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Effect of Organic Mineral Mixtures, Probiotics, Enzymes, Emulsifier and Liver Supplements on Carcass Traits of Broilers

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ABSTRACT

A feeding trial was conducted to study the effects of organic mineral mixture, probiotics, enzymes, emulsifier and liver supplements on the carcass traits of broilers. For this purpose, a total of 396 day-old commercial broiler chicks (Cobb) were used and randomly allocated into 11 groups with three replicates of 12 chicks each. The results revealed that maximum dressed yield with and without giblets at six weeks was noted in group T_{10} i.e. broilers supplemented with enzymes with probiotics, liver supplement 1 and emulsifier followed by T_4, T_9, T_3, T_5, T_2 , T_1 and T_8. Similarly, all the supplemented groups showed significant (P<0.05) increase in the cut up parts compared to the control except T_6, T_7 and T_8. Supplemented groups also showed significant (P<0.05) decrease in the processing losses except in T_7 for blood loss & feather loss and in T_6 & T_7 for head loss. Thus, it may be concluded that supplementation has been found beneficial in yielding more edible meat with lesser dressing losses.

Key words: *Broilers, Enzymes, Probiotics, Organic mineral mixture, Emulsifier*

INTRODUCTION

Poultry is one of the fastest growing segments of the agricultural sector in India. India is the third largest egg producer after China and USA and the fourth largest poultry producer after China, Brazil and USA. The annual egg and broiler production of India is 70 billion eggs and 3.8 million tons respectively, with per capita consumption of 68 eggs and 2.5 kg chicken meat against the ICMR recommendations of 180 eggs and 11 kg poultry meat[1]. Poultry meat has significant role in Indian diet valued at US $ 6.6 billion. Favoured by socio- economic conditions like rising purchasing power and changing food habits of the people this sector is driven by ever increasing domestic demand. Poultry meat is an excellent source of high quality protein, vitamins, and minerals and is not subjected to cultural and religious restrictions. Rising input cost in poultry production has necessitated the need to look for feed supplements which can enhance the nutrient utilization efficiency of feeds thereby improving performance of poultry and resultant increase in profitability.

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In this context use of organic minerals, probiotics, enzymes, emulsifiers and liver supplements seems promising. Use of organic minerals in poultry diets has been shown to have multiple beneficial effects including higher absorption and increased antibody levels as they may provide alternative pathways for absorption, by decreasing mineral excretion. Similarly, use of probiotics and feed enzymes have been reported to regulate gut integrity, reduce digestive disorders, improve nutrient absorption/ feed efficiency, increases production, check the mortality and lowering of feed cost. Poultry produces emulsifiers in the form of bile, however, at times it is insufficient in view of added fats and oils. Also, as the digestive tract in young birds is not completely developed, fat absorption from the feed matrix is hampered. Hence, addition of emulsifier into the diet can overcome this problem by reducing the size of the fat globules forming small micelles and increasing the total surface available for enzymatic digestion. The addition of synthetic emulsifier to broiler diets is a recent practice as compared to other dietary supplements. Polyherbal liver stimulants possess hepato – protective, hepatogenic, immunomodulatory and antioxidant properties, which tone up liver resulting in increased utilization of feed and better performance.

Keeping the above facts in view, an experiment was conducted to determine the effect of supplementation of organic mineral mixtures, probiotics, enzymes, emulsifier and liver supplements supplementation on the carcass traits of broilers.

MATERIAL AND METHODS

A total number of 396 day old commercial broiler chicks (Cobb) were procured for undertaking the experiment. All the chicks were individually weighed and randomly allotted to eleven different groups each with three replicates of 12 chicks. The groups were designated as T_0; basal diet, T_1; basal diet along with organic mineral mixture 1 (Organomin forte) @ 0.5 g/ kg feed, T_2; basal diet along with organic mineral mixture 2 (Vannamin) @ 0.5g/ kg feed, T_3; basal diet along with probiotics (Microguard) @ 0.1g/ kg feed,T_4; basal diet along with enzymes + probiotics (Brozyme - XPR) @ 0.5 g / kg feed, T_5; basal diet along with emulsifier (Lipigon) @ 0.5 g/ kg feed, T_6; basal diet with 3% less energy, T_7; basal diet with 3% less energy along with liver supplement 1(Superliv premix) @ 0.5 g/kg feed, T_8; basal diet with 3% less energy along with liver supplement 2 (X- liv Pro) @ 0.5 g/kg feed, T_9; basal diet along with enzymes with probiotics (Brozyme - XPR) and liver supplement 1(Superliv premix) @ 0.5 g/kg feed, and T_{10}; basal diet along with enzyme with probiotics (Brozyme - XPR), liver supplement 1(Superliv premix) and emulsifier (Lipigon) @ 0.5 g/kg feed. The broiler chicks were housed in deep litter system under standard management practices. At the end of experiment on 42nd day of age, two broilers from each replicate (6 broilers per treatment) were randomly selected and slaughtered for carcass trait study**.** Prior to slaughter the broiler chickens were off fed for 12 hours. For dressing and processing of the experimental broilers, different steps followed were as under:

Slaughtering: The broiler chickens were weighed alive just prior to slaughter. They were killed by cutting the carotid artery and jugular vein by single clean cut with a sharp knife and left for bleeding. **Bleeding:** For complete bleeding one minute was allowed without any struggling and then the carcass was again weighed and the blood loss was recorded. **Scalding:** The bled carcass was dipped in hot water for one and half minutes. The temperature of water was kept 58°C. **Defeathering:** The feathers were removed manually, after the removal of pin feathers, the carcass was again weighed to record the feather loss. **Dressing:** The broiler chickens were dressed by removing the head by cutting between the first cervical and occipital bone.

The neck at the base where it joins the body was cut off, the blood adhering to it was removed. The shanks were cut off from the hock joint and the head and shanks were discarded. **Evisceration:** It was done by making a slit from the tip of breast bone up to the area around the cloaca. The visceral organs were removed by supporting the bird with one hand through the incised abdomen. Liver was removed carefully. Gall bladder was removed gently without rupture. Gizzard and heart were also removed carefully. The internal layer of gizzard lining was removed retaining its muscular portion. The pericardium of heart was removed. **Washing:** After evisceration, thorough washing and cleaning was done with running tap water. **Draining:** The carcasses were kept hanging on the special racks for 5 – 10 minutes.Various parameters viz. dressed yield without or with giblet, cut-up parts i.e. drumsticks and thighs, wings, neck, back and breast and processing losses as blood loss, feather loss, head and shank losses as per cent of live weight were then calculated. Dressed yield was calculated by deducting weight loss as blood, feathers, head, shank and viscera from live weight and dressed yield with giblet was calculated by adding weight of giblet with dressed yield.

RESULTS AND DISCUSSION

Dressed yield

The effects of feed supplementations on dressed yield (without or with giblet) of broilers have been presented in Table 1

Broilers of feed supplemented groups showed significant positive impact on the dressed yield without giblet and dressed yield with giblet. In dressed yield without giblet, control group broilers (70.63 ± 0.55 per cent) were significantly ($P<0.05$) lower than feed supplemented groups except T_6 and T_7. However, maximum (73.24 ± 0.53 per cent) value of dressed yield without giblet was found in T_{10} group of broilers. There were no significant differences in the dressed yield without giblet between T_2 and T_5, T_0, T_6 and T_7, T_3, T_4 and T_9, groups of broilers. In dressed yield with giblet, control group broilers (75.61 ± 0.53 per cent) were significantly ($P<0.05$) lower than feed supplemented groups except T_6 and T_7. However, maximum (78.21 ± 0.14 per cent) value of dressed yield with giblet was found in T_{10} group of broilers. However, there were no significant differences in the dressed yield with giblet between T_2 and T_5, T_0, T_6 and T_7, T_3, T_4 and T_9, groups of broilers. Results of the present study on carcass yield were in tune with the findings of Midilli *et al.*[4], who found that dressed yields were higher in enzymes and probiotic supplemented groups of broilers. Khan *et al.*[3] noted that, enzymes supplementation improved the dressing percentage in the broilers. Higher dressed yield in feed supplemented groups may be due to better fleshing and favourable meat to bone ratio in the treated groups.

Cut up parts

The effect of feed supplementations on the cut-up parts viz. back, breast, thigh, drumstick, wings and neck have been presented in Table 2 Broilers of feed supplemented groups T_1, T_2, T_3, T_4 T_5 T_9 and T_{10} had significant positive impact on back weight with maximum (19.91 ± 0.02 per cent) weight observed in T_{10} group whereas minimum (18.26 ± 0.01 per cent) back weight was observed in control (T_0) group of broilers. There were no significant differences in the back weight among T_1, T_2 and T_3, T_6, T_7 and T_8, T_9 and T_{10} groups. Broilers of feed supplemented groups T_1, T_2, T_3, T_4 T_5, T_9 and T_{10} showed significant positive effect on breast weight with maximum value (18.79 ± 0.04 per cent) in T_{10} group and minimum (17.44 ± 0.01 per cent) in T0 (control) group.

Table 1: **Effect of feed supplementation on carcass yield (% of live wt) of broilers**

Treatments	Dressed yield without giblet	Dressed yield with giblet
T_0	$70.63^{a} \pm 0.55$	$75.61^{a} \pm 0.53$
T_1	$71.55^{b} \pm 0.56$	$76.53^{b} \pm 0.39$
T_2	$71.98^{c} \pm 0.73$	$76.94^{c} \pm 0.50$
T_3	$72.85^{d} \pm 0.58$	$77.82^{d} \pm 0.60$
T_4	$72.95^{de} \pm 0.72$	$77.93^{de} \pm 0.43$
T_5	$72.04^{c} \pm 0.59$	$77.0^{c} \pm 0.34$
T_6	$70.77^{a} \pm 0.73$	$75.75^{a} \pm 0.33$
T_7	$70.76^{a} \pm 0.53$	$75.72^{a} \pm 0.56$
T_8	$71.52^{b} \pm 0.54$	$76.47^{b} \pm 0.62$
T_9	$72.93^{de} \pm 0.62$	$77.92^{de} \pm 0.28$
T_{10}	$73.24^{e} \pm 0.53$	$78.21^{e} \pm 0.14$

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

There were no significant differences in the breast weight among T_1, T_2, T_3, and T_5, T_6, T_7, and T_8, T_9 and T_{10} groups. Broilers of feed supplemented groups T_3, T_4, T_5, T_9 and T_{10} showed significantly (P<0.05) higher thigh weight in comparison to other groups. Maximum (11.16 ± 0.04 per cent) thigh weight was found in the broilers of T_{10} group and minimum (10.46 ± 0.01 per cent) in T_0 (control) group. There were no significant differences in the T_3, T_4, T_5, T_9 and T_{10}, T_1, T_2, T_6, T_7 and T_8 groups.

Table 2: Effect of feed supplementation on cut up parts (% of live weight) of broilers

Treatments	Back	Breast	Thigh	Drumstick	Wing	Neck
T_0	$18.26^{a} \pm 0.01$	$17.44^{a} \pm 0.01$	$10.46^{a} \pm 0.01$	$9.70^{a} \pm 0.02$	$9.42^{a} \pm 0.02$	$4.60^{a} \pm 0.01$
T_1	$18.85^{b} \pm 0.02$	$18.08^{b} \pm 0.05$	$10.70^{a} \pm 0.02$	$9.98^{a} \pm 0.04$	$9.73^{b} \pm 0.01$	$4.68^{a} \pm 0.02$
T_2	$18.95^{b} \pm 0.02$	$18.21^{bc} \pm 0.02$	$10.73^{a} \pm 0.03$	$10.11^{b} \pm 0.02$	$9.81^{b} \pm 0.01$	$4.73^{ab} \pm 0.01$
T_3	$19.33^{b} \pm 0.04$	$18.57^{b} \pm 0.01$	$10.90^{b} \pm 0.01$	$10.23^{b} \pm 0.01$	$9.94^{b} \pm 0.01$	$4.85^{b} \pm 0.01$
T_4	$19.55^{c} \pm 0.05$	$18.63^{c} \pm 0.01$	$10.97^{b} \pm 0.02$	$10.28^{b} \pm 0.01$	$9.99^{b} \pm 0.01$	$4.91^{b} \pm 0.01$
T_5	$19.11^{c} \pm 0.06$	$18.37^{cb} \pm 0.05$	$10.81^{b} \pm 0.02$	$10.18^{b} \pm 0.01$	$9.87^{b} \pm 0.01$	$4.79^{b} \pm 0.01$
T_6	$18.53^{ba} \pm 0.06$	$17.78^{ab} \pm 0.03$	$10.58^{a} \pm 0.01$	$9.82^{ab} \pm 0.01$	$9.56^{ab} \pm 0.02$	$4.65^{a} \pm 0.01$
T_7	$18.35^{ab} \pm 0.03$	$17.58^{ab} \pm 0.05$	$10.52^{a} \pm 0.01$	$9.74^{a} \pm 0.01$	$9.48^{ab} \pm 0.02$	$4.61^{a} \pm 0.00$
T_8	$18.76^{ba} \pm 0.02$	$17.91^{ab} \pm 0.02$	$10.64^{ab} \pm 0.02$	$9.88^{ab} \pm 0.01$	$9.66^{ab} \pm 0.01$	$4.64^{a} \pm 0.00$
T_9	$19.75^{c} \pm 0.03$	$18.69^{c} \pm 0.01$	$11.05^{b} \pm 0.01$	$10.34^{b} \pm 0.01$	$10.04^{c} \pm 0.01$	$4.97^{bc} \pm 0.01$
T_{10}	$19.91^{c} \pm 0.02$	$18.79^{c} \pm 0.04$	$11.16^{b} \pm 0.04$	$10.45^{c} \pm 0.04$	$10.14^{c} \pm 0.03$	$5.07^{c} \pm 0.03$

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

Broilers of feed supplemented groups T_2, T_3, T_4, T_5, T_9 and T_{10} showed significant positive effect on drumstick weight with maximum value (10.45 ± 0.04 per cent) in T_{10} group and minimum (9.70 ± 0.02 per cent) in control (T_0) group. There were no significant differences in drumstick weight among T_1,T_6, T_7 and T_8, T_2, T_3, T_4, T_5, T_6, T_8 and T_9 groups.Broilers of feed supplemented groups T_1,T_2, T_3,T_4,T_5,T_9 and T_{10} noted significant positive impact on wing weight with maximum value (10.14 ± 0.03 per cent) in T_{10} group and minimum wing weight (9.42 ± 0.02 per cent) was observed in broilers of control (T_0) group. There were no significant differences in wing weight among T_1,T_2, T_3,T_4,T_5,T_6, T_7 and T_8, T_9 and T_{10} groups.Broilers of feed supplemented groups T_3, T_4,T_5, T_9 and T_{10} noted significant positive impact on neck weight with maximum (5.07 ± 0.03 per cent) neck weight was found in T_{10} group. and minimum neck weight (4.60 ± 0.01 per cent) were observed in broilers of control (T_0) group. There were no significant differences in neck weight among T_1,T_2, T_6, T_7 and T_8, T_3, T_4,T_5 and T_9, T_9 and T_{10} groups. Results of the present investigation were in accordance with the finding of Midilli *et al.*[4], who found better carcass and cut up yields in enzymes and probiotics supplemented groups of broilers. Fathi *et al.*[2], also found significant increase in the breast muscles yield in broilers supplemented with probiotics. The higher cut up yields observed in supplemented groups may be due to more edible muscle mass in broilers in feed supplemented groups.

Processing losses

The effect of feed supplementations on processing losses viz. blood loss, feather loss, head, shank and wing tip of broilers have been shown in Table 3

All the group except T_7 showed significantly decrease in blood loss with maximum (3.69 ± 0.11, per cent) blood loss was found in T_0 group broilers while minimum blood loss (3.16 ± 0.02 per cent) was found in T_{10} group broilers. There were no significant differences in the blood loss among T_1,T_2, T_5 and T_8. T_6, T_7, and T_8. T_9 and T_{10}. All the group except T_7 showed significantly decrease in feather loss with maximum (6.43 ± 0.06, per cent) feather loss was found in T_0 group broilers while minimum feather loss(5.35± 0.02 per cent) was found in T_{10} group broilers. There were no significant differences in the feather loss among T_1,T_2, T_5,T_6, and T_8, T_9 and T_{10}. All the groups except T_7 showed significantly decrease in head loss with maximum (3.11 ± 0.07 per cent) head loss was found in T_0 group broilers while minimum head loss (2.73 ± 0.04 per cent) was found in T_{10} group broilers. There were no significant differences in the head loss among T_1,T_2, T_5, T_6, and T_8, T_9 and T_{10}, T_2,T_3,T_4, T_5 and T_9

Table 3: Effect of feed supplementation on processing losses (% of live weight) of broilers

Treatments	Blood loss	Feather loss	Head	Shank & Wing tip
T_0	$3.69^{a} \pm 0.11$	$6.43^{a} \pm 0.06$	$3.11^{a} \pm 0.07$	$6.45^{a} \pm 0.05$
T_1	$3.47^{b} \pm 0.07$	$5.91^{b} \pm 0.04$	$2.96^{b} \pm 0.08$	$5.77^{b} \pm 0.05$
T_2	$3.41^{bc} \pm 0.05$	$5.86^{bc} \pm 0.00$	$2.93^{bc} \pm 0.07$	$5.66^{bc} \pm 0.00$
T_3	$3.30^{c} \pm 0.03$	$5.76^{c} \pm 0.00$	$2.85^{c} \pm 0.07$	$5.53^{c} \pm 0.00$
T_4	$3.25^{ce} \pm 0.03$	$5.67^{cd} \pm 0.04$	$2.80^{cd} \pm 0.06$	$5.47^{c} \pm 0.02$
T_5	$3.36^{cb} \pm 0.04$	$5.81^{cb} \pm 0.01$	$2.89^{cb} \pm 0.07$	$5.60^{cb} \pm 0.02$
T_6	$3.58^{d} \pm 0.08$	$6.10^{b} \pm 0.05$	$3.03^{ab} \pm 0.08$	$6.00^{d} \pm 0.05$
T_7	$3.64^{da} \pm 0.09$	$6.25^{a} \pm 0.02$	$3.08^{a} \pm 0.07$	$6.22^{e} \pm 0.07$
T_8	$3.52^{db} \pm 0.07$	$6.00^{b} \pm 0.00$	$2.99^{b} \pm 0.08$	$5.89^{d} \pm 0.00$
T_9	$3.20^{ce} \pm 0.03$	$5.53^{d} \pm 0.03$	$2.76^{cd} \pm 0.06$	$5.41^{c} \pm 0.00$
T_{10}	$3.16^{e} \pm 0.02$	$5.35^{d} \pm 0.02$	$2.73^{d} \pm 0.04$	$5.35^{c} \pm 0.02$

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

Groups. All the groups showed significantly decrease in shank & wing tip loss with maximum (6.45 ± 0.05 per cent) shank & wing tip loss was found in T_0 group broilers while minimum shank & wing tip loss (5.35 ± 0.02 per cent) was found in T_{10} group broilers. There were no significant differences in the shank & wing tip loss among T2,T3,T4, T5, T_9 and T_{10}, T_6 and T_8, T_1, T_2 and T_5.The data of the present investigation indicated that the processing losses were significantly decrease due to organic mineral mixtures, probiotics, enzymes, emulsifier and liver supplements supplementations.

Thus, it may be concluded that organic mineral mixtures, probiotics, enzymes, emulsifier and liver supplements supplementation has been found beneficial in yielding more edible meat with lesser dressing losses.

REFERENCES

1. VISION,C., Central Avian Research Institute, Izatnagar, Bareilly, India. (2050).
2. Fathi, M. M., Mansour, S. A., Homidan, S. A., Khalaf, A. A. and Damegh, M. A., Effect of yeast culture supplementation on carcass yield and humoral immune response of broiler chicks. *Vet. World* **5(11):** 651-657 (2012).
3. Khan, S. H., Sardar, R. and Siddique. B., Influence of enzymes on performance of broilers fed sunflower-corn based diets. *Pakistan Vet. J.* **26(3):** 109-114 (2006).
4. Midilli, M. and Tuncer, S. D., The effect of enzyme and probiotic supplementation to diets on broiler performance. *Turk-Veterinerlik-ve-Hayvanclk-Dergisi.* **25(6):** 895-903 (2001).

