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The Key Role of Copper Supplementation in The Case of Leukoderma in Buffaloes

Ajeet Kumar[1]*, Namrata[2], Aditya Kumar[3], Raushan Kumar Sharma[4] and Akriti Rani[5]

[1]Department of Veterinary Pathology, Bihar Veterinary College, BASU, Patna
[2]Department of Veterinary Medicine, Bihar Veterinary College, BASU, Patna
[3]Department of Veterinary Parasitology, Bihar Veterinary College, BASU, Patna
[4]Department of Veterinary Surgery and Radiology, Bihar Veterinary College, BASU, Patna
[5]Intern student Bihar Veterinary College, BASU, Patna

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Introduction

A dermatological illness called leukoderma, sometimes called vitiligo, is characterized by the loss of skin pigmentation, which makes white patches develop on the skin. Buffaloes are among the species that can be affected by this illness, even though it is most frequently seen in people. Most often, injury to melanocytes in the epidermal layer of skin and then in the follicular reservoir, which houses the majority of the melanocytic stem cells, is the initial step towards hypomelanosis. Buffaloes with leukoderma may experience serious consequences to their production, well-being, and general health. Because of the high expense of treatment, the unsightly appearance of the animals, the challenges in commercializing them, and—most importantly—the reduction in the amount of leather that can be produced, these diseases cause the producing sector to suffer large financial losses.

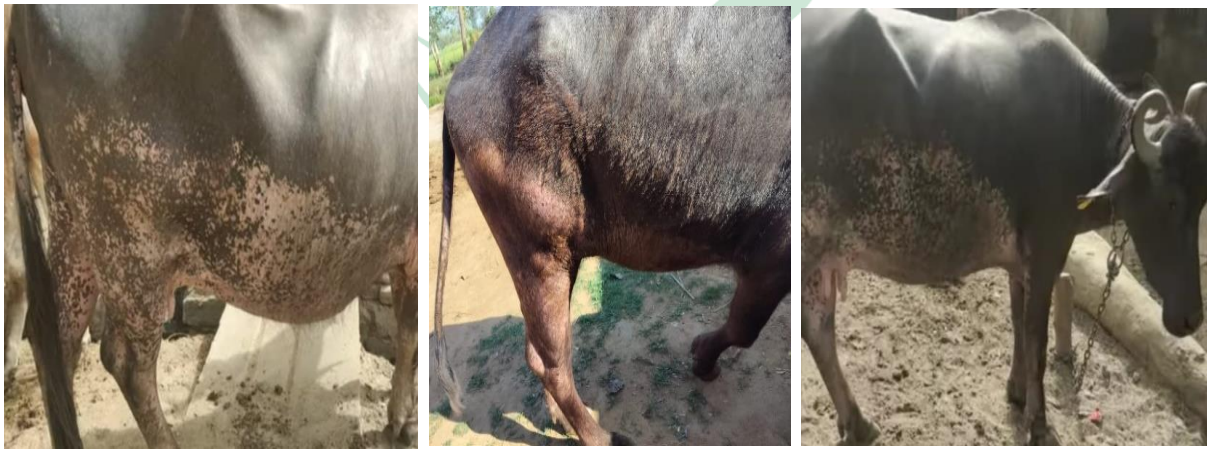

Fig. Widespread whitish patches on most part of the body of leukoderma affected buffaloes

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Why Is the Illness Present?

Leukoderma may be caused by an environmental assault, an inflammatory reaction in which the immune system destroys melanocytes (An autoimmune response), an inherited propensity, or a copper deficit. Melanocyte changes lead to the loss of normal skin and hair pigmentation, which causes leukoderma, a multifactorial illness affecting buffaloes tegumentary system.

How is the Illness Spreading?

Lack of melanocytes, melanocytes' inability to produce melanin, or melanin's inability to reach epidermal cell are the case of the leukoderma.it can also be acquired by depigmentation, which is the loss of melanocytes or existing melanin. Achromotrichia and leukoderma in copper shortage are caused by a decrease in tyrosinase activity, which breaks down the conversion of tyrosine to melanin. This is the precise process underlying skin depigmentation.

What is the appearance of the illness?

Vitiligo is characterized by hypopigmented or depigmented areas usually sharply demarcated and often symmetric.in buffaloes depigmentation usually start in the region of brisket and may extend to lower abdomen, neck, posterior part of body (genitalia, udder, legs), muzzle. Cupper deficiency may lead to anoestrus, decrease productivity, congenital disease, weakness, anaemia, immune compromise, osteoporosis (leads to lameness).

Which therapeutic plan is suggested for the buffaloes with leukoderma?

1. Copper glycinate @ 120 mg/adult animals s/c in brisket region don't repeat within 90 days.

   and @ 60 mg/calf s/c in brisket region don't repeat within 90 days.

   Ex- Curan H
2. Copper sulphate powder @ 4 gm weekly for 3-5 weeks by oral route (calf of age 2-4 months)

   and @ 8-10 gm weekly for 3-5 weeks by oral route (adult animals)
3. Mineral mixture @ 50gm orally daily

The Possible Preventive Strategies

The management of leukoderma in buffaloes is heavily dependent on preventive measures. Sunburn risk can be reduced and depigmented areas can be kept from getting worse

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by offering sufficient shade and shelter from direct sunshine. Keeping the buffalo herd's surroundings tidy and sanitary might also lessen the chance of problems or subsequent infections. Provide adequate amount of mineral mixture is one of the most important preventive strategies.

Conclusion

It is thought that a malfunction in the metabolism of the copper-ion-dependent enzyme tyrosinase is directly responsible for the emergence of skin and hair depigmentation, although the precise origin of the condition is not entirely understood. Tyrosinase is the primary enzyme responsible for skin pigmentation; a decrease in copper conversion in its active site hinders the creation of melanin. Therefore, the absorption of copper, which primarily occurs in its bivalent form in the small intestine, might vary depending on the dietary sources of this micronutrient or the presence of antagonistic elements in the animal's diet, which can lead to the development of leukoderma. Therefore, farmers that deal with this issue should use continual mineralization of buffalo herds as a preventive management approach.

References:

Barbosa J. D., Possidonio B. I. O., Dos Santos J. B., Oliveira H. G. D. S., Sousa A. I. J., Barbosa C. C., Beuttemmuller E. A., Silveira N. D. S. E. S., Brito, M. F. and Salvarani F. M. (2023). Leucoderma in Buffaloes (*Bubalus bubalis*) in the Amazon Biome. *Animals: an open access journal from MDPI*, **13(10):** 1665.

Singh R., Randhawa S.S. Copper Responsive Leucoderma in Buffaloes. *Ind. J. Anim. Sci.* 2011,**78:**116–118.