



# Histological and histochemical studies of sebaceous gland in crossbreed cattle

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**Abstract :** The sebaceous glands were found in the papillary layer of the dermis in association with the hair follicles. The gland was simple alveolar type and of holocrine mode of secretion. These glands were lined by squamous epithelial cells with centrally located nuclei. Generally two glands were found associated with one hair follicle. But in some areas, one gland was found in association with one hair follicle. These glands were superficially located in the papillary layer of the dermis in lactating cow and of smaller size in pregnant cow.

**Key words :** Histology, Histochemistry, Sebaceous gland in crossbreed cattle

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## INTRODUCTION

Indian cattle breeds are low milk producers as compared to the exotic breeds of the cattle. Due to this, crossbreed cattle are reared in India to increase the milk production per animal. The skin characters generally attract the interest for the selection criteria of animal. Similarly it helps to adapt the animals of the universe in different seasons. The crossbreed animals *i.e.* F<sub>1</sub> generation (50% Deoni x 50% Holstein) are reared in the high environmental temperature, resistant against the tropical diseases. Hence, the present investigation has been made to study the histology of the skin epidermis in crossbreed cattle (Deoni x Holstein F<sub>1</sub> generation) in different groups, *viz.*, heifers, pregnant and lactating cows.

## RESEARCH METHODOLOGY

The present experiment was conducted on female crossbreed cattle (Deoni x Holstein F<sub>1</sub> generation). These animals were divided into following groups and each group comprising six animals:

- Group1 Heifers
- Group2 Pregnant cows
- Group3 Lactating cows

All these animals were apparently healthy and reared under normal hygienic conditions on the farm. The skin biopsy samples were collected in summer season

The obtained skin samples were washed in normal saline solution to remove blood clots. The samples were cut in convenient sizes by BP blade and were immediately kept in either of the following fixatives for preservation.

- 10 per cent formaline solution
- 10 per cent neutral buffered formaline solution.

After preservation for 48 hours, small pieces of the tissues were processed in the laboratory by adapting ascending grades of alcohol for dehydration and xylene for clearing, respectively. The tissues were then embedded in the paraffin wax of melting point 58 to 60°C. The vertical and horizontal sections of 4 to 5  $\mu$  thickness were obtained on the glass slides by manually operated Rotatory Microtome Machine (Singh and Sulochana, 1997). Then the tissue sections were stained by the following staining methods.

- Harrie's haematoxyline and Eosin stain for general observation (Mukherjee, 1992).
- Weigert's Van Gieson stain for collagen fibres (Singh and Sulochana, 1997).
- Silver impregnation stain method for reticular fibres (Singh and Sulochana, 1997).
- Verhoeff's stain for elastic fibres (Mukherjee, 1992).
- Crossman's modification of Mallory's Triple stain for collagen and elastic fibres (Singh and Sulochana, 1997).
- Periodic Acid Schiff's (PAS) stain for carbohydrate like glycogen, mucin and polysaccharides (Mukharjee, 1992).

The stained sections were studied for various histological and histochemical parameters of the skin epidermis. The measurements were taken from vertical and horizontal sections under simple microscope by ocular micrometer scale after calibration at low power and high power magnification.

The data collect were subjected to statistically analysis as per the standard procedures of Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

### Sebaceous gland:

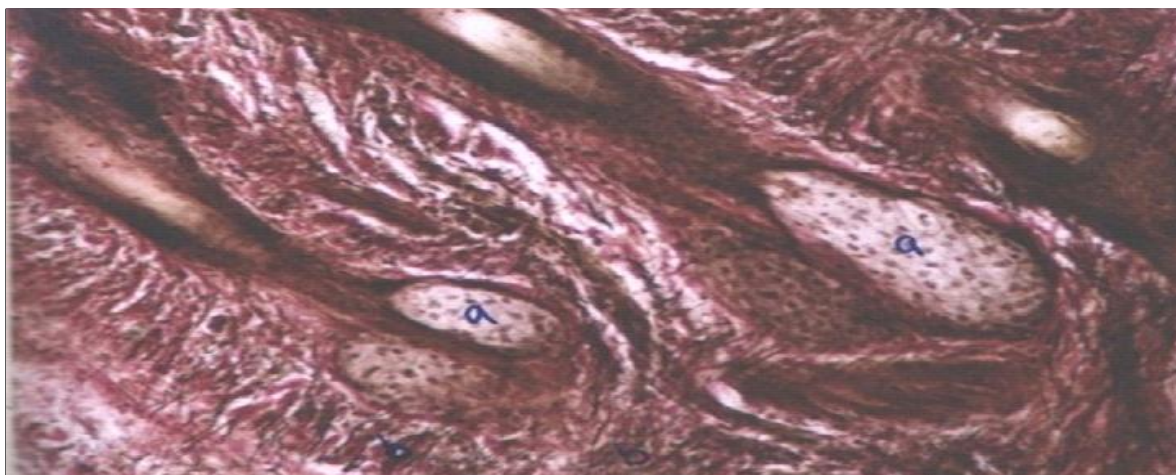
The sebaceous glands were found in the papillary layer of the dermis in association with the hair follicles. The glands was simple, alveolar type and of holocrine mode of secretion (Plate 1). The lining epithelium of the gland was squamous epithelium with centrally located nuclei. These glands were found associated with hair follicles. The ducts of these glands opened into hair follicle. Generally two glands were found associated with one hair follicle. But in some areas one gland was found associated with one hair follicle also.

In heifer, these glands were rounded and intermediate in size. Some places more than two glands were associated with one hair follicle.

In lactating cow the sebaceous glands were found larger, oval, rounded in shape. These glands were associated with hair follicles and located in the papillary layer of the dermis and few in number. These glands were lined by squamous epithelial cells. The cells in the gland were with more prominent nucleus and cell boundries. Ducts of sebaceous glands opening into hair follicle were also prominent in heifer and lactating cow. These glands were more superficially located in the papillary layer of dermis.

In pregnant cow, the sebaceous glands were found deeper in the papillary layer as compared to other group of animals. The glands were smaller in size with somewhat elongated or irregular in shape. The cell boundries and nuclei were less prominent as compared to other group of animals.

The depth of sebaceous gland ranged from 303.78 to 428.17  $\mu$ m with mean  $365.144 \pm 20.40$   $\mu$ m in heifers, 298.69 to 417.18  $\mu$ m with mean  $356.684 \pm 24.09$   $\mu$ m in pregnant cow and 277.57 to 317.72  $\mu$ m with mean  $294.376 + 7.24$   $\mu$ m in lactating. The sebaceous glands were more deeply located in heifer than that of pregnant and lactating cow (Table 1).



(a) Sebaceous gland (Verhoeffs Stain 100 X)

**Plate 1 : Microphotograph of the skin from heifer showing**

**Table 1 : Showing the measurement of depth, diameter and length of sebaceous gland**

Group	Depth			Diameter			Length		
	Range (µm)	Mean (µm)	(±) S.E.	Range (µm)	Mean (µm)	(±) S.E.	Range (µm)	Mean (µm)	(±) S.E.
Heifer	303.78 to 428.17	365.14	20.40	75.57 to 92.57	83.61	3.26	65.92 to 99.08	86.25	6.28
Pregnant cow	298.69 to 417.18	356.68	24.09	57.57 to 71.62	63.50	2.49	62.16 to 99.12	82.81	7.18
Lactating cow	277.57 to 315.72	294.38	7.24	72.67 to 98.62	88.66	4.39	71.67 to 98.62	89.42	5.55
Average mean	294.38 to 365.14	338.73	17.24	63.50 to 88.66	78.59	3.88	82.81 to 89.42	86.16	30.64

The depth of sebaceous gland was found higher than the reports of Mugale (2000) in Deoni cattle.

The diameter of sebaceous gland was higher in lactating cow than that of heifer and pregnant cow. The diameter of sebaceous glands ranged from 75.57 to 92.57 µm with a mean  $83.606 \pm 3.26$  µm in heifers, 57.57 to 71.62 µm with a mean  $63.496 \pm 2.49$  µm in pregnant cow and 72.67 to 98.62 µm with a mean  $88.66 \pm 4.39$  µm in lactating cow (Table 1).

The length of sebaceous glands was more in lactating cow as compared to other group of animals. The length of sebaceous glands ranged from 65.92 to 99.08 µm with a mean  $86.252 \pm 6.28$  µm in heifers, 62.16 to 99.12 µm with a mean  $82.806 \pm 7.18$  µm in pregnant cow and 71.67 to 98.62 µm with a mean  $84.916 \pm 5.55$  µm in lactating cow (Table 1).

The information on length and diameter of sebaceous gland in domestic animals in different groups is not available in the present literature and hence, these were not compared.

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