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Effect on carcass characteristics of black Bengal and Jamunapari goat

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Abstract

A study was conducted to know the carcass characteristics and physical cut of Black Bengal and Jamunapari goat. Ten castrated males and 10 adult female goats of the breed of 10-12 month of age with an average body weight of 5-8 kgs were selected for the study and were slaughtered with the standard humane procedure. The results indicated that the slaughter weight, empty body weight, hot carcass weight, chilled carcass weight, carcass length and dressing percentage of slaughter weight showed significant difference ($p < 0.01$) between two breeds. Significantly higher values were recorded for weight of the head, skin, lungs, and trachea ($p < 0.01$) in Jamunapari goat. Weight of heart, liver, spleen, kidneys and weight of pluck also varied significantly ($p < 0.01$) between two breeds. Weight of wholesale cuts (neck, shoulder, rack, lion, breast and shank) in Jamunapari goats were significantly higher ($p < 0.01$). The percent yield of meat, fat and bone in different wholesale cuts differed significantly ($p < 0.05$) between the breeds and the percentage proportions of meat in the whole carcass observed in the percentage proportions of meat in the whole carcass observed in the present study were 60.406 ± 0.011 and 70.328 ± 0.009 for Black Bengal and Jamunapari respectively. Effect on a carcass on wholesale cuts, Carcass Characteristics of Jamunapari goats were higher than Black Bengal goats.

Keywords: Black Bengal, breed, carcass characteristics, Jamunapari, wholesale cuts

Introduction

Goats are among the main meat-producing animals in India and goat meat (chevon) fetches huge domestic demand, with no social, cultural, and religious taboos. Despite the popularity of goat meat, goat rearing has not been conducted as either a large or a small-scale industry in the state of West Bengal or in India as a whole (Biswas *et al.*, 2010) [2]. Goats, by virtue of their higher fecundity and better productivity, assured income to 40% of the rural population below poverty line with low input cost in diverse agro-climatic condition (Handbook of Animal Husbandry, ICAR). In spite of about 42% annual slaughter rates of the goats, the population continues to increase at an average of 3.04% per annum (Dhara *et al.*, 2008) [8]. India has more than 135.2 million goats, which account for more than 26.4 percent of the country's total livestock and contribution of meat in total meat production around 16%. Chevon accounts for approximately 63% of the red meat consumed worldwide is goat meat (Shurley, 2000) [17]. The world goat population has been on increasing during the last three decades and currently stands at almost 840 million head, as compared to 1.4 billion cattle and 1.1 billion sheep (FAOSTAT, 2015) [9]. There are approximately 570 breeds and types of goats in the world (Galal, 2005) [10]. Globally, goats that are slaughtered for meat production constitute about 45% of the recorded world goat population (FAOSTAT, 2015) [9]. 268 million tons of meat in total was produced in 2005 globally; 1.7% of this was chevon (FAOSTAT, 2015) [9]. Asia produces about 73.8% of the world's chevon in 2005. Census data revealed that India accounts for 20% of the world's goat population with annual growth rate of 1.6% (Department of Animal Husbandry and Dairying, 2005). In general, the global demand for goat meat is growing (Gipson, 1998) [11]. In India, it is the most popular meat and accepted to all communities irrespective of any caste or creed, Chevon has been established as a lean meat with favourable nutritional qualities protein source which is lower in calorie, total fat, saturated fat and cholesterol than other red meats. Despite the low lipid content in chevon compared to meat from other ruminants, chevon has a high proportion of unsaturated fatty acids in addition to being a source of conjugated linoleic acid (Webb *et al.*, 2005) [20] which acts as anti-inflammatory, anti-thrombotic and atherosclerotic preventives (Givens *et al.*, 2006) [12]. Among the different goat breeds, Black Bengal is already recognized globally for its excellence in productive capabilities and

production of quality meat and Jamunapari has been introduced for cross-breeding with indigenous goats for improving production capabilities (Amin *et al.*, 2000) [1]. The present study was undertaken to evaluate the effect of breed on carcass characteristics commercially established goat breeds in India, i.e. Black Bengal and Jamunapari.

Materials and Methods

Ten castrated male goats and 10 adult female goats of breed of 10-12 months of age with an average body weight of 5-8 kgs were procured from local market, fasted overnight with free access to water and were slaughtered by severing the carotid arteries and veins in both sides with sharp knives. The pre-slaughter weight of the animals was also recorded. After complete bleeding, the slaughtered animals were de-skinned. The head was detached at the Atlanto-occipital joint and fore and hind cannons were removed at the knee and hock joint respectively. The carcasses consisted of the skinned, eviscerated body from which the head and feet were removed. Hot carcass weight (kg) was taken within one hour of slaughter at warm condition. The weight of pluck was comprised of lung with trachea, liver and heart. All the carcasses were weighed, covered with poly-ethylene wrap to prevent moisture loss and chilled at 4°C overnight. Subsequently, the next day each carcass was dissected into six primal cuts (*i.e.* neck, shoulder, breast & shank, rack, loin and leg) with a band saw as per the Indian standard institution (ISI, 1963) standard. The weight of the aforesaid cutup parts was taken in kilogram. The weight of each cut was recorded and expressed as percentage of hot carcass weight. The carcass length was measured from the anterior point of the aitch-bone to anterior edge of the first rib by the help of a cloth tape. It was recorded in centimetre (Bundy *et al.*, 1976) [3]. The carcass characteristics and physical composition of Black Bengal goat carried out. The right sides of the carcasses were used to determine the physical composition. The yield or dressing out percentage was found out by comparing the dead weight with the live weight and was expressed as percentage of the live weight of the animal (Thornton and Gracey, 1974) [18]. All the data which were obtained during the present study were analysed statistically to draw valid conclusion in SPSS (Version 16.0) software.

Table 1: Effect on carcass characteristics of Black Bengal and Jamunapari goats (Mean ±SE).

Carcass Characteristics	Effect of Breed	
	Black Bengal	Jamunapari
Slaughter weight (kg)	12.97±0.02	25.97±0.21
Empty body weight (kg)	12.34±0.21	23.70±0.02
Hot carcass weight (kg)	5.23±0.06	12.26±0.06
Chilled carcass weight (kg)	5.07±0.06	12.07±0.06
Dressing percentage (%)	39.65±0.14	44.36±0.13
Carcass length (cm)	47.28±0.23	54.56±0.89
Head (kg)	0.89±0.01	1.63±0.04
Blood (kg)	0.56±0.01	1.19±0.02
Skin (kg)	0.84±0.01	2.38±0.03
Lung and Trachea (kg)	167.69±2.16	341.30±3.41
Heart (gm)	64.86±0.49	133.97±1.42
Liver (gm)	256.89±3.89	453.95±4.19
Spleen (gm)	28.54±0.27	45.42±0.94
Kidneys (gm)	50.97±0.75	91.07±1.51
Pluck (gm)	492.14±2.62	923.86±2.34

The data were analyzed according to Independent Samples T-test ($p < 0.05$ is significant and $p < 0.01$ is highly significant).

Table 2: Effect of carcass on weight of wholesale cuts of Black Bengal and Jamunapari goats (Mean ±SE)

Wholesale cuts	Effect of Breed	
	Black Bengal	Jamunapari
Neck (kg)	0.60±0.01	1.70±0.01
Shoulder (kg)	0.82±0.01	1.90±0.01
Rack (kg)	0.62±0.02	1.72±0.02
Loin (kg)	0.64±0.01	1.73±0.01
Leg (kg)	1.48±0.02	2.61±0.01
Breast and shank (kg)	0.83±0.01	1.94±0.01

The data were analyzed according to Independent Samples T-test ($p < 0.05$ is significant and $p < 0.01$ is highly significant).

Table 3: Percent physical composition in individual cuts and whole carcass of Black Bengal and Jamunapari goats (Mean ±SE).

Wholesale cuts		Black Bengal	Jamunapari
		Meat	61.38 ^a ±0.09
Neck	Fat	3.32±0.01	3.60±0.01
	Bone	34.36 ^a ±0.08	23.61 ^b ±0.01
	Meat	64.13 ^a ±0.01	70.14 ^b ±0.06
Shoulder	Fat	8.17 ^a ±0.01	4.32 ^b ±0.01
	Bone	26.60 ^a ±0.02	21.58 ^b ±0.04
	Meat	59.22 ^a ±0.03	69.23 ^b ±0.60
Rack	Fat	3.71 ^a ±0.01	2.81 ^b ±0.01
	Bone	35.86 ^a ±0.02	23.23 ^b ±0.01
	Meat	55.13 ^a ±0.02	72.09 ^b ±0.01
Loin	Fat	18.90 ^a ±0.01	4.71 ^b ±0.01
	Bone	24.92 ^a ±0.01	20.23 ^b ±0.01
	Meat	61.10 ^a ±0.02	72.54 ^b ±0.01
Leg	Fat	48.70 ^a ±0.01	3.43 ^b ±0.01
	Bone	29.21 ^a ±0.02	21.04 ^b ±0.01
	Meat	59.88 ^a ±0.01	64.86 ^b ±0.02
Breast and shank	Fat	4.99 ^a ±0.01	3.38 ^b ±0.01
	Bone	34.09 ^a ±0.01	27.09 ^b ±0.01
	Meat	60.40 ^a ±0.01	70.32 ^b ±0.01
Whole carcass	Fat	8.10 ^a ±0.01	3.62 ^b ±0.01
	Bone	30.34 ^a ±0.02	22.41 ^b ±0.01

The data were analyzed according to Independent Samples T-test ($p < 0.05$ is significant and $p < 0.01$ is highly significant).

Results

The slaughter weight, empty body weight, hot carcass weight, chilled carcass weight, carcass length and dressing percentage on slaughter weight showed significant difference ($p < 0.01$) between two breeds. Moreover, the mean of hot carcass weight and dressing percentage were 5.23 ± 0.06 kg and 39.65 ± 0.14, respectively in Black Bengal goats. Whereas, the corresponding values for Jamunapari goats were 12.26 ± 0.21 kg and 44.36 ± 0.13, respectively. The weight of wholesale cuts (neck, shoulder, rack, loin, leg, breast and shank) in Jamunapari goats was significantly higher ($p < 0.01$). The weight of head, blood, skin, lung and trachea was significantly higher ($p < 0.01$) in Jamunapari goats. The weight of the heart, liver, spleen, kidney and pluck also varied significantly ($p < 0.01$) between the two breeds. The percent physical composition of individual cuts and whole carcass of Black Bengal and Jamunapari goats depicted in Table 3 showed that the percent yield of meat, fat and bone in different wholesale cuts differed significantly ($p < 0.05$) of breeds. The percentage proportions of meat in whole carcass observed in the present study were 60.40±0.01 and 70.32±0.01 for Black Bengal and Jamunapari respectively.

Discussion

The breed-wise difference in dressing percentage observed in our study was in concur with earlier study of Dhanda *et al.*

(2003a) [5] who also reported the significant ($p<0.05$) difference in dressing percentage on account of genotypic difference. The dressing percentage is frequently influenced by age, breed, sex, plane of nutrition, management system etc. (Das and Rajkumar, 2010). The recorded dressing percentage of the slaughter weight basis for Black Bengal by Dhangar *et al.* (1992) was 38.6%, which substantiated our finding. Amin *et al.* (2000) [1] found 4.9 ± 0.21 kg hot carcass weight and $38.8\pm 0.44\%$ dressing percentage in case randomly breed of Black Bengal goats. Johric and Talpatra (1971) have reported the dressing percent of 44.2 in Jamunapari goats. Kadim and Mahgoub (2012) found differences in dressing percentage based on full and empty live body weight which were in range of 39.5%-41.8% and 53.3%-56.6% respectively, among three Omani goats breeds. Das and Rajkumar (2010) obtained slightly higher values for hot carcass weight and dressing % for Jamunapari goats.

The variation in carcass characteristics may be due to variation in age of slaughter, body condition and different managerial and nutritional status of the slaughtered animals. The relatively higher weight of wholesale cuts in Jamunapari goats observed in our study was in agreement with the earlier report that the increase in carcass primal cuts is directly related to carcass weight (Das and Rajkumar, 2010). Conversely, the significant breed-wise difference in weight of viscera fairly supported the findings of Wahid *et al.* (1985), who reported that breed type affected weight of heart, lungs, liver, and testis in goats. According to Pal *et al.* (1997), weights of variety meats and cavity fat vary significantly between breeds and age in sheep. Dhanda *et al.* (2003b) [6] indicate significant ($p<0.05$) difference in the muscle, fat and bone contents between genotype.

Conclusion

The present study revealed that the effect on a carcass on wholesale cuts, Carcass Characteristics of Jamunapari goats were higher than Black Bengal goats.

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