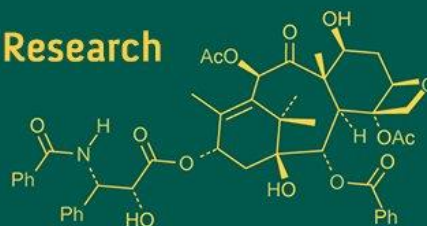
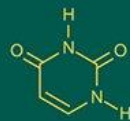
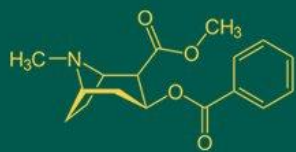


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Dermatophytosis in bovine calves: A comparative case report

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Abstract

Dermatophytosis is a contagious superficial mycotic infection of keratinized tissue commonly reported in young calves with significant zoonotic potential. Lesions are characterized by scaly focal alopecic patches with raised grey to white crust. The present report describes the occurrence of dermatophytosis in two 4 months-old bovine calves of different breeds housed together under similar environmental condition. Both the calves exhibited a well demarcated focal alopecic patches with scaly raised grey to white crust over the forehead, ears and peri-ocular region. Normal feed intake and upon clinical examination, all the physiological parameters were within the normal range.

Skin scrapping and hair samples from the active skin lesions were taken and inoculated in Sabouraud Dextrose Agar (SDA) for cultural examination. Fungal culture revealed characteristics colony morphology suggestive of *Trichophyton* spp. Based on clinical examination and fungal culture, both the cases were diagnosed as dermatophytosis caused by *Trichophyton* Spp. Lakhimi Calf responded well to the herbal (Tee-burb @1 capsule twice daily) and supportive therapy whereas the Gir calf required additional systemic antifungal treatment (fluconazole @ 5 mg/kg Bwt, PO) for complete recovery. The difference in therapeutic response may be attributed to the breed susceptibility and depth of antifungal invasion. This case report highlights the importance of early diagnosis and appropriate antifungal along with managemental practices in controlling dermatophytosis in ruminants and to reduce the zoonotic implications. Both the calves exhibited a marked improvement by the end of 14 days of treatment.

Keywords: Dermatophytosis, sabouraud dextrose agar (SDA), keratinized tissue

Introduction

Dermatophytosis is a highly contagious superficial fungal infection of keratinized tissue. Dermatophytes are mainly classified into asexual or imperfect genera (*Trichophyton*, *Microsporum* and *Epidermophyton*). Certain genera have zoonotic potential and poses great public health concern. Fungi that are capable of reproducing sexually are classified into teleomorphic genera (arthoderma). In cattle, among all the fungal isolates, *Trichophyton verrucosum* is frequently isolated followed by trichophyton mentagrophytes (Agnetti *et al*, 2014, Dalis *et al.*, 2019). Prevalence of *Trichophyton verrucosum* is same as that of intensive and semi-intensive rearing system (Papini *et al.*, 2009). Winter season is more favourable for dermatophytes infection. Calves are more prone to dermatophytes infection than the adult probably due to non-acidic environment of the skin which favours fungal growth (Arora *et al.*, 1979). Environmental stress, prolonged wetting of the skin, rearing pattern, dietary factors act as a predisposing factor for dermatophytosis (Moretti *et al.*, 1998). No sex predilection was reported. Lesions appear as focal alopecic patches with scaly, raised, grey to white demarcating areas. In calves, lesions mainly appears in the forehead region whereas in adult cattle, lesions are either generalized or in the trunk region (Dalis *et al.*, 2019) [2, 5, 10, 4, 7].

Case history

Two 4 months-old bovine calves (Gir calf and Lakhimi calf) were presented with complaints of focal alopecic patches with raised grey to white crust in and around the forehead and in the periocular areas (fig.1, fig.2). Appetite was normal, stool and urine were also normal in appearance. Deworming was regular (2 weeks before appearance of clinical signs). Calves were recently introduced into the same shed and maintain under similar managemental condition.

Clinical Examination and Investigation

Physical examination revealed well demarcated circular alopecic patches with scaly raised grey to white crust over the forehead, periocular areas and in the ears in both the calves. Ocular mucous membranes were normal (pink) in appearance, all physiological parameters including respiratory rate, heart rate and rectal temperature were within the normal range. Stool and urine were normal in colour and consistency.

Haemato- biochemical examination of both the calves revealed normal findings (Table.1 and Table. 2), which is consistent with the superficial nature of dermatophytes infection.

Skin scrapping material and hair plugs collected from the peripheral active margins of the lesions following standard aseptic procedure. The affected areas were first gently cleaned with 70% ethanol to remove the surface contaminants. Using a sterile scalpel blade, deep skin scraping were taken until there was slight oozing of blood along with that broken hairs and scaly crust were collected using a sterile forceps. The collected samples put into a sterile dry petri dish and were processed for fungal cultural examination. The samples were inoculated onto Sabouraud dextrose agar (SDA) and incubated at room temperature for upto 2 weeks. The fungal colonies obtained were examined microscopically by staining with lactophenol cotton blue which revealed septate hyphae and macroconidia suggestive of *Trichophyton spp.* (fig.3)

Diagnosis

Based on integration of clinical (discrete focal alopecic patches with scaly raised grey to white crust) and fungal culture examination (septate hyphae with numerous macroconidia), both cases were diagnosed as *Trichophyton spp* associated dermatophytosis.

Treatment and discussion

Calves were treated with tee-burb capsule twice daily orally for 10 days and Strepto-penicillin injection (Dicrysticin-S-2.5 g) for 5 days intramuscularly along with other supportive medications like vitamin A, D3 and E (Vitacept injection) intramuscularly for 5 days. Owner was advised to regularly dressed the affected lesions with povidone iodine solution (Betadine solution). The Lakhimi calf responded well to the therapeutics and showed a marked improvement of the affected lesions. But the Gir calf did not show a comparable clinical response during the same treatment. The Gir calf was treated additionally with fluconazole tablet (Zocon -200 mg, @ 5 mg/kg Bwt, PO) once daily orally for 14 days and showed a significant improvement (Fig.4). This might be due to deeper follicular involvement of the mycotic infection in the Gir calf. Tee-burb capsule is a polyherbal formulation known for immunomodulatory, antifungal and skin healing properties. In dermatophytosis, immunity plays a crucial role and the use of herbal adjuncts may help in reducing skin lesions (Pandey and Madhuri,2010) ^[11]. The favourable outcome in case of lakhimi calf suggestive of that mild to moderate superficial fungal infection may respond well to

oral polyherbal formulation combined with topical antiseptics. Strepto-penicillin (Dicrysticin S) was administrated to prevent secondary bacterial invasion as the fungal infection leads to disruption of skin barrier (Scott *et al.*, 2001). Fluconazole was administrated orally to the Gir calf due to unfavourable response to initial therapy. Fluconazole inhibits the ergosterol synthesis which is an essential component of fungal cell wall, thus inhibiting fungal growth and multiplication (Gupta and Cooper,2008). It has good oral bioavailability and effective in treating deeper or persistent dermatophytic infections (Moriello,2014). Although, specific breed susceptibility to dermatophytosis in Gir and lakhimi cattle has not been studied extensively but crossbred cattle have a significant higher prevalence of dermatophytosis compared to local indigenous cattle breed. Local breeds of cattle have a frequent exposure to the local dermatophyte strains and are better adapted and might develop a stronger innate immunity (Dalis *et al.*, 2019). Also, indigenous cattle breed has been reported to exhibit a difference in innate and adaptive immune response trait compared to crossbred cattle (Verma *et al.*,2017).

Calves are more susceptible due to incomplete development of cell mediated immunity (Abd Elmegeed *et al.* 2020), moisture and high humid condition and poor hygienic conditions in the farm predisposed to infection (Al khikani *et al.*, 2000). Winter season, lesser sunlight exposure, contaminated fomites act as major factors for mycotic infection (Singh *et al.*, 2025, Sisti *et al.*, 2014). *Trichophyton verucosum* is a major zoophilic dermatophyte with significant zoonotic potential. Animal handlers, farm workers and veterinarians are at increased risk of infection. Strict hygienic and protective measures are to be taken to prevent the occupational exposure (Shihab *et al.*, 2025, Agnetti *et al.*, 2014, Wabacha *et al.*,1998). Dermatophytosis in cattle is self limiting in nature typically resolve in 1-3 months of age (Radostits *et al.*, 2007, Peek *et al.*, 2017, Moriello, 2025) but proper therapeutic intervention reduces the exposure and duration of infections and economic losses ^[11, 15, 6, 8, 5, 18, 1, 16, 17, 14, 2, 19, 13, 9].

Statements and Declarations

- **Consent to Publish:** The authors took necessary consent from the owner of the animal for publication of the clinical details, images included in this manuscript
- **Conflict of Interest:** The authors declare no conflict of interest.
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- **Ethical approval:** Appropriate procedure and institutional animal ethics regulation was followed while carrying out the treatment.

Table 1: Haematological parameters

Parameters	Values (Lakhimi calf)	Values (Gir calf)	Reference Range	Interpretation
RBC (million/mm ³)	6.8	6.5	5.0-10.0	Normal
PCV/HCT (%)	34	32	24-46	
Haemoglobin (g/dl)	11.2	10.8	8-15	

Thrombocytes (m/mm ³)	400	380	100-800	
MCH (pg)	23.0	22.8	11-17	
MCHC (cells/mm ³)	33.5	33.1	30-36	
MCV (fL)	72	70	40-60	
Neutrophils (%)	36	38	15-33	
Lymphocytes (%)	58	55	45-75	
Monocytes (%)	3	4	0-8	

2016: Hematologic reference ranges, 11th edn. The Merck Veterinary Manual

Table 2: Biochemical parameters

Parameters	Values (Lakhimi calf)	Values (Gir calf)	Reference Range	Interpretation
SGPT/ALT (U/L)	30	32	10-109	Normal
SGOT/AST (U/L)	72	78	60-125	
Total Bilirubin (mg/dL)	0.17	0.20	0-1.6	
BUN (mg/dL)	16	18	10-25	
Creatinine (mg/dL)	1.0	1.1	0.5-2.2	
Total protein (g/dL)	7.2	6.9	6.7-7.5	
Albumin (g/dL)	3.6	3.4	2.5-3.8	
Globulin (g/dL)	3.6	3.5	3.0-3.5	

2016: Hematologic reference ranges, 11th edn. The Merck Veterinary Manual



Fig 1: Focal alopecic patches with raised grey to white crust over the forehead of the Lakhimi calf, **Fig 2:** Well demarcated raised white scaly alopecic crust over the forehead, periocular areas and in the ears of the Gir calf



Fig 3: Microscopic photograph showing septate hyphae with numerous macroconidia suggestive of Trichophyton spp. (200x, Lactophenol Cotton Blue staining)



Fig 4: Complete resolution of the discrete alopecic scaly white crust over the forehead, periocular lesion and in the ears

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