



Original Article

Skin\Leather Quality of Some Sudan Goats under Range Condition

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ABSTRACT

This study was designed to investigate the effect of breed and feeding level before slaughter on the skin\leather quality of the three main breeds of Sudan goats. Thirty (30) pieces of fresh skins from the three goat breeds (an average age 1-1.5 years) were chosen for the study purpose. For whole variations between the three breeds in two levels of feeding (poor and rich pastures) Complete Randomized Design (CRD) was used for data analysis. The results revealed that, leather weight (kg), elongation%, tensile strength (kg/cm²), cracking load (kg), thickness (mm), tear load (kg/cm) and chrome% findings were significantly affected (P 0.05) by breed variation. Flexibility, moisture%, Ash% and fat % were not significantly affected (P 0.05) by breed. On the other hand, skin weight (kg), Cracking load (kg), Tear load (kg/cm) and Ash% were significantly affected (P 0.05) by pasture quality. While Leather Elongation%, Tensile strength (kg/cm²), Thickness (mm), Flexibility, Moisture%, Fat % and Chrome% were not statistically (P 0.05) affected by pastures quality.

Keywords: Skin\Leather, Quality, Goats, Sudan.

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INTRODUCTION

The main goat's breeds in the Sudan are Nubian, Desert, Nilotic, Taggar, Baggara and Engasana (Devendra and Mcleroy, 1982; Gall, 1996). The Nubian goat is considered as a milk production, while the other breeds are generally considered as meat animals. The pure desert goat is now mainly found in desert areas of the country due to it is superior adaptation to the environment. Taggar goat is not mentioned by Devendra and Mcleroy (1982) and Gall (1996). According to Mofarrah (1995) it is found in south Kordofan, also found in Engasana area (mountains) and in Jabel Mara in Darfur region. Sudan goats are highly adapted to harsh environments. It is owned mainly by nomads and also owned in large numbers by agro-pastoralists (Gall, 1996).

Some breeds of Sudan goats have been shown to differ in the quality of leather produced from their skins. Though many reports have suggested that, no farm or range conditions can exert a strong influence on goat's skin characteristics. This trial was designed to investigate

the effect of feeding level before slaughter on the quality of leather produced from pelts of three breeds of Sudan goats.

MATERIALS AND METHODS

Study Area

This work was conducted at University of Kordofan, Elobaied, 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). 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 tugidum*, *Arisdia spp*, *Cympopogons spp.*, *Ctenium elegans*, *Dactyloctenium aegyptium* and *Eragrostis tremula* (Harrison and Jackson, 1958).

Skins Collection

Ten (10) pieces of fresh skins were collected from each of the three goat breeds (Nubian, Desert and Taggar). Skins were chosen from goats on an average age of 1-1.5 years old. Five (5) pieces were obtained from goats fed on enriched pastures condition for each breed and the same numbers were taken from goats fed on poor pastures conditions.

Tanning Procedures and Sampling

Leather was prepared from goat skin according to the following main steps: Soaking, liming, deliming, bating, degreasing, pickling, tanning, neutralization and re-tanning. Sampling and assessment of chemical and physical characteristics were done according International Standards Organization (ISO2418, 2002 and ISO 4044, 2008). Physio-mechanical properties that assessed were Tensile strength and elongation percentage according to ISO3376 (2002), Flexibility test according to ISO5402- (2002) and Measurement of tearing load and resistance to grain cracking according to ISO3377-1 (2002) and ISO3378 (2002). Moisture, total Ash, fats and oils contents were determined according to SLTC - Society of Leather Trades Chemists- (1965) and chromium content according to ISO5398-1 (2007) procedures.

Statistical Analysis

The data were statistically analyses using Complete Randomized Design (CRD) according to (Gomez and Gomez, 1984). Duncan's Multiple Range Tests (DMRT) was used for means separation.

RESULTS AND DISCUSSION

Effect of Goat Breed on Skin\Leather Quality

As shown in table (1) the weight of fresh skin (kg) were significantly affected (P 0.05) by the breed. Taggar goat was reported the lowest skin weight of 1.27 ± 0.42 Kg. Similar results on Sudan sheep leather were obtained by Ebrahiem *et al.*, (2015); Passman and Sumner (1983) and Bigham *et al.*, (1978). Passman and Dalton (1982) and Sumner *et al.*, (1981) mentioned that, the leathers produced from the skins of each breed were of similar weight, thickness and shape.

Elongation % was significantly affected (P 0.05) by the breed. Similar finding of a significant different was obtained by Ebrahiem *et al.*, (2015); Teklebrhan *et al.*, (2012) Craig *et al.*, (1987) and Jacinto *et al.*, (2005).

Tensile strength (kg/cm^2) was affected (P 0.05) by the breed. Ebrahiem *et al.*, (2015); Teklebrhan *et al.*, (2012) and Oliveira *et al.*, (2007) reported that, significant difference in leather strength properties among sheep breeds was not detected.

Cracking load (kg) was affected ($P < 0.05$) by the breed. Similar result of significant different was reported by Ebrahiem *et al.*, (2015) on Sudan sheep leather.

Thickness (mm) was significantly affected by the breed ($P < 0.05$). This result was different from Ebrahiem *et al.*, (2015); Oliveira *et al.*, (2007) Sudha *et al.*, (2009); Salehi *et al.*, (2014) and Passman and Sumner (1983) whom observed that, thickness of skin was not affected by breed and high degrees of homogeneity in thickness among different genotypes was obtained.

Tear load (kg/cm) was significantly affected ($P < 0.05$) by the breed variation. Similar result of significant difference was reported by Ebrahiem *et al.*, (2015); Sudha *et al.*, (2009); Salehi *et al.*, (2014) and Passman and Sumner (1983).

Breed effect was not detected among goat leather flexibility, Moisture%, Ash% and Fat % findings. Flexibility, Moisture% and Fat % results were different to Ebrahiem *et al.*, (2015) findings on these parameters at Sudan sheep leather. But, similar result of insignificant at Ash% was detected by Ebrahiem *et al.*, (2015).

Chrome oxide percent was significantly affected ($p < 0.05$) by the breed. A similar result of significant was obtained by Ebrahiem *et al.*, (2015) on Sudan sheep leather.

Table 1: breed effect on Skin\Leather Quality of Some Sudan Goats

Parameters	Breeds		
	Nubian	Desert	Taggar
Weight (kg)	1.69±0.39 ^a	1.61±0.15 ^b	1.27±0.42 ^c
Elongation%	61.10±3.21 ^a	56.90±2.62 ^a	50.60±2.87 ^b
Tensile strength (kg/cm ²)	200.77±29.82 ^a	184.99±18.61 ^b	183.35±28.18 ^b
Cracking load (kg)	21.31±4.47 ^a	20.99±4.31 ^{ab}	19.19±4.21 ^b
Thickness (mm)	1.56±0.36 ^a	1.17±0.35 ^b	1.12±0.42 ^b
Tear load (kg/cm)	49.35±4.11 ^a	44.62±5.17 ^b	36.83±5.04 ^c
Flexibility	3.30±0.82 ^a	3.30±0.82 ^a	2.60±0.67 ^a
Moisture%	14.18±1.83 ^a	13.10±2.22 ^a	12.84±2.33 ^a
Ash%	2.13±0.18 ^a	2.02±0.23 ^a	1.96±0.32 ^a
Fat %	6.32±0.58 ^a	6.18±0.94 ^a	6.14±0.63 ^a
Chrome%	3.43±0.17 ^a	3.38±0.47 ^a	2.88±0.16 ^b

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

Effect of Feeding Level on Goat Skin\Leather Quality

Pasture level was significantly affected ($p < 0.05$) on leather weight (kg), Cracking load (kg), tear load (kg/cm) and Ash content%. On the other hand, no significant differences were detected ($p < 0.05$) between feeding on enrich and poor pasture level among leather elongation%, tensile strength (kg/cm²), thickness (mm), flexibility, moisture%, Fat % and Chrome%. The highest values of these parameters were observed at the enrich pastures condition. These results were similar to Ebrahiem *et al.*, (2014) findings on sheep leather quality at the same conditions. While in moisture content no significant different ($p < 0.05$) was detected. This result is different from Ebrahiem *et al.*, (2014) who found significant difference for the parameter at the same conditions (Table 2).

Table 2: pasture condition effect on Skin\Leather Quality of Some Sudan Goats

Parameters	Enrich pasture	Poor pasture
Weight (kg)	1.57±0.09 ^a	1.47±0.18 ^b
Elongation%	56.60±3.94 ^a	55.80±6.39 ^a
Tensile strength (kg/cm ²)	191.64±20.39 ^a	187.77±11.62 ^a
Cracking load (kg)	22.47±2.46 ^a	18.52±2.52 ^b
Thickness (mm)	1.34±0.26 ^a	1.22±0.18 ^a
Tear load (kg/cm)	46.12±5.09 ^a	41.08±5.21 ^b
Flexibility	3.20±0.88 ^a	2.93±0.77 ^a
Moisture%	13.48±1.63 ^a	13.27±2.01 ^a
Ash%	2.15±0.21 ^a	1.92±0.28 ^b
Fat %	6.46±0.66 ^a	5.97±0.73 ^a
Chrome%	3.29±0.26 ^a	3.17±0.39 ^a

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

CONCLUSION

leather weight (kg), elongation%, tensile strength (kg/cm²), cracking load (kg), thickness (mm), tear load (kg/cm) and chrome% findings were significantly affected (P 0.05) by breed variation. Flexibility, moisture%, Ash% and fat % were not significantly affected (P 0.05) by breed. On the other hand, leather weight (kg), Cracking load (kg), tear load (kg/cm) and Ash% were significantly affected (P 0.05) by pasture quality. Leather Elongation%, Tensile strength (kg/cm²), Thickness (mm), Flexibility, Moisture%, Fat % and Chrome% were not statistically (P 0.05) affected by pastures quality. Taggar goats produce the lowers quality leather in comparison to Nubian and desert goats. Goats at enrich pasture feeding conditions tended to produce higher quality leather than goats fed on poor pastures conditions.

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