Comparative evaluation of the efficacy of some topical herbal formulations in the management of mange and dermatophytosis in cattle

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Abstract
Mange and dermatophytosis are common veterinary problems of cattle in most parts of the world. Topical formulations based on essential-oils of plant origin form an important component of traditional and contemporary therapies for these diseases. These agents relax the requirements for protracted differential diagnosis and also tackle mixed infections successfully. A clinical trial was undertaken to compare the efficacy of some topical essential-oil based formulations in clinical cases of mange and fungal dermatitis in cattle. 24 cattle suffering from these diseases were assigned to either of three (03) equal groups. Group T1 received treatment with AV/CPS/23 spray (M/s Ayurvet Ltd., India); Group T2 with competitor Brand A; and Group T3 with competitor Brand B. The response of the animals to the treatment was evaluated using an efficacy index based on the proportion of animals cured within each group and the severity of the cases successfully cured. Amongst treatments, AV/CPS/23 spray was found to be most effective for the management of mange and fungal dermatitis in cattle.

Keywords: mange, dermatophytosis, dermatitis, topical, veterinary, essential-oil

Introduction
Dermatophytosis, the fungal invasion of the superficial keratinized layers of the skin and its appendages viz. hair, nails, horns, is a frustrating and common problem in veterinary practice that occurs worldwide and affects all species of animals (Hamid, 2016) [5]. The disease is zoonotic in nature and affected animals are highly infectious to other animals and humans (Esch et al., 2014) [2]. Cattle are commonly affected but unlike humans, topical therapy is preferred over systemic antifungal therapy. The differential diagnosis includes mange, most commonly caused by the mite Sarcoptes scabei. Like dermatophytosis, mange is also a very common veterinary problem of zoonotic significance and occurs worldwide in all species, including cattle. Though both of these conditions can present as patchy dermatitis in the face, head or neck region with crusts and scabs, the conventional treatments for the two conditions take very different courses. Microscopy of skin scrapings for differential diagnosis between the two conditions (Hamid, 2016) [5] is relatively easy but is often impracticable for field veterinarians. Mixed infections with both of these agents are also not uncommon.

Essential oils are known to bear promising activity against a range of skin pathogens. Many essential oils have been used traditionally, forming important materia medica in the treatment of dermatophytosis and scabies. Several of these oils of plant origin, such as those of garlic, cinnamon, eucalyptus, neem, and clove, have been validated for their efficacy using contemporary methods (Baptista et al., 2015; Fang et al., 2016; Orchard et al., 2019) [1, 3, 8]. Many commercial preparations based on this class of plant-derived agents have also been shown to be very effective in vitro and in vivo against S. scabei and different fungi that commonly cause affections of the skin in various species of animals (Sharma et al., 1995; Silver and McGill, 1998) [10, 11]. Here, we report the findings of a clinical trial undertaken to compare the efficacy of some essential oil-based topical formulations in clinical cases of mange and dermatophytosis in cattle.

Materials and Methods
The trial was held from July, 2018 to June, 2019 in the Indian state of Uttarakhand at State Veterinary Hospital, Dwarahat, District Almora; State Veterinary Hospital, Rameshwarpur, District Udham Singh Nagar; and State Veterinary Hospital, Sadar Bageshwar, District Bageshwar. 24 cattle of either sex, aging 5 months to 8 years, presenting to the clinics with...
complaint of pruritus, alopecia, flaky skin, patchy dermatitis, etc., were recruited in the study and randomly assigned to either of three equal groups. Group T1 received treatment with AV/CPS/23 spray (M/s Ayurvet Ltd., India); Group T2 with popular competitor Brand A; and Group T3 with popular competitor Brand B. In each case, the overlying hair were clipped, the affected area was cleaned and the spray was applied generously. The spray was applied twice daily till recovery or till discontinuation of therapy due to non-recovery. Non-recovering cases were treated with ivermectin (Gill et al., 1989; Kirmizigül et al., 2012) \(^{[4,6]}\) systemically as per standard clinical procedures.

Before initiation of treatment, the lesions were graded by the attending clinician on an ordinal scale of 1-10 as per the severity of the clinical presentation of the case (area of the lesions, alopecia, redness, exudation, presence and characteristics of crusts and scabs, etc.), with 10 being the most severe. An efficacy index proposed by us previously (Tiwari et al., 2020) \(^{[13]}\) was used for comparing the efficacies of the treatments.

### Results and Discussion

Although quantitative estimates are not available, it is well accepted that both scabies and dermatophytosis cause substantial economic harm to cattle on account of poor feeding, loss of body and coat condition, loss of milk yield, depreciation of hide quality, and treatment costs (Mousa and Eman-abdeen, 2018) \(^{[7]}\). Effective and easy-to-administer point-of-care topical formulations that preclude withholding of the animals’ produce are much needed for these conditions in veterinary practice. In the present study, three topical herbal preparations were compared for their efficacy in the management of mange and dermatophytosis in cattle. The group-wise severity of cases at their first presentation, the respective responses to the treatments and the calculated efficacy indices are summarized in Table 1.

### Competing Interests

M/s Ayurvet Limited, India, intends to manufacture AV/CPS/23 commercially. KR and BG are employees of M/s Ayurvet Limited, India. However, the nature of this affiliation did not influence the outcomes of the study in any manner.

### References

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