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# Effect of Slaughter Age and Sex on Carcass Characteristics and Composition of Macherla Brown Sheep

**P. Vinaya Babu[1*], B. Eswara Rao[2] and T. Srinivasa Rao[3]**

*[1&2]Dept of LPT, [3]Dept of VPH&E, NTR College of Veterinary Science, Gannavaram*

ABSTRACT

Twenty four local Macherla Brown lambs of both sexes in the age group of 9 and 12 months were slaughtered to study the carcass characteristics and composition. Pre-slaughter weight, dressing percent and carcass weight were significantly (P<0.01) higher at 12 months of age than 9 months. Dressing percent on pre-slaughter weight was significantly (P<0.01) higher in males compared to females. Except for dressing percent all the other carcass traits and byproducts yield varied insignificantly (P<0.01) between male and female lambs. Moisture content was significantly (P<0.01) lower and protein content was significantly higher as age of animal advanced from 9 to 12 months. However, no differences were observed significantly in fat and ash contents. The study showed that sex had no influence on proximate composition of meat from Macherla Brown sheep. It was concluded from the study that slaughter age of 12 months was found to be superior for quantitative and qualitative meat production.

***Key Words :*** *Macherla brown, Carcass characteristics, Sex, Slaughter weight*

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## INTRODUCTION

Local breeds are genetic base for meat production because of their ability to thrive and perform in different weather conditions and irregular feed availability (Santos Silva *et al.* 2003). Macherla Brown are the local sheep population seen in the villages adjacent to Krishna river and Nagarjuna Sagar project ayacut areas in Guntur, Nalgonda, Prakasam and Krishna districts of Andhra Pradesh with specific phenotypic characters and are well known for adaptability to hot and humid climatic conditions prevailing in this region. In the present study an attempt has been made to find out certain carcass, non carcass characteristics and proximate composition of local Macherla Brown lambs reared in field conditions.

## MATERIAL AND MNETHODS

The study was conducted at the Department of Livestock Products Technology, NTR College of Veterinary Science, Gannavaram, Krishna district of Andhra Pradesh at 16.525tE latitude and 80.778tN longitude. The climate of the location was classified as hot and humid. The study includes the sheep selected from the flocks in Krishna district. Age of sheep was ascertained by multistage stratified random sampling technique. Twenty four healthy lambs of good grade were randomly selected and allotted to four groups. Each group comprises six males and females in the age group of 9 and 12 months for the study. The lambs were fasted overnight with free access to water adlibitum and weights of them were recorded on electronic weighing machine before slaughter in the experimental abattoir. The lambs were slaughtered by *Halal* method after overnight starving. The animals were slaughtered without stunning by severing the jugular vein, trachea and esophagus and allowed to bleed till death. Sticking, legging, dressing and evisceration were performed as per procedure described by Gerard (1964). After slaughter, the head was removed at atlanto – occipital joint. Fore and hind cannons were obtained by disjointing at the carpal and tarsal joints respectively. The animals were partially skinned lying on their back on the floor. Then the animals were suspended by the hind legs for further skinning. Immediately after skinning, evisceration was carried out. Carcass and non carcass components were weighed immediately after evisceration and recorded. Hot carcass weight included kidney and kidney fat. Weight of edible and inedible organs were recorded after detaching from the fat attached. Edible organs comprised testes, spleen, pancreas, caul fat, kidney fat, kidney, liver and heart. Inedible organs comprised hooves, stomach, intestines, gall bladder, lungs and trachea. The weight of blood, head and skin were recorded separately. The per cent composition of carcass, edible and inedible organs was calculated based on pre-slaughter weight. The Longissimusdorsi muscle was collected from each carcass and placed in polyethylene bags and shifted to the laboratory under chilled condition for various analyses. The moisture, protein, fat and ash content were determined using the techniques recommended by AOAC (1995). Data was recorded and analyzed using one way analysis of variance in SPSS version 17.0 of windows, SPSS Chicago (US).

## RESULTS AND DISCUSSION

The body weight (kg) of 9 months old Macherla Brown lambs ranged from 19 to 25. In the present study the overall mean ± SE of body weight (kg) of nine months old Macherla Brown

*Corresponding Author E-mail address : vipbabu74@gmail.com

lambs was found to be 24.15 ± 0.88. The result obtained in the present study was found to be higher than that of many Indigenous mutton breeds of same age as in Sonadi (Mehta *et al.* 1995), Vembur (Chandran *et al.* 2009), Ganjam (Pattanayak *et al.* 2003), Madras red (Raman *et al.* 2003), Mecheri (Karunanidhi *et al.* 2005) and Nellore (Ravindrareddy *et al.* 2009).

The body weight (kg) of 12 months old Macherla Brown lambs ranged from 25 to 32.3. The overall mean ± SE of body weight (kg) was found to be 29.64 ± 1.53 in the present study. The result obtained in the present study was found to be higher than that of fellow breeds of same age as in Vembur (Chandran *et al.* 2009), Garole (Sahana *et al.* 2001), Ganjam (Pattanayak *et al.* 2003), Madras red (Raman *et al.* 2003), Mecheri (Karunanidhi *et al.* 2005), Deccani (Nimbalkar *et al.* 2007), Pugal (Gopaldass 2007), Malpura (Arunkumar *et al.* 2008), Nellore (Ravindrareddy *et al.* 2009).

The effects of age and sex on carcass characteristics are presented in Table 1. The pre-slaughter weight was significantly (P<0.01) higher in 12 months as compared to 9 months. This was similar with the findings of Das *et al.* (2008) in Muzaffarnagari in which the pre-slaughter weight was significantly (P<0.01) increased with increase in age from 6 to 9 months and Mule *et al.* (2013) in Deccani in which the pre-slaughter weight was significantly (P<0.01) increased with increase in age from 4 to 12 months. The results at 12 months old were found to be higher than that of Muzaffarnagari lambs under field conditions (Acharya 1981), Mecheri (Karunanidhi *et al.* 2005), Garole (Sandipbanerjee 2007), Chokla and Avikalin (Suresh kumar and Karim 2009), Kenguri (Appanavar *et al.* 2010), Shahabadi (Sandipbanerjee 2011), B genotype (Gadekar *et al.* 2012), Deccani (Mule *et al.* 2013), native ram lambs of Ananthapur district (Venkateswarlu and Ramanareddy 2013).

**Table 1 : Carcass characteristics of Macherla Brown sheep (Mean ± S.E)**

| Characteristic* | 9 Months | | 12 Months | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Pre slaughter weight (Kg) | $23.52^{a}$ ±0.50 | $23.08^{a}$ ±0.51 | $28.65^{b}$ ±0.67 | $28.5^{b}$ ±0.63 |
| Dressing Percent (%) | $48.22^{ab}$ ±0.27 | $47.68^{a}$ ±0.50 | $49.74^{c}$ ±0.24 | $49.27^{bc}$ ±0.34 |
| Carcass weight (Kg) | $11.34^{a}$ ±0.30 | $11.02^{a}$ ±0.35 | $14.26^{b}$ ±0.39 | $14.05^{b}$ ±0.39 |

* P<0.01, Means with different superscripts in a row differ significantly; n=6 for each group

Males have significantly (P<0.01) higher dressing percent on slaughter weight than females. Similar trend was observed in Nellore (Muthukumar *et al.* 2006) in which males show significantly (P<0.05) higher dressing per cent. The dressing percent of local Macherla Brown lambs recorded in the present investigation was higher than that of Nellore lambs in 15-25 kg weight class (Muthukumar *et al.* 2006), Garole rams and Shahabadi ewes at 12 months (Sandipbanerjee 2007) and Nellore ram lambs of about 7 months (Girish *et al.* 2012) raised on natural grazing.

Significantly (P<0.01) higher dressing per cent was found in 12 months lambs than 9 months. This was similar to the findings on Deccani (Mule *et al.* 2013) in which the dressing per cent was significantly (P<0.01) increased with increase in age from 9 to 12 months. This trend also reflects in the findings of Muthukumar *et al.* (2006) who reported significantly (P<0.05) higher dressing per cent in Nellore lambs with increase in slaughter weight. This may be attributed to the increase in pre-slaughter weight as the age advances.

The carcass weight along with pre-slaughter weight was significantly (P<0.01) higher in 12 months old lambs than those of 9 months old. Mule *et al.* (2013) also reported significantly (P<0.01) higher dressing per cent and hot carcass weight along with live weight in Deccani with advancement of age from 4 to 12 months. Similar trend was observed by Das *et al.* (2008) in Muzaffarnagarari advancement of age from 6 to 9 months.

Sex did not show significant (P<0.01) difference in pre-slaughter weight as well as carcass weight but males have significantly (P<0.01) higher dressing per cent than females.

The effects of age and sex on byproducts yield of Macherla Brown sheep are presented in Table 2. No significant (P<0.01) difference in blood, head and skin per cent exist between the age groups as well as sexes. Blood and head per cent decreased with increase in age and body weight. Similar trend was reported by Muthukumar *et al.* (2006) in Nellore, Das *et al.* (2008) in Muzaffarnagari. But the per cent skin slightly increased with increase in age and body weight. Similar trend was reported by Das *et al.* (2008) in Muzaffarnagari.

**Table 2: Byproducts yield in Macherla Brown sheep (Mean ± S.E)**

| Characteristic* | 9 Months | | 12 Months | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Blood(%) | 4.75± 0.23 | 4.74± 0.22 | 4.71± 0.48 | 4.50± 0.43 |
| Head(%) | 7.21± 0.25 | 7.21± 0.19 | 6.99± 0.34 | 6.89± 0.28 |
| Skin(%) | 10.66± 0.31 | 10.65±0.29 | 10.51± 0.41 | 10.84± 0.25 |
| Edible organs(%) | 5.75± 0.23 | 5.76± 0.29 | 5.71± 0.32 | 5.61± 0.38 |
| Inedible organs(%) | 23.42± 0.78 | 23.95±0.55 | 22.25± 1.33 | 22.90± 1.08 |

* P<0.01; n=6 for each group

No significant (P<0.01) difference in percent of edible and inedible organs exist between age groups as well as sexes. But the proportion of edible and inedible organs decreased with increase in age and slaughter weight.

The effects of age and sex on proximate composition of meat from Macherla Brown sheep are presented in Table 3. No significant (P<0.01) difference in per cent of moisture exists between the sexes. The findings were similar to the results in Nellore lambs of similar weight class (Muthukumar *et al.* 2006), Coimbatore lambs at 9 months (Pannerselvam *et al.* 2009) reared on natural grazing.

**Table 3: Proximate composition of meat of Macherla Brown sheep (Mean ± S.E)**

| Characteristic* | 9 Months | | 12 Months | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Moisture(%) | $76.07^{a}$ ±0.11 | $76.20^{a}$ ±0.09 | $74.21^{b}$ ±0.19 | $74.17^{b}$ ±0.27 |
| Protein(%) | $20.10^{a}$ ±0.19 | $19.72^{a}$ ±0.06 | $21.01^{b}$ ±0.10 | $21.02^{bb}$ ±0.21 |
| | $2.74^{a}$ ±0.19 | $2.80^{a}$ ±0.19 | $2.95^{a}$ ±0.09 | $2.92^{a}$ ±0.08 |
| | $1.00^{a}$ ±0.20 | $0.95^{a}$ ±0.13 | $1.48^{a}$ ±0.16 | $1.43^{a}$ ±0.16 |

* P<0.01, Means with different superscripts in a row differ significantly; n=6 for each group

As age advances from 9 to 12 months, the moisture content in the meat significantly (P<0.01) decreased. Similar trend was reported by Muthukumar *et al.* (2006) who found that there was significant (P<0.05) decrease in moisture per cent as the slaughter weight of Nellore lambs increased. As age advances from 9 to 12 months, the protein content in the meat significantly (P<0.01) increased.

No significant (P<0.01) difference in per cent of fat and ash exist between the age groups as well as sexes.This was in accordance with the results of Muthukumar *et al.* (2006) who found that there was no significant (P<0.05) increase in fat and ash per cent as the slaughter weight of Nellore lambs increasedand with Das *et al.* (2008) who found that there was no significant (P<0.05) increase in ash per cent as age advanced from 6 to 9 months.

## CONCLUSION

It was concluded from the study that the slaughter age of 12 months is more suitable to obtain quantitative and qualitative meat production.

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