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Carcass Characteristics of Broiler Chicken Fed Sheep Manure Based Diets Supplemented with or without Enzymes

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A B S T R A C T

An experiment was carried out to evaluate the carcass characteristics of broiler chicken fed with different levels of Sheep manure with or without enzyme supplementation. A total of 210 broiler chicks were procured from commercial hatchery and brooded under uniform managemental condition for one week. On 8th day the chicks were distributed into five treatment groups viz. T_1, T_2, T_3, T_4 and T_5 containing 42 chicks in each which were subdivided into three replicates of 14 chicks each. The T_1 (Control) group fed basal diet and in T_2 and T_4 the basal diet was replaced by SM at 5% and 10% level without enzyme where as T_3 and T_5 the basal diet was replaced by SM at 5% and 10% level with multi enzyme supplementation. The per cent blood loss was recorded ranged from 4.22 ± 0.08 in T_2 to 4.42 ± 0.09 in T_4. The per cent feather loss was recorded to be 5.95 ± 0.12 T_1 to 6.16 ± 0.11 in T_5. The per cent dressing yield was found to be 71.86 ± 0.38, 72.13 ± 0.29, 71.92 ± 0.22, 71.75 ± 0.28 and 72.07 ± 0.32 respectively, for T_1, T_2, T_3, T_4 and T_5 groups. Statistically, no significant difference was observed among the different treatment groups for blood loss, feather loss and dressing yields. The per cent of different cut-up parts were found to be differed non-significantly among the different treatment groups. The per cent giblet yield was found to be 6.88 ± 0.14, 6.28 ± 0.12, 6.82 ± 0.14, 6.48 ± 0.17 and 6.58 ± 0.15 respectively, for T_1, T_2, T_3, T_4 and T_5 groups. Statistical analysis revealed non-significant differences among the various treatment groups.

Introduction

In poultry rearing, feed cost accounts for 60-70% of the total cost of either egg or poultry meat production and protein accounts 15% of feed cost (Singh, 1990). There is shortage of quality feed ingredients in Kashmir valley. The feeds are to be imported from other states of the country which adds more production cost of poultry. The nutritionists are often forced to formulate the cheaper diet by inclusion of locally available non-conventional feeds. Sheep manure is a unconventional feed ingredients that is relatively high in protein and energy levels and can form a satisfactory feed ingredient in poultry diet (Onu, 2007; Abeke *et al.*, 2008; Onu and Otuma, 2008). However, the usefulness of sheep manure as feed ingredient in monogastric diets is constrained by its relative high fibre content which causes increased viscosity of the gut content resulting

lower nutrient digestibility (Galassi *et al.,* 2004; Len, 2008). According to Kanengoni *et al.,* (2002) and Partanen *et al.,* (2007), as the level of fibre in monogastric diets increases, digestibility of nitrogen and energy decreases.

Trait and Wright (1990) reported that fibre dwindle availability of nutrients by dropping the period of exposure of the food to digestive enzymes and absorptive surfaces due to the increase rate of passage of the feed induce by its fibre content. Hajati (2010) reported that endogenous enzymes of broilers cannot effectively digest nonstarch polysaccharides and thereby the ingestion of high levels of soluble NSP leads to increased digesta stickiness and reduced nutrient digestibility and absorption.

However, its incorporation in the diet of monogastric animal is encumbered by its relatively high fibre content that reduces its nutritional value (Onu, 2007). Inclusion of exogenous enzymes will improve its nutritional value and utilization by birds. In recent years the use of animal manure for feeding of livestock has generated considerable interest due to the fact that the conventional feed stuffs can no longer adequately meet the need of fast growing poultry industry (Abeke *et al.,* 2003). Therefore, the present study was conducted to evaluate the performance of broiler chicken fed with sheep manure(SM) based diets supplement with or without enzymes.

Materials and Methods

A total of 210 broiler chicks were procured from commercial hatchery and brooded under uniform managemental condition for one week. On 8th day the chicks were distributed into five treatment groups viz. T_1, T_2, T_3, T_4 and T_5 containing 42 chicks in each which were subdivided into three replicates of 14 chicks each. The birds were reared battery cages. The T_1 (Control) group fed basal diet and in T_2 and T_4 the basal diet was replaced by SM at 5% and 10% level without enzyme where as T_3 and T_5 the basal diet was replaced by SM at 5% and 10% level with multi enzyme supplementation. The sheep manure was collected from the Mountain Research Centre on Sheep and Goat, Sher- e- Kashmir University of Agricultural Sciences and Technology of Kashmir, India and dried at 80 ^{0}C for 3 hours in the hot air oven and then grounded and utilized in the diet of broiler chicken. The study was conducted upto six weeks of age. At the end of trial 30 birds (six birds from each treatment) were selected randomly to study the carcass traits. The birds were slaughtered by halal methods after overnight fasting. The dressed yield, eviscerated yield and giblet were recorded and expressed as per cent pre slaughter live weight. The yield of various cut-up parts were also recorded and expressed as per cent of dressed weight. The data collected were analysed as per the method of Snedecor and Cochran (1994).

Results and Discussion

The pre slaughter live weight was recorded to be 2150, 2148, 2090, 2185 and 2086 g respectively for T_1, T_2, T_3, T_4 and T_5 groups. The per cent blood loss was recorded as 4.27± 0.06, 4.22 ± 0.08, 4.37± 0.06, 4.42 ± 0.09 and 4.28 ± 0.07 for T_1, T_2, T_3, T_4 and T_5 groups, respectively. The per cent feather loss was recorded to be 5.95 ± 0.12, 6.08 ± 0.09, 6.15 ± 0.08, 5.98 ± 0.09 and 6.16 ± 0.11 respectively, for T_1, T_2, T_3, T_4 and T_5 groups. Statistically no significant differences were observed among different treatment groups. The per cent dressing yield was found to be 71.86 ± 0.38, 72.13 ± 0.29, 71.92 ± 0.22, 71.75 ± 0.28 and 72.07 ± 0.32 respectively, for T_1, T_2, T_3, T_4 and T_5 groups. Statistically, no significant difference was observed among the different treatment groups.

The per cent thigh yield recorded ranged from 14.52 ± 0.35 in T_5 to 15.42 in T_1 groups. The per cent drumstick was recorded to be 13.82 ± 0.24, 13.98 ± 0.22, 13.88 ± 0.25, 14.05 ± 0.22 and 14.22 ± 0.28 respectively in T_1, T_2, T_3, T_4 and T_5 groups. The per cent breast was recorded to be 32.84 ± 0.52, 33.22 ± 0.49, 33.86 ± 0.65, 32.67 ± 0.60 and 31.98 ± 0.58 in T_1, T_2, T_3, T_4 and T_5 groups, respectively. The per cent back recorded ranged from 16.58 ± 0.37 in T_2 to 17.43 ± 0.44 in T_1 groups. The per cent wings recorded ranged from 12.58 ± 0.29 in T_2 to 13.28 ± 0.20 in T_5 groups. The per cent neck recorded to be 5.83 ± 0.08, 5.27 ± 0.06, 5.82 ± 0.06, 5.65 ± 0.08 and 5.78 ± 0.10 in T_1, T_2, T_3, T_4 and T_5 groups, respectively.

Among the cut up parts breast yield was the highest which ranges from 31.98 in T_5 group to 33.86% in T_3 group. The per cent different cut-up parts were found to be differed non-significantly among the different treatment groups. The per cent head and shank recorded to be 2.92±0.07 and 4.65 ± 0.05, 2.86±0.10 and 4.75 ± 0.05, 2.87±0.08 and 4.69 ± 0.10, 2.79±0.11 and 4.78 ± 0.06 and 2.84±0.11 and 4.76 ± 0.05 in T_1, T_2, T_3, T_4 and T_5 groups, respectively. The head and shank recorded in the present study were non-significant among the groups.

The per cent liver yield was ranged from 3.11 in T_1 group to 3.18 in T_3 group. The per cent heart yield was range from 0.63 in T_2 group to 0.71 in T_4 group. The per cent gizzard yield was range from 2.85 in T_3 group to 3.04 in T_1 group. Statistical analysis revealed non-significant differences for liver, heart and gizzard yields among the various treatment groups. The per cent cutting loss ranges from 1.81 in T_4 to 1.92 in T_2 groups.

The per cent blood loss was recorded as 4.27± 0.06, 4.22 ± 0.08, 4.37± 0.06, 4.42 ± 0.09 and 4.28 ± 0.07 for T_1, T_2, T_3, T_4 and T_5 groups, respectively. The per cent feather loss was recorded to be 5.95 ± 0.12, 6.08 ± 0.09, 6.15 ± 0.08, 5.98 ± 0.09 and 6.16 ± 0.11 respectively, for T_1, T_2, T_3, T_4 and T_5 groups. Statistically no significant differences were observed among different treatment groups. The blood loss and feather loss observed in the present study are in agreement with Sheikh *et al.,* (2005) while replaced the fishmeal of broilers diet with silkworm pupae meal.

Sheikh and Chatterjee (2009) also recorded similar results in Vanaraja birds. Khursheed *et al.,* (2017) also observed non-significant effect on feather loss of broiler fed mint leave as feed additive with or without enzyme supplementation.

However, Dicken and Lyon (1993) observed lower values for blood and feather loss than the findings of the present study. The per cent dressing yield was found to be 71.86 ± 0.38, 72.13 ± 0.29, 71.92 ± 0.22, 71.75 ± 0.28 and 72.07 ± 0.32 respectively, for T_1, T_2, T_3, T_4 and T_5 groups (Table 1).

Statistically, no significant difference was observed among the different treatment groups. This observation indicates that broiler finisher diets could be formulated with up to10% SM with or without enzyme supplementation, as dressed weight represents the absolute value of salable meat (Tion and Ogra, 2004; Nwawe *et al.,* 2005).

This is in agreement with the findings of Onu and Otuma (2008) and Onu and Madubuike (2010) who also reported non-significant differences among different treatment groups fed with SM based diets supplemented with or without enzyme. Khursheed *et al.,* (2017) also observed similar results with non-significant effects in broilers. However, slightly higher dressing per cent recorded by Fanimo *et al.,* (2007) while feeding cashew nut testa in broiler chicken.

Table.1 Carcass characteristics of broiler birds fed sheep manure based diets

Parameter	T1 (Control)	T2 (5%SM + Enzyme)	T3 (5%SM+ without Enzyme)	T4 (10%SM + Enzyme)	T5 (10%SM + without Enzyme)
Pre Slaughter Live Weight (g)	2150	2148	2090	2185	2086
Blood loss (%)	4.27± 0.06	4.22 ± 0.08	4.37± 0.06	4.42 ± 0.09	4.28 ± 0.07
Feather Loss (%)	5.95 ± 0.12	6.08 ± 0.09	6.15 ± 0.08	5.98 ± 0.09	6.16 ± 0.11
Dressed weight (g)	1545	1549	1503	1567	1502
Dressing %	71.86 ± 0.38	72.13 ± 0.29	71.92 ± 0.22	71.75 ± 0.28	72.07 ± 0.32
Cut up parts (% Dressed weight)					
Thigh	15.42 ± 0.43	14.84 ± 0.38	15.29 ± 0.40	15.08 ± 0. 34	14.52 ± 0.35
Drumstick	13.82 ± 0.24	13.98 ± 0.22	13.88 ± 0.25	14.05 ± 0.22	14.22 ± 0.28
Breast	32.84 ± 0.52	33.22 ± 0.49	33.86 ± 0.65	32.67 ± 0.60	31.98 ± 0.58
Back	17.43 ± 0.44	16.58 ± 0.37	16.88 ± 0. 38	16.94 ± 0.42	16.98 ± 0.44
Wings	12.85 ± 0.22	12.58 ± 0.29	12.72 ± 0.25	12.63 ± 0.22	13.28 ± 0.20
Neck	5.83 ± 0.08	5.27 ± 0.06	5.82 ± 0.06	5.65 ± 0.08	5.78 ± 0.10
Head	2.92±0.07	2.86±0.10	2.87±0.08	2.79±0.11	2.84±0.11
Shank	4.65 ± 0.05	4.75 ± 0.05	4.69 ± 0.10	4.78 ± 0.06	4.76 ± 0.05
Giblet					
Liver (%)	3.11 ± 0.14	3.14 ± 0.12	3.18± 0.14	3.12± 0.17	3.16± 0.15
Heart (%)	0.69 ± 0.07	0.63 ± 0.07	0.70 ± 0.06	0.64 ± 0.08	0.71 ± 0.06
Gizzard (%)	3.04± 0.10	2.92 ± 0.06	2.85 ± 0.07	2.88 ± 0.07	2.95 ± 0.08

The per cent of different cut-up parts were found to be differed non-significantly among the different treatment groups. Among the cut up parts breast yield was the highest ranges from 31.98 % in T_5 group to 33.86% in T_3 group. Breast meat yield has the highest economic value, if the bird is considered as a whole. During the growth period, breast meat linearly increases as a per cent of live weight. Similar pattern have been noted by Acar *et al.*, (1993). Marapana (2016) also observed similar results. Therefore, the success of poultry meat production has been strongly related to improvements in growth and carcass yield, mainly by increasing breast yield. The per cent thigh and breast yield recorded in the present study was lower than those observed by Akinmutimi and Okwu (2006).The per cent liver yield was ranged from 3.11 in T_1 group to 3.18 in T_3 group. The per cent heart yield was range from 0.63 in T_2 group to 0.71 in T_4 group. The per cent gizzard yield was range from 2.85 in T_3 group to 3.04 in T_1 group. Statistical analysis revealed non-significant differences for liver, heart and gizzard yields among the various treatment groups. This is in agreement with the findings of Onu and Madubuike (2010) who also reported non- significant differences among different treatment groups fed with SM based diets supplemented with or without enzyme, however, they observed significantly

($P < 0.05$) higher gizzard yield in birds fed 15% sheep manure without enzyme addition. Similar results were also reported by Onu (2007) who reported non-significant differences for liver and heart yields and significantly ($P < 0.05$) higher gizzard yield in birds fed 10% and 15% sheep manure without enzyme addition. However, the increment in gizzard weight of birds fed 15% heat treated sheep manure without enzyme supplement may reflect the extra muscular or secretory work required to process the high fibre diet as reported by Tuleun and Igba (2007). As the liver, assisted by the heart, has major role in detoxification, the similarities in liver and heart weights in all the groups suggest that there were no serious toxicity problems with the test diet. Diarra *et al.,* (2014) also recorded similar liver and heart yields when fed birds with commercial diets and cassava based diets.

The head and shank recorded in the present study were non-significant among the groups and are similar to the results that recorded by Karaoglu *et al.,* (2004) in broiler chicken. Onu and Otuma (2008) also recorded non-significant differences in shank yields. The gizzard per cent found in the present study was lower than those recorded by Akinmutimi and Okwu (2006) in broilers fed Cooked Mucuna utilis Seed meal for substitution of Soybean meal in broiler finisher diet.

From the present experiment it can be concluded that sheep manure could be utilized successfully in broiler chicken ration upto 10% level with or without enzyme supplementation without any significant affect on the carcass characteristics and giblet yields of broiler birds.

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