

## **STUDY ON SKIN THICKNESS OF CATTLE BREEDS OF MAHARASHTRA IN DIFFERENT CLIMATIC CONDITION**

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**Abstract:** The present study was conducted on skin samples of 4 – 6 years of age healthy Deoni, Red kandhari, Dangi and Gaolao breeds of cattle managed under hygienic conditions on farm in different regions of Maharashtra. The skin samples, 10 of each breed were obtained surgically from loin region during winter and summer seasons separately. The average thickness of skin recorded immediately after collection was found maximum during winter season in all cattle breeds.

**Keywords:** Skin, thickness, cattle.

### **Material and Methods**

The present study was conducted in the Department of Veterinary Anatomy and Histology, College of Veterinary and Animal Sciences, Parbhani (M.S.). The experiment was carried out on 40 female cattle of 4 – 6 years of age belonging to different breeds located in different regions of Maharashtra state during winter (November - February) and summer (March – June) seasons, separately. The skin samples, 10 of each were obtained from loin region of healthy Deoni, Red kandhari, Gaolao and Dangi breeds of cattle, managed under hygienic conditions on the farm in different regions of Maharashtra state.

The skin samples were obtained by performing following surgical operative technique:

### **Operative technique**

The area of loin region irrespective of side between 2nd and 3rd lumbar transverse process was cleaned, shaved and disinfected with spirit. An elliptical skin sample of 1 cm length along with fascia was taken out surgically after infiltration of local analgesia. The antiseptic powder was sprinkled on the surgical wound and the incised wound was sutured by interrupted suture using nylon thread. The wound was sealed with tincture iodine.

The obtained skin samples were washed immediately with normal saline solution to remove blood clots. The thicknesses of the skin were recorded gently with the help of \*Oxytetracycline – Indian Immunologicals, Hyderabad digital vernier callipers immediately.

## Results and Discussion

### Thickness of skin

The total thickness of fresh skin snippets included of epidermis, dermis and hypodermis was measured immediately after collection of skin samples using digital Vernier callipers.

The average thickness of fresh skin snippet is presented in table 1 during present study, a significant increase in average thickness of skin was observed in winter season in all breeds of cattle. The average thickness of fresh skin snippets in summer was  $5.03 \pm 0.08$  mm,  $4.11 \pm 0.06$  mm,  $4.79 \pm 0.05$  mm and  $4.95 \pm 0.07$  mm whereas, during winter it was recorded as  $5.41 \pm 0.20$  mm,  $4.71 \pm 0.10$  mm,  $5.31 \pm 0.05$  mm and  $5.20 \pm 0.04$  mm in Deoni, Red Kandhari, Dangi and Gaolao breeds of cattle respectively (Table 1).

In the present investigation, the total thickness of skin in Deoni and red Kandhari cattle was within the range reported by Mugale (2000) in Deoni and Hole (2003) in Red Kandhari cattle. Also, total skin thickness of Gaolao and Dangi cattle were within the range of other indigenous breeds of cattle as reported by Bhayani *et al.* (1989) at mid side region in Kankrej cow, Bhayani and Vyas (1990) in Gir cattle, Hamid *et al.* (2000) in skin of hind quarter in indigenous X Sahiwal cattle and Aslan *et al.* (2004) in Zavot cattle.

However, the average thickness of skin recorded in all breeds of cattle in present study was found lower than the skin thickness reported by Nay and Hayman (1963) in European breeds of cattle, Hayman *et al.* (1966) in Sahiwal cattle, Dowling (1955) in Zebu and European breeds of cattle, Walker (1963) in Indigenous breeds of African cattle, Mohan and Prabhu (1969) skin of back region in Haryana and Tharparkar cattle and Dowling (1964) in different Breeds of European cattle. This Variation in skin thickness may be due to age, site, climatic conditions and breed differences. Similarly, Patel *et al.* (1988), Bhayani and Vyas (1990), Fazzini and Peirone (1985) and Saxena *et al.* (1994) mentioned significant variation in skin thickness as per age. Aslan *et al.* (2004), Hamid *et al.* (2000), Mohan and Prabhu (1969) and Bhatia and Prabhu (1970) reported variation in skin thickness from site to site. Also, Nay and Hayman (1963), Hayman *et al.* (1966) and Dowling (1964) reported breed and seasonal effect on the variation of skin thickness.

The increase in thickness of skin during winter season might be attributed to protection of animals from extreme cold. Similar observations were reported by Nay and Hayman (1963). They recorded more thickness of skin in winter than summer season in different breeds of European cattle.

The average thickness of skin showed statistical significant variations between breeds in both season during present work. However, non-significant difference was observed between Deoni and Gaolao cattle during summer season and between Deoni and Dangi cattle during winter season. The maximum thickness of skin in present study was recorded in Deoni cattle and minimum in Red Kandhari cattle during both seasons.

**Table 1: Mean and SE of total skin thickness during summer and winter season in Deoni, Red Kandhari, Dangi and Gaolao cattle** Skin thickness (mm)

Season	Deoni	Red Kandhari	Dangi	Gaolao
Summer	5.03 A2 ± 0.08	4.11 C2 ± 0.06	4.79 B2 ± 0.05	4.95 A2 ± 0.07
Winter	5.41 A1 ± 0.20	4.71 B1 ± 0.10	5.31 A1 ± 0.05	5.20 A1 ± 0.04

### Literature cited

- [1] Aslan, S., Kocamis, H., Gulmez, N. and M. Nah [2004]: Histological and histometrical studies on the skin of Zavot breed cattle. *Indian Vet. J.*, 81: 1254-1257.
- [2] Bhatia, S.S. and S.S. Prabhu [1970]: Studies on variation in skin fold thickness in Indian cattle breeds. II. Sahiwal and Red Sindhi. *Indian J. Anim. Sci.* 40 [1]: 24 – 40.
- [3] Bhayani, D.M., Vyas, K.N. and J.M. Patel [1989]: Thermoregulatory structures and shrinkage percentage during processing of skin biopsies in the Kankrej cow. *Indian J. Anim. Sci.*, 59 [3]: 339 – 343.
- [4] Bhayani, D.M and K.N. Vyas [1990]: Age and regional differences along with effect of drought on the thickness of skin as well as papillary and reticular layer in cattle [*Bos indicus*]. *Indian. Vet. J.*, 67: 1148 - 1152.
- [5] Dowling, D.F. [1955]: The hair follicle and apocrine gland population of Zebu [*Bos indicus L.*] and Shorthorn [*B. Taurus L.*] cattle skin. *Aust. J. Agric. Res.*, 6 [4]: 645 – 654.
- [6] Fazzini, U. and S.M. Peirone [1985]: Structure of the skin of cattle during growth and senescence. *Fac. Med. Vet. Univ., Turin, Italy.*, 29: 156 -174 [*Vet. Bull.* 55 [11]: 917, Abst. No. 7484]
- [7] Hamid, M.A., Husain, S.M.I., Khan, M.K.I., Islam, M.N., and M.A.A. Bishwas [2000]: Skin thickness in relation to milk production of crossbred cows. *Pakistan J. Bio. Sci.*, 3 [9]: 1525 - 1529
- [8] Hayman, R.H., Beeston, J.W.U., Allen, T.E. and T. Nay [1966]: Skin thickness in Sahiwal and Jersey cattle and its measurements. *J. Agric. Sci. Camb.* 67: 345 - 351.

- [9] Hole, M.B [2003]: Histological study of skin in Red Kandhari cows. Unpublished M.V.Sc. thesis submitted to Maharashtra Animal and fishery sciences university, Nagpur.
- [10] Mohan, M. and S.S. Prabhu [1969]: Studies on variation in skin fold thickness in Indian cattle breeds. I. Haryana and thrparkar. Indian J. Anim. Sci. 39 [5]: 393 - 409.
- [11] Mugale, R.R. [2000]: Histomorphology of the skin of Deoni cattle with reference to age, sex and their adaptation to different climatic conditions. Unpublished Ph.D. thesis submitted to Marathwada Agriculture University, Parbhani.
- [12] Nay,T. and R.H. Hayman [1963]: Some skin characters in five breeds of European [*Bos Taurus L.*] dairy cattle. Aust. J. Agric. Res.,14 [2]: 294 - 302.
- [13] Patel, J.M., Vyas, K.N., Vyas, Y.L. and A.D. Dave [1988]: Age associated changes in skin thickness and follicle and sweat gland depth in Jersey X Kankrej and Holstein x kankrej F1 crossbreds. Indian. Vet. J., 65: 523 - 526.
- [14] Saxena, S.K., Malik, M.R. and H.K.B. Parekh [1994]: Skin characters of crossbred cattle and physiological adaptation: Skin thickness. Indian J. Anim. Sci., 64[5]: 446 -449.
- [15] Walker, C.A. [1963]: The skin characters of some breeds indigenous African cattle. J. Agric. Sci., 55 [1]:119 – 121.