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Meat Quality Characteristics of Non-Descript Buffalo as Affected by Age and Sex

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Abstract: A study to evaluate meat characteristics (physcio-chemical and organoleptic meat quality parameters) of non-descript buffaloes of both sexes in three different age groups viz. 6 months to 2 years, 2 to 4 years and above 4 years was carried out. Samples of meat were collected and were kept in chiller (0±1° C) till 48 hours and then in freezer (-15±1° C) up to 7 days. Physico-chemical characteristics viz. pH, R- Value, Colour, fiber diameter, shear force values, Water holding capacity and organoleptic evaluation was carried out. The pH and R-value were inversely proportional as the storage period increased. The Munsell hue and value showed significantly ($P<0.01$) higher values in males than females and chroma was higher in males and in 2 to 4 years age group. The fiber diameter and Warner-Bratzler shear force value increased linearly with increase in age, whereas they decreased as the storage period increased. The water holding capacity was higher in males than females. Taste panel scores revealed increase in flavour score with increase in age. The juiciness, tenderness and overall acceptability were highest in 2 to 4 years age group. The R-value and other physico-chemical quality parameters along with taste panel scores favored meat from animals slaughtered at 2 to 4 years age group.

Key words: Non-descript buffalo, Meat quality, Muscle fiber, Physico-chemical and organoleptic Characteristics

INTRODUCTION

Buffalo meat aptly suits the current needs of consumer demand for leaner meat because of its Leaness compared to the meat from other species [1,2]. The fat in cara beef has less saturated fat than that of beef and mutton. Though buffaloes have the potential to produce good quality meat, in several countries, their value as work animals or as milk producers and their longevity have prevented them from being considered as meat producers [3]. The non-descript buffaloes are present in numerous numbers, but are not recognized as breeds and their potentiality as meat producers is unexplored.

India holds the pride to have the largest population of buffaloes in the world. The steady rise in buffalo population is due to farmers' preference for buffaloes and their gradual shift from raising cows to buffaloes as a source of milk and meat because of the versatile characteristic nature of buffaloes to thrive on poor and dry fodder crops. Buffalo meat industry has a good potential because of large buffalo population in India and a competitive edge in international market due to availability of cheap labour. The earnings in international market through the export of buffalo meat are also expected to increase many folds due to pressing demand mainly from Gulf countries [4]. Besides, they also contribute to the Indian economy by a large number of valuable byproducts such as hides, which earn the country a considerable foreign exchange. With an intention to contribute to increase the buffalo meat production in India, this study was taken up with the objective to study the physico-chemical and organoleptic quality of south Indian non-descript buffalo meat.

MATERIALS AND METHODS

Experimental Design: A total number of sixty non-descript buffaloes of both sexes of three different age groups viz. Group (I) - 6 months to 2 years; Group (II) - 2 to 4 years; and Group (III) - above 4 years were procured from open market in and around Chennai city and used for this study. Each age group consists of 20 animals containing equal number of both male and female animals. The buffaloes were subjected to a thorough ante mortem inspection and were slaughtered and dressed as per the standard procedure [5].

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Meat Samples: Samples were taken from the *longissimus dorsi* muscle between 5th and 12th rib. The meat samples were stored at chiller temperature of 0±1°C for 24 h and then at freezer temperature of -15±1°C up to 7 days and subjected to analyses at 0 h, 24 h, 48 h and 7th day postmortem.

Parameters: pH of the *l.dorsi* muscle samples were estimated by using a digital pH meter as per the method outlined by [6]. R-value was analyzed according to the procedure outlined by [7]. The colour of *longissimus dorsi* muscle was assessed using Munsell book of colour (1976 edition) under standard conditions as specified in the manual. Muscle fiber diameter was assessed according to the method outlined by [8]. Muscle fiber diameter was estimated at 0 h, 24 h and 48 h postmortem. Water holding capacity was measured by the standard filter paper press method recommended by [9] with certain modifications. Small nails were inserted at a distance of 40 mm in meat blocks from samples boned at 1 hour postmortem. *Longissimus dorsi* muscle was used to assess the cooked Shear force value using Warner-Bratzler meat shear (G.R.Electric Manufacturing Co., Manhattan, USA). The meat sample of about 100 g was cooked at 15 lbs pressure for 15 minutes in a domestic cooker. The cooked samples were cooled in a refrigerator and a core having 1.25 cm diameter and about 3 cm length was taken from the cooked and cooled sample. Five readings were taken from each core. The average of the five readings were recorded as the mean force required to shear through the core and expressed in Kg. Shear force value was recorded at 24 h, 48 h and 7th day postmortem.

Cubes of 1.5 cm were cut from the *longissimus dorsi* muscle in sufficient numbers and were cooked at 15 lbs (6.8 kg) pressure for 15 minutes. The cooked samples were served to the trained panelists. The members were provided with a nine point hedonic scale (9 is extremely desirable and 1 is extremely poor) score card as per the method of [10]. The overall acceptability was assessed by calculating the average of the above three attributes.

Statistical Analysis: Data were analyzed by statistical method of one way ANOVA using SPSS@ software package (1997) developed as per the procedure of [11] and means were compared by using Duncan's multiple range test [12]. Correlation coefficients were used to determine relationships among quality parameters.

RESULTS AND DISCUSSION

Mean + SE of pH, R-value, Fiber diameter, Water holding capacity, color, shear force vales and taste panel scores of L.*dorsi* muscle of non-descript buffaloes of different sex and age groups along with ANOVA are presented in Table 1, 2, 3 & 4.

pH: ANOVA indicated the absence of significant difference in pH values between different age groups, but revealed the existence of a highly significant ($P<0.01$) difference in pH values between sexes at 0 h and absence of significant difference in pH values between sexes at subsequent periods. The interaction for pH values between age and sex were highly significant ($P<0.01$) at 24 h and significant ($P<0.05$) at 48 h and 7 days of storage. The critical difference analysis showed the presence of a highly significant ($P<0.01$) difference in overall mean pH values between sexes at 0 h, indicating male buffalo carcasses recorded high pH than female at 0 h. The progressive fall in pH values during the periods of storage were similar to the findings [13,14].

R-value: A highly significant ($P<0.01$) difference in R-value between age groups at 24 h and 48 h of storage was observed. It was observed that the mean R-value between sexes at 24 h and 48 h differed significantly ($P<0.05$). No significant difference existed for R-values in the interaction between age and sex during different storage periods.

The R-value obtained in this study at 24 h (1.16-1.26) in all age groups and sexes indicated that onset of rigor mortis during this period at chiller storage [15] and increasing trend in R-value was noticed up to 48 h period in this study indicating advancement of rigor mortis and there after a slight decrease in the R-value. Similar changes were also observed by [16,17].

Munsell Colour: Absence of significant differences in Hue and Value and presence of significant difference ($P<0.01$) in chroma between different age groups was observed. A highly significant ($P<0.01$) difference was noticed in Hue and Value between sexes whereas no such difference was seen with respect to Chroma. Age and sex interaction revealed the absence of any significant difference in Hue, Value and Chroma. A significantly ($P<0.01$) higher mean munsell colour scores for hue and value were observed in males than females, indicating

Table 1: Mean (±SE) values of pH, R-value, Fiber diameter and Water holding capacity of L.*dorsi* muscle of non-descript buffaloes of different sex and age groups

	0 hour				24 hour			
	Age							
Sex	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean
pH								
Male	6.64±0.05	6.73± 0.05	6.79±0.03	6.72X±0.04	5.81^{a}±0.05	5.75^{abc}±0.05	5.61^{c}±0.02	5.72±0.04
Female	6.65±0.04	6.49±0.10	6.60±0.05	6.58Y±0.06	5.62^{bc}±0.05	5.81^{ab}±0.04	5.75^{abc}±0.05	5.73±0.05
Overall mean	6.64±0.05	6.61±0.07	6.70±0.05	6.65±0.06	5.72±0.05	5.78±0.05	5.68±0.04	5.73±0.05
R- Value								
Male	0.85±0.02	0.83±0.02	0.84±0.01	0.84±0.02	1.16±0.01	1.20±0.01	1.20±0.01	1.19X±0.01
Female	0.84±0.01	0.85±0.01	0.87±0.01	0.85±0.01	1.21±0.01	1.24±0.01	1.26±0.01	1.23Y±0.01
Overall mean	0.84±0.02	0.84±0.02	0.87±0.01	0.85±0.02	1.18^{b}±0.01	1.22^{a}±0.01	1.23^{a}±0.01	1.21±0.01
Fiber Diameter								
Male	0.99±0.12	0.83±0.03	0.88±0.02	0.90X±0.06	1.95^{bc}±0.13	1.77^{c}±0.12	2.19^{ab}±0.06	1.97X±0.10
Female	1.09±0.13	1.11±0.08	1.14±0.11	1.11Y±0.11	2.27^{a}±0.04	2.38^{a}±0.06	2.33^{a}±0.09	2.35Y±0.06
Overall mean	1.04±0.13	0.97±0.06	1.01±0.07	1.01±0.09	2.11±0.09	2.08±0.09	2.26±0.08	2.15±0.08
Water Holding Capacity								
Male	0.99±0.12	0.83±0.03	0.88±0.02	0.90X±0.06	1.95^{bc}±0.13	1.77^{c}±0.12	2.19^{ab}±0.06	1.97X±0.10
Female	1.09±0.13	1.11±0.08	1.14±0.11	1.11Y±0.11	2.27^{a}±0.04	2.38^{a}±0.06	2.33^{a}±0.09	2.35Y±0.06
Overall mean	1.04±0.13	0.97±0.06	1.01±0.07	1.01±0.09	2.11±0.09	2.08±0.09	2.26±0.08	2.15±0.08
	48 hour				7 days			
	Age							
Sex	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean
pH								
Male	5.66^{abc}±0.03	5.62^{bc}±0.03	5.63^{bc}±0.02	5.63±0.03	5.70^{ab}+0.002	5.68^{ab}±0.02	5.68^{ab}±0.02	5.69±0.01
Female	5.60^{c}±0.004	5.68^{ab}±0.03	5.70^{a}±0.02	5.66±0.03	5.65^{b}±0.01	5.69^{ab}±0.01	5.73^{a}±0.02	5.69±0.01
Overall mean	5.63±0.04	5.65±0.03	5.66±0.02	5.65±0.03	5.68±0.02	5.69±0.02	5.71±0.02	5.69±0.02
R- Value								
Male	1.27±0.01	1.29±0.02	1.32±0.01	1.29X±0.01	1.18±0.01	1.23±0.01	1.20±0.02	1.20X±0.01
Female	1.29±0.01	1.32±0.01	1.33±0.01	1.31Y±0.01	1.22±0.01	1.24±0.01	1.27±0.01	1.25Y±0.01
Overall mean	1.28^{b}±0.01	1.30^{ab}±0.02	1.32^{a}±0.01	1.30±0.01	1.20^{b}±0.01	1.24^{a}±0.01	1.24^{a}±0.02	1.23±0.01
Fiber Diameter								
Male	2.26^{bc}±0.09	2.15^{c}±0.11	2.44^{ab}±0.08	2.28X±0.09	2.13^{ab}±0.07	2.32^{b}±0.06	2.09^{a}±0.08	2.18±0.07
Female	2.48^{ab}±0.06	2.62^{a}±0.05	2.47^{a}±0.09	2.52Y±0.07	2.26^{a}±0.08	2.30^{a}±0.07	2.27^{ab}±0.07	2.28±0.07
Overall mean	2.37±0.08	2.38±0.08	2.45±0.09	2.40±0.08	2.19±0.08	2.31±0.07	2.18±0.08	2.59±0.07
Water Holding Capacity								
Male	2.26^{bc}±0.09	2.15^{c}±0.11	2.44^{ab}±0.08	2.28X±0.09	2.13^{ab}±0.07	2.32^{b}±0.06	2.09^{a}±0.08	2.18±0.07
Female	2.48^{ab}±0.06	2.62^{a}±0.05	2.47^{a}±0.09	2.52Y±0.07	2.26^{a}±0.08	2.30^{a}±0.07	2.27^{ab}±0.07	2.28±0.07
Overall mean	2.37±0.08	2.38±0.08	2.45±0.09	2.40±0.08	2.19±0.08	2.31±0.07	2.18±0.08	2.59±0.07

Means bearing different superscripts in each sub cell and overall mean for sex differ significantly

Analysis of Variance

		Mean squares			
Source of variation	d.f	0 hour	24 hour	48 hour	7 days
pH					
Between age groups	2	0.041^{NS}	0.0500^{NS}	0.004^{NS}	0.0047^{NS}
Between sexes	1	0.288**	0.0005^{NS}	0.009^{NS}	0.0002^{NS}
Age x sex interaction	2	0.088^{NS}	0.1460**	0.024*	0.0130*
Error	54	0.033	0.0240	0.005	0.0035

Table 1: Continued

R- Value					
Between age groups	2	0.0015^{NS}	0.0110**	0.0087**	0.0083**
Between sexes	1	0.0022^{NS}	0.0350**	0.0059*	0.0290**
Age x sex interaction	2	0.0018^{NS}	0.0003^{NS}	0.0007^{NS}	0.0041^{NS}
Error	54	0.0023	0.0013	0.0010	0.0014
Fiber Diameter					
Between age groups	2	3873.27**	3429.19**	2650.87**	1965.48**
Between sexes	1	0081.85^{NS}	0023.55^{NS}	0013.59^{NS}	0025.07^{NS}
Age x sex interaction	2	2459.12**	2954.21**	1582.79**	0853.55*
Error	54	0488.32	0352.34	214.40	180.89
Water Holding Capacity					
Between age groups	2	0.024^{NS}	0.191^{NS}	0.042^{NS}	0.103^{NS}
Between sexes	1	0.681**	1.901**	0.866**	0.217^{NS}
Age x sex interaction	2	0.052^{NS}	0.303*	0.236*	0.227*
Error	54	0.092	0.089	0.073	0.060

Table 2: Mean (± SE) values of Colour (Hue, Value & Chroma) and Shear Force Values of L.*dorsi* muscle of non-descript buffaloes of different sex and age groups

	Hue				Value				Chroma			
	Age											
Sex	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean
Male	7.50±0.50	8.25±0.36	8.50±0.39	8.09^{X}±0.42	3.70±0.40	3.40±0.16	3.50±0.26	3.53^{X}±0.27	4.40±0.25	6.00±0.00	5.20±0.31	5.20±0.19
Female	7.00±0.32	7.00±0.32	7.75±0.24	7.25^{Y}±0.29	2.70±0.15	2.60±0.24	3.40±0.25	2.90^{Y}±0.21	4.20±0.19	5.40±0.29	4.90±0.44	4.83±0.31
Overall mean	7.25±0.41	7.63±0.34	8.13±0.32		3.20±0.28	3.00±0.20	3.45±0.26		4.30^{B}±0.22	5.70^{A}±0.15	5.05^{AB}±0.38	

Means bearing different superscripts in overall mean for sex and ages differ significantly

Table 3: Mean (± SE) Warner Bratzler Shear Force Values (kg) of L.*dorsi* muscle of non-descript buffaloes of different sex and age groups

	24 hour				48 hour				7 days			
	Age											
Sex	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean
Male	5.12^{ab}±0.64	4.27^{ab}±0.37	5.50^{a}±0.23	4.96^{X}±0.41	4.80^{a}±0.61	3.41^{ab}±0.39	4.91^{a}±0.22	4.37^{X}±0.41	4.13^{a}±0.56	2.71^{abc}±0.38	4.00^{ab}±0.25	3.61^{X}±0.39
Female	2.45^{c}±0.49	3.99^{b}±0.21	5.20^{ab}±0.45	3.88^{Y}±0.38	1.93^{b}±0.49	3.79^{ab}±0.57	4.71^{a}±0.48	3.48^{Y}±0.51	1.56^{c}±0.48	2.27^{bc}±0.47	4.37^{a}±0.41	2.73^{Y}±0.45
Overall mean	3.79^{B}±0.57	4.13^{B}±0.29	5.35^{A}±0.34	4.42±0.39	3.37^{B}±0.55	3.60^{B}±0.48	4.81^{A}±0.35	3.92±0.46	2.85^{B}±0.52	2.49^{B}±0.43	4.18^{A}±0.33	3.17±0.42

Means bearing different superscripts in overall mean for ages differ significantly

Table 4: Mean (± SE) values of Taste Panel Scores of L.*dorsi* muscle of non-descript buffaloes of different sex and age groups

	Flavour				Juiciness				Tenderness				Overall acceptability			
	Age															
Sex	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean	6 months to 2 years	2 to 4 years	Above 4 years	Overall mean
Male	3.70±0.25	6.40±0.45	7.50±0.41	5.87±0.37	5.60±0.29	8.00±0.28	4.70±0.29	6.10±0.29	7.80±0.28	7.70±0.35	5.20±0.24	6.90±0.29	5.67±0.16	7.37±0.13	5.76±0.19	627±0.16
Female	3.00±0.25	6.40±0.43	7.40±0.35	5.60±0.34	4.90±0.26	7.70±0.29	4.80±0.37	5.80±0.31	7.50±0.26	8.30±3.16	5.50±0.26	7.10±1.23	5.12±0.11	7.44±0.21	5.87±0.20	6.14±0.17
Overall mean	3.35^{c}±0.25	6.40^{B}±0.44	7.45^{A}±0.38		5.25^{B}±0.28	7.85^{A}±0.29	4.75^{B}±0.33		7.65^{A}±0.27	8.00^{A}±1.76	5.35^{B}±0.25		5.40^{B}±0.14	7.41^{A}±0.17	5.82^{B}±0.20	

Means bearing different superscripts in overall mean for ages differ significantly

Table 4: Continued

Analysis of Variance

		Mean squares		
Source of variation	d.f	Hue	Value	Chroma
Between age groups	2	3.854^{NS}	1.017^{NS}	9.817**
Between sexes	1	10.417**	6.017**	2.017^{NS}
Age x sex interaction	2	0.729^{NS}	1.117^{NS}	0.217^{NS}
Error	54	1.458	0.665	0.869

		Mean squares (Shear force Values)		
Source of variation	d.f	24 hour	48 hour	7 days
Between age groups	2	13.465**	11.969*	15.941**
Between sexes	1	17.583**	11.953*	11.625*
Age x sex interaction	2	9.449*	14.954**	11.478**
Error	54	2.013	2.505	2.111

		Mean squares			
Source of variation	d.f	Flavour	Juiciness	Tenderness	Overall acceptability
Between age groups	2	90.72**	55.40**	41.45**	22.48**
Between sexes	1	1.07^{NS}	1.35^{NS}	0.60^{NS}	0.23^{NS}
Age x sex interaction	2	0.72^{NS}	0.80^{NS}	1.05^{NS}	0.69^{NS}
Error	54	1.48	0.98	0.79	0.33

Table 5: Correlation coefficient between various quality parameters of meat from non-descript buffaloes

Parameters	pH	WHC	Fibre diameter	Shear force value	Tenderness
pH	-				
Fibre diameter	0.5227**	-	-		
Water Holding Capacity	-0.1063	0.2695**	-	-	-
Shear force value	0.5042**	-	0.6784**	-	-
Tenderness	0.0321	-	0.2245*	-0.3424**	-

** Significant (P<0.01)

darker colour of meat in male carcasses than female. Similarly, higher eye muscle colour in males was recordes compared to that of females [18,19]. There was significantly (P<0.01) greater mean chroma values in 2 to 4 years age group. Chroma notation in munsell colour system describes the intensity of colour. This difference in chroma values may be due to age group variation [20] and the increase in chroma value may be due to higher myoglobin content in working and male animals [21].

Fiber Diameter: The analyses of variance revealed that there was a highly significant (P<0.01) difference between age groups for fiber diameter at 0 h, 24 h and 48 h of storage period. The critical difference analysis between age groups showed the presence of a highly significant (P<0.01) difference in fiber diameter at all periods and conditions of storage indicating that the 6 months to 2 years age group had significantly (P<0.01) smaller fiber diameter than the other two age groups at different storage periods. The results are in congruent with the findings of other workers [22,23]. The fiber diameter decreased gradually from 0 h to 48 h of storage period resulting in increased tenderness during ageing. There was no significant difference in fiber diameter between sex groups in all different storage periods. However significant difference was observed in sex and age interaction which may be due to the variation in physiological and biochemical characteristics that represents the types of muscle fiber present [24].

Water Holding Capacity: A highly significant (P<0.01) difference existed between sexes for water holding capacity areas measured at 0 h, 24 h and 48 h. The age and sex interactions for water holding capacity area at 24 h and 48 h were significant (P<0.05) and it was not significant (P>0.05) at 0 h. The analysis of critical difference showed the presence of a significant (P<0.01) difference between sexes indicating lesser WHC values in male than female non-descript buffaloes at different storage periods. Water holding capacity is one of the important qualitative and quantitative characteristics of meat [25]. The decrease in water holding capacity in females may be associated with higher ratio of moisture to protein in the meat [20,26] and

decrease on account of age and sex interaction may be due to the variation in slaughter condition, storage condition, etc., as indicated by [27] and other pre-slaughter factors.

Shear Force Value: revealed a highly significant ($P<0.01$) difference between age groups (I, II and III) for shear force value at 24 h and 7 days whereas it was only significant ($P<0.05$) at 48 h. It was observed that the mean shear force value between sexes differed highly significantly ($P<0.01$) at 24 h and differed significantly ($P<0.05$) at 48 h and 7 days. The critical difference analysis of shear force value at different storage periods showed the presence of highly significant ($P<0.01$) difference between the above 4 years age group and the other two age groups, indicating that greater shear force was required to shear through the same size core of muscle samples in above 4 years age group than the two younger age groups. The increase in shear force value in older buffaloes may be due to the development of connective tissue after maturity [28,29]. Results of this study showed that male buffalo meat required more SFV to shear through the core samples than female, which indicates meat obtained from female animals are more tender than males. This could be due to the nature of works (draft purposes) the male buffaloes are subjected in rural areas. The SFV results of this study indicated a significant ($P<0.01$) decrease in shear force value as the duration of storage period increased which might be due to increased lactic acid content which might degrade the connective tissues [30].

Taste Panel Studies: Results of the panelist revealed the presence of a highly significant ($P<0.01$) difference between age groups for flavour, juiciness, tenderness and overall acceptability. The critical difference analysis revealed the existence of a significant ($P<0.01$) difference between age groups for all the attributes. The mean flavour scores showed that the age groups I, II and III differed significantly from each other indicating higher score in above four years age group followed by 2 to 4 years and 6 months to 2 years age group. The juiciness and overall acceptability scores showed that there was a significant ($P<0.01$) difference between the 2 to 4 years age group and the other two groups (I and III) indicating higher scores for juiciness and overall acceptability in 2 to 4 years than the other two groups. It was observed that the cooked buffalo meat emanated "buffalo flavour" and the meat obtained from castrated animals is superior in flavour, tenderness, juiciness and overall acceptability [31]. The decrease in tenderness and juiciness may be associated with increase in the connective tissue component in the muscle of older animals [19]. The 2 to 4 years age group buffalo meat obtained significantly ($P<0.01$) higher scores for overall acceptability.

Correlation Study: A correlation study was made involving various physico-chemical, biochemical parameters and taste panel scores of non-descript buffalo meat of different age and sex groups to ascertain their interrelationship. This study revealed the R-value is positively and significantly ($P<0.01$) correlated with WHC area (in cm^2). The correlation study revealed a significant ($P<0.01$) and positive correlation of pH with fiber diameter and shear force value. A positive relationship was observed between fiber diameter and shear values and indicated that a decrease in shear force value was related to a decrease in muscle fiber diameter and increased tenderness [32]. Tenderness scores of taste panel studies is negatively and significantly ($P<0.01$) correlated with shear force value. Several workers reported a significant inverse correlation between shear force values of cooked meat and taste panel scores for tenderness [33].

CONCLUSION

Based on the above observation, it could be concluded age and sex of the animal has a major influence on the quality of meat that is produced from these animals. In addition, under Indian condition majority of the animals are salvaged for meat after their productivity and hence the quality of meat from such spent animals are poor. Hence, optimum age of slaughter of these non-descript animals need to be ascertained for better meat quality and returns. In this study it was found that non-descript buffaloes of 2 to 4 years age are having superior quality characteristics with desirable organoleptic and yield characteristics than other two age groups. Females had a non-significant edge over the males in terms of physico-chemical characteristics. However, since milk fat percentage of buffalo is high and it is of high demand in most places, consideration has to given for proper rearing of male buffaloes and slaughtering them to meet the present day meat production. Hence, it is advocated that slaughter of male buffaloes at 2 to 4 years will bring in more economic return to Livestock Farmers and better quality meat for Meat Processors.

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