



Hide and Leather Quality of Baggara Cattle

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ABSTRACT

This study was designed to investigate the effect of sex and age on the leather quality of Baggara breeds of Sudan cattle. Thirty pieces of fresh hides from ox, heifer and cow were chosen for this study purpose. For whole variations between the selected hides Statistix8 Program was used for variance analysis on Complete Randomized Design. The results revealed that, heifer hides yield better upper leather on physical properties [Elongation %, Tensile strength (kg/cm²), Cracking load (kg), Thickness (mm), Tear load (kg/cm) and Flexibility] than ox and cow hides. Leather chemical properties were affected ($p \geq 0.05$) by both sex and age of the animals. Ox and cow hides were scored the high values of Moisture and Fat contents, in the other hand heifer hide was reported the high values of Ash and chrome contents.

Key words: Leather Quality, Baggara Cattle, Hide.

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INTRODUCTION

Sudan produces about 4 million cattle hides in a year. About 600,000 are processed locally into leather and the rest are exported mainly to China (MAR, 2014). Bennett et al. (1954) classified the Sudanese local cattle into three main groups Northern or Arab and Southern or NiloLic and the relatively small cattle of the Nuba mountain, which together constitute the great bulk of Sudanese cattle. Makkawi et al. (2007) mentioned that Baggara, Butana, Kenana and Nilotiuc are the main four breeds of cattle in the Sudan. The name of the breed 'Baggara' means cattle herders in Arabic. This breed was found in western Sudan and was raised by nomadic tribes in Darfur and Kordofan provinces. Its homeland is the savannah belt of Central Sudan lying about latitudes 10°-16° N (Osman and Rizgalla, 1968). Baggara cattle are characterized by a relatively large hump and short horns. Colours vary enormously though, in this respect the herds of some tribes show a considerable uniformity. In Southern Darfur, some tribes show a preference for light-coloured cattle so that it was common to find herds in which the majority of the cattle are white body colour. The hide is pigmented. In Kordofan region, western Sudan there exist herds which the general body colour was dark-red or brown-red. Musculature is only moderate and tends to deteriorate from west to east. Baggara cattle in Kordofan are generally smaller than those in Darfur (Osman and Rizgalla, 1968).

Considerable improvement has been achieved in the quality of cured hides by such studies as reported here, where the factors pertinent to hide and leather quality were brought to the notice of farmers and the hide and skin industry. There remains, however, a great deal more to be achieved in this field to meet the competition from synthetic materials in the leather industry, change in attitude is required. Because of hides and for that matter skins as well, were unfortunately regarded as a by-product (Cooper and Gallaway, 1972). So the present study was designed to investigate the effect of sex and age on the leather quality of Baggara breeds of Sudan cattle.

MATERIAL AND METHODS

Study Area

Hides samples were collected from Elobaied leather market, Sudan (latitudes 11°:15– 16°:30- N, longitudes 27°- 32° E). The average temperature varies between 30 and 35°C during most of the year (Idris et al., 2010; Ebrahiem et al., 2015a and b). The rainy season extends from July to October, reaching its peak in August. Annual rainfall ranges from 75 mm in the north to about 500 mm in the south (Technoserve, 1987 and El-Tahir et al., 1999). The natural vegetation consisted mainly of the grass species *Panicum turgidum*, *Arisdia spp.*, *Cymbopogons spp.*, *Ctenium elegans*, *Dactyloctenium aegyptium* and *Eragrostis tremula* (Harrison and Jackson, 1958; Ebrahiem et al., 2014).

Hides Collection

Ten pieces of wet-salted hides were selected randomly from each of ox, heifers and cow (total 30). The selected hides were obtained from Sudanese Baggara cattle breed in Darfur and Kordofan Regions. Heifers average age were 1.5-

2, Ox average age was 3.5-4 years and cows were 3-3.5 years old. Leather was prepared from cattle hides according to the following main steps: Soaking, liming, deliming, bating, degreasing, pickling, tanning, neutralization and re-tanning (Ebraheim, 2015a). Sampling and assessment of chemical and physical characteristics were done according International Standards Organization (ISO2418, 2002 and ISO 4044, 2008). Tensile strength and elongation percentage were assessed according to ISO3376 (2002). Flexibility test was done according to ISO5402- (2002). Measurement of tearing load and resistance to grain cracking was determined according to ISO3377-1 (2002) and ISO3378 (2002) respectively. Moisture, total Ash, fats and oils contents were determined according to SLTC - Society of Leather Trades Chemists- (1965) and chromium content was assessed according to ISO5398-1 (2007) procedures.

Statistical Analysis

The Statistix 8 Program was used for variance analysis on Complete Randomized Design according to (Gomez and Gomez, 1984). Duncan's Multiple Range Tests (DMRT) was used for means separation (Statistix 8, 2007).

RESULTS AND DISCUSSION

Physical prosperities of Baggara cattle hide

As shown in table 1 leather Elongation percent was significantly affected ($P \geq 0.05$) by the age and sex. The best elongation was signed by heifer hide (64.61). According to SSMO (2006) the proper standard for upper leather elongation percent was 65%. Also the proper tensile strength was scored by heifer hide of 263.81(kg/cm²), and significantly different ($P \geq 0.05$) from which scored by ox and cow hides. Tensile strength results were affected by both sex and age. Leather Cracking load (kg) was affected ($P \geq 0.05$) by sex and age of the animals. Heifer was recorded the heist leather Cracking load (103.11kg) followed by ox hides and last cow hides. Leather Thickness (mm) results were significantly ($P \geq 0.05$) affected by sex and age. The best thickness was reported by heifer hide of 1.95 according to SSMO (2006). Tear load (kg/cm) higher records were scored by heifer hide (82.41), when the lowest value was reported for cow hide for this parameter. Flexibility better values were recorded at heifer and cow hides (2-2.25 degree), and it significantly ($P \geq 0.05$) varied from which was obtained at ox hide. These results were in confirm with Cooper and Gallway (1972) whom reported that, the hides of beef breeds generally produce better upper leather than those of dairy breeds, that ox and heifer hides yield better upper leather than cow hides and the better hides come from the cattle with higher carcass grades.

Table 1. Physical leather quality of western Sudan cattle (Baggara) in January 2015

Parameters	Ox hide	Heifer hide	Cow hide
Elongation %	62.63±1.58 ^b	64.61±1.95 ^a	66.51±1.75 ^a
Tensile strength (kg/cm ²)	232.13±19.83 ^b	263.81±14.53 ^a	207.75±18.05 ^c
Cracking load (kg)	96.12±5.97 ^b	103.11±3.77 ^a	84.23±5.52 ^c
Thickness (mm)	1.69±0.12 ^b	1.95±0.15 ^a	1.63±0.13 ^b
Tear load (kg/cm)	74.13±4.09 ^b	82.41±2.71 ^a	66.17±3.45 ^c
Flexibility (degree)	4.38±0.92 ^a	2.00±1.13 ^b	2.25±1.12 ^b

Means in the same row with the same letter are not significantly different ($p \geq 0.05$).

Chemical properties of Baggara cattle hide

As in table 2 leather chemical properties was affected ($p \geq 0.05$) by both sex and age of the animals. Also, ox and cow hides were scored the high values of Moisture and Fat contents, in the other hand heifer hide was reported the high values for Ash and chrome contents.

Table 2. Chemical leather quality of western Sudan cattle (Baggara) in January 2015

Parameters	Ox hide	Heifer hide	Cow hide
Moisture%	11.71±1.66 ^a	7.75±1.51 ^b	11.83± ^a
Ash%	2.66±0.22 ^b	2.98±0.13 ^a	2.52±0.16 ^b
Fat %	5.98±0.68 ^a	3.32±1.41 ^b	6.51±1.11 ^a
Chrome%	3.70±0.13 ^b	4.69±0.18 ^a	3.51±0.15 ^b

CONCLUSION

Heifer hides yield better upper leather on physical properties than ox and cow hides. Ox and cow hides were composed of high fat contents which resulted in low tanning efficiency in comparison to heifer hides.

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