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Comparison of different Animal Species Hairs with respect to their Medullary Index for the Individual Identification and comparison from the Animals of local Village of Palam Vihar, Gurugram, Haryana

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Abstract

In this study hair sample of different domestic animal species is evaluated on the basis of their medullary index, which help the forensic scientist for the identification and comparison of different animal hair species. Animal hair always has a medullary index of 1/3 or greater with hair root having rounded in shape. Animal hair is rough and has larger medulla than human hair. Forensic scientist determine the number of things from hair sample, from the crimescene i.e, verifying whether the hair in question is that of human or an animal, if the hair is from animal, the forensic investigator can potentially identify the species from which it is originated, the hair can be of pet or wild animal, the clues reveals including which part of the body hair came from, if human hair; race of the person, gender, age, if the hair shed naturally or pulled from someone's body part. In the present study different species of animal hair i.e., Dog, Cat, Buffalo, Cow are collected from local area of PalamVihar, Gurugram were microscopically examined. This research paper provides the data to the identification and comparison of different animal hair with respect to their medullary index based on their microscopic examination because hair is strongly resistant from decomposition and this property makes hair a nearly ideal type of physical evidence.

Keywords: Animal Hair, Medullary Index, Microscopic Examination, Strongly Resistant, Physical Evidence.

Introduction

Hair can be defined as a slender, thread-like outgrowth from a follicle in the skin of mammals, composed mainly of keratin.The hairs of humans and animals have similarities but they are different enough that forensic scientist can distinguish between them. One obvious difference between animal hair stop growing when it reaches a certain length, it then falls out and is replaced by a new hair. Human hair naturally grows much longer and must be cut periodically to maintain a certain length. It has three morphological regions—the cuticle, medulla, and cortex. The cuticle is a translucent outer layer of the hair shaft consisting of scales that cover the shaft. The medulla is a central core of cells that may be present in the hair,if it is filled with air, it appears as a black or opaque structure under transmitted light, or as a white structure under reflected light. The cortex is the main body of the hair composed of elongated and fusiform (spindle-shaped) cells. It may contain cortical fusi, pigment granules, and/or large oval-to-round-shaped structures called ovoid bodies. A hair grows from the papilla and with the exception of that point of generation, is made up of dead, cornified cells. The animal hair in forensic science can act as physical evidence at crime scene where firstly hair evidence must be collected properly and analyzed according to protocols. The first step of the examination involves verifying whether the hair in question is that of a human or an animal. If the hair is from an animal, the examiner can potentially identify the species from which it originated, the hair can be of pet or wild animal. The identification of animal hair in crime scene can indicate the physical contact between victim and suspect or to the crime scene may happen when the perpetrator is a pet owner or when the crime was committed in a place where animal was kept such as barns, basement, transport vehicle. Here the parameter of differentiation is taken on the basis of their medullary index (the fraction of the hair shaft's diameter and the diameter of medulla occupies) ranging; Cow (Bostaurus: 0.22-0.43), Buffalo (Bubalusbublis: 0.53-0.78), Cat (Felisindicus: 0.52-0.78), Dog (canis lupus familaris: 0.54-0.75). The medullary index may also vary in same species.

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Methodology

The hairs were collected from the Cow hair and its Calf hair, Buffalo and its Calf hair, Dog and its Puppy hair, Cat and its Kitten hair from animals of local area of PalamViharGurugram Haryana, India. Hairs were collected in Plastic zipper bags. Hairs were cleaned and degreased in 70% ethanol and further investigated by light microscope . Hair samples were analyzed using a light microscope equipped with a digital camera. Microphotographs were taken with a digital camera at 40x magnification. Morphometric analysis of hair shaft, medullary diameter was taken. At least 10 measurements were performed in each hair sample. The hair sample was mounted by glycerin and placed a coverslip on it and then the medullary index with the examined under microscope with the help of attached micrometer attached on another eyepiece. Medulla pattern: Medullary index Human hair generally < 1/3 Animal hair >=1/2 Medullary shape Human =normally cylindrical Animal =varies by species.

Result

The medullary index of different animal species is given below-

Medullary index can be calculated by -diameter of medulla/diameter of hair shaft.

1. DOG (canislupus familaris)

1.	**Labrador**	**20/22= 0.62**
2.	**Labrador puppy**	**17/32=0.53**
3.	**Indian pariah**	**22/32=0.68**
4.	**Indian mastiff**	**23/37=0.62**
5.	**Rampur hound**	**35/50=0.7**
6.	**Gaddikutta**	**26/45=0.57**
7.	**Combai**	**14/24=0.58**
8.	**German shepherd**	**17/31=0.54**
9.	**Indian spitz**	**10/14=0.71**
10.	**Permanian**	**10/21=0.47**

2. BUFFALO (Bubalus Bublis)

1.	**Murrah male**	**26/47=0.55**
2.	**Murrah female**	**24/42=0.57**
3.	**Jaffrabadi male**	**23/41=0.56**
4.	**Surti-**	**29/51=0.56**
5.	**Surti (calf)**	**26/41=0.63**
6.	**Mehsana**	**29/54=0.53**
7.	**Bhadawari**	**28/52=0.53**
8.	**Bhadwari calf**	**29/56=0.51**
9.	**Niliravi**	**30/59=0.50**
10.	**Mehsana calf**	**28/53=0.52**

3.CAT (Felis Indicus)

1.	**Himalayan cat**	**29/52=0.55**
2.	**Black cat**	**29/45=0.64**
3.	**Brown cat**	**29/45=0.64**
4.	**White cat**	**23/41=0.56**
5.	**Tobby cat**	**21/33=0.63**
6.	**Tobby grey**	**28/37=0.75**
7.	**Eura blue**	**21/32=0.65**
8.	**Bengal cat**	**31/41=0.75**
9.	**Siberain cat**	**21/32=0.65**
10.	**Muddy yellow**	**22/36=0.61**

4. COW (Bos taurus)

1.	**Jersey**	**29/41=0.70**
2.	**Rathi**	**23/36=0.63**
3.	**Rathi calf**	**15/26=0.57**
4.	**Nagori**	**29/42=0.69**
5.	**Nagori calf**	**25/41=0.60**
6.	**Sahiwal**	**28/42=0.66**
7.	**Sahiwal calf**	**25/38=0.65**
8.	**Sindhi**	**26/33=0.78**
9.	**Sindhi calf-**	**21/29=0.72**
10.	**Badri**	**26/35=0.74**

Discussion

Microscopic analysis of some animal hair was performed and the preliminary data obtained in this study provide valuable information for specific identification of animal hair.We have concluded that the provide a useful tool for the forensic identification of the examined species .This method is rapid and low cost , specific identification can be performed on the hair because its structure is generally very regular and all parts (cuticle, cortex and medulla) are easily detectable. In this study the medullary pattern medulla diameter of cow ranges between 0.52-0.78, buffalo 0.532-0.78 and dog 0.542-0.75, cat 0.52-0.78. There may be similarity between different animal hair in terms of their medullary index, then they can be differentiate on the basis of the morphological characterstics or other like scale pattern,color, shaft,cuticle pattern ,DNA analysis can also be examined for accurate animal species identification.

References

1. Boehme A, Brooks E, Mc naught I, Robertson J (2009). The persistence of animal hairs in a forensic context. Australian Journal of Forensic Sciences 41: 99-112.
2. Bisbing, R.E. (2001). Finding traces evidence. Trace evidence analysis. Houck, Max, (Edn) academic press, San Diego, California.
3. Bruner, H. (1974). The identification of mammalian hair. Hair atlases 176.
4. Crocker, E.J. (1998). A new technique for the rapid simultaneous examination of medullae and cuticular patterns of hairs. Microscope 46: 169-173.
5. Crocker, J.E. (1999). Trace evidence in forensic evidence in Canada, (2nd Edn). Canadian law books Inc, aurora, ON.
6. Deed rick, K. (2004). Microscopy of hair. A practical guide and manual for animal hair 595-620.
7. Derrick, D.W. & Sandra, L.K. (2004). Microscopy of Hair Part II: A Practical Guide and manual for Animal Hairs.

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