicate (6 birds/treatment) were randomly selected and slaughtered, as per Committee for Control and Supervision of Experiments on Animals, Ministry of Environment and Forests, Government of India. The representative meat samples from the thigh and breast muscles of the slaughtered birds were collected and moisture, crude protein, ether extract and total ash were analyzed as per standard methods (AOAC, 2003).

All the data on various parameters were analyzed statistically by ANOVA using SPSS statistical software (SPSS, Armonk, New York, US). The significant mean differences between the treatments were determined at $P<0.05$ using Duncan's Multiple Range Test (DMRT) as

modified by Kramer (1957). A *p-value* of <0.05 was considered statistically significant.

RESULTS AND DISCUSSION

There were non-significant differences in the moisture, ether extract and total ash content among different treatments in the thigh and breast meat in comparison to control. While a significant difference in crude protein content among different treatments in the thigh and breast meat in comparison to control as shown in Table 1 was observed.

The results of the present experiment were supported by the findings of Stoyanov *et al.* (2004) and Khaksefidi and Rahimi (2005) who observed significant (P<0.05) increase in protein content of thigh and breast meat of broilers fed the diet supplemented with probiotics. Similarly, Kaushal *et al.* (2018) found a significant (P<0.05) increase in protein content of thigh meat of broilers fed the diet supplemented with enzymes and probiotics while there were non-significant (P>0.05) differences in moisture, ether extract, and total ash. Similarly, Narasimha (2013), Swamy and Upendra (2013) and Kaushal *et al.* (2018) also found non-significant (P>0.05) difference in ether extract content of thigh and breast meat of broilers fed the diet supplemented with enzymes and probiotics.

Blood loss, feather loss, head loss and shank and wingtip loss was significantly less in the broilers of feed supplemented groups in comparison to control as shown in Table 2.

In contrast, the results of Kaushal *et al.* (2018) found non-significant (P>0.05) differences in processing losses of broilers fed the diet supplemented with enzymes and probiotics. Sharma *et al.* (2018) found a significant (P<0.05) increase in blood loss, feather loss, head loss, shank and wingtip loss of broilers fed the diet supplemented with enzyme.

From the results of the experiment, it is clear that the proximate composition for moisture, ether extract and total ash contents of breast and thigh muscles were not affected due to different supplementation while protein content of breast and thigh muscles were significantly (P<0.05) increased because of development of better musculature. Upon the dietary inclusion of different supplements or their combinations, greater crude protein

Table 1: Proximate composition of thigh and breast meat of broilers (wet basis)

Treatments	Meat	Proximate Composition (%)			
		Moisture	CP	EE	Total ash
T_0	Thigh	71.14 ± 0.05	20.07^{a} ± 0.00	7.36 ± 0.04	1.47 ± 0.00
	Breast	73.42 ± 0.02	21.60^{a} ± 0.02	2.42 ± 0.01	1.43 ± 0.00
T_1	Thigh	71.53 ± 0.00	21.39^{b} ± 0.02	7.28 ± 0.02	1.49 ± 0.06
	Breast	73.85 ± 0.07	22.31^{b} ± 0.02	2.40 ± 0.00	1.47 ± 0.00
T_2	Thigh	71.62 ± 0.03	21.43^{b} ± 0.01	7.32 ± 0.01	1.50 ± 0.02
	Breast	73.83 ± 0.00	22.42^{b} ± 0.02	2.37 ± 0.00	1.46 ± 0.00
T_3	Thigh	71.75 ± 0.01	22.74^{c} ± 0.02	7.25 ± 0.01	1.48 ± 0.07
	Breast	73.97 ± 0.01	23.40^{c} ± 0.03	2.35± 0.00	1.45 ± 0.00
T_4	Thigh	71.80 ± 0.01	22.76^{c} ± 0.02	7.29 ± 0.00	1.49 ± 0.00
	Breast	74.03 ± 0.01	22.70^{b} ± 0.02	2.35 ± 0.01	1.45 ± 0.00
T_5	Thigh	71.69 ± 0.00	22.78^{c} ± 0.02	7.26 ± 0.01	1.48 ± 0.00
	Breast	73.90 ± 0.03	23.31^{c} ± 0.01	2.37 ± 0.00	1.46 ± 0.00
T_6	Thigh	71.28 ± 0.02	22.15^{d} ± 0.03	7.28 ± 0.01	1.49 ± 0.01
	Breast	73.62 ± 0.02	22.89^{b} ± 0.01	2.35 ± 0.01	1.45 ± 0.00

Values with different superscripts column wise differ significantly (P<0.05)

Table 2: Processing losses of broilers

Treatments	Processing losses (% of live weight)			
	Blood loss	Feather loss	Head loss	Shank and Wing tip loss
T_0	3.69^{a} ± 0.11	6.43^{a} ± 0.06	3.11^{a} ± 0.07	6.45^{a} ± 0.05
T_1	3.47^{b} ± 0.07	5.91^{b} ± 0.04	2.96^{b} ± 0.08	5.77^{b} ± 0.05
T_2	3.41^{bc} ± 0.05	5.86^{bc} ± 0.00	2.93^{bc} ± 0.07	5.66^{bc} ± 0.00
T_3	3.30^{c} ± 0.03	5.76^{c} ± 0.00	2.85^{c} ± 0.07	5.53^{c} ± 0.00
T_4	3.25^{ce} ± 0.03	5.67^{cd} ± 0.04	2.80^{cd} ± 0.06	5.47^{c} ± 0.02
T_5	3.36^{cb} ± 0.04	5.81^{cb} ± 0.01	2.89^{cb} ± 0.07	5.60^{cb} ± 0.02
T_6	3.58^{d} ± 0.08	6.10^{b} ± 0.05	3.03^{ab} ± 0.08	6.00^{d} ± 0.05

Means bearing different superscripts in a column differ significantly (P < 0.05)

and lower crude fat contents of the breast and thigh meats were observed compared to the control diet.

The increased protein content of muscles may be due to an increase in net protein retention in enzymes and probiotic supplemented groups of broilers.

CONCLUSION

It me concluded that supplementation of enzymes; probiotic and their combination did materially affect the processing losses of broilers. The mineral mixtures, probiotics, enzymes and emulsifiers, and their combination exhibited lower crude fat and greater crude protein of the breast and thigh meat than the control. Although the results of the current study provided new leads for further investigation of the interaction between different supplements and their combination on meat composition, long-term investigations of the mechanism of different supplements to the gut microbes of chicken.

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