



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2022; SP-11(11): 2018-2020  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 21-09-2022  
Accepted: 25-10-2022

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## Clinico-hemato-biochemical findings and therapeutic management of MEHSANA goat's infested with scabies

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### Abstract

Fifteen goats out of twenty one screened, diagnosed to be suffering from scabies were subjected to clinico-hemato-biochemical analysis and therapeutic management. The examination of skin scraping revealed the presence of *Sarcoptes scabiei* mite. Clinical manifestations recorded were itching, alopecia and crust formation at the ventral aspect of abdomen and distal part of hind limbs. Hematological alterations recorded were anemia and increased TLC with eosinophilia. Therapy was initiated with ivermectin @ 0.2 mg/kg b.wt subcutaneously at weekly intervals until recovery along with supportive antihistaminic and multivitamin preparation for 5 days and, hematinic preparation for 15 days. Clinical recovery was noticed on 15<sup>th</sup> day with improvement in skin lesions. Improvement in altered haemato-biochemical parameters after treatment was recorded, signifying the favorable response to the therapy.

**Keywords:** Clinico-hemato-biochemical, goats, ivermectin, *Sarcoptes scabiei*

### Introduction

Goats play a significant role in socio-economic development of rural people in developing country like India. Ectoparasite infestation imposes severe economic constraints on goat production across the world (De and Dey, 2010) [1]. Amongst the ectoparasites, mange infestation caused by *Sarcoptes scabiei* (*S. scabiei*) is a contagious and widespread acarosis of animals responsible for significant economic losses in terms of growth retardation, reduced weight gain, damage to the skin and hides, treatment cost and mortality (Rahbari *et al.*, 2009) [2]. Poor husbandry practices followed in rearing the animals act as one of the predisposing factors for occurrence of sarcoptic mange in animals (Rahbari *et al.*, 2009) [2]. Mite is transmitted through direct contact or through fomites. Mite infestation is clinically manifested as intense pruritus, over the face, ear pinnae, neck, limbs, or whole body evident as papules, crusts, excoriations, alopecia, lichenification, thickening and hyperpigmentation of the skin. Death is noticed in the final stage of the disease owing to anorexia, emaciation and lethargy (Smith and Sherman, 2022) [3]. Goats play a pivotal role in the economy of the poor farmers of Banaskantha region. The present communication discusses the clinico-haemato-biochemical parameters associated with *S. scabiei* infestation in goats and its therapeutic management.

### Materials and Methods

#### Animal selection criteria

Twenty one goats, aged about 3-4 years weighing around 15-20 kg was presented to Teaching Veterinary Clinical Complex (TVCC), College of Veterinary and Animal Science, K.U. (Gujarat) with the history of itching and alopecia all over the body over a period of 15 days. These goats were screened for the presence of *S. scabiei* mites. History was taken regarding the husbandry practices followed by the owner in rearing the goats. Fifteen goats found positive for *S. scabiei* were considered as diseased group (group I), whereas, six goats found negative for any ectoparasite were used as healthy control group (group II).

#### Diagnosis

Diagnosis for *S. scabiei* was performed as described by Soulsby (2005) [4]. In brief, clipping of the hairs was done and then the lesion was scraped until capillary bleeding was evident. The collected scraping material was then treated with 10% potassium hydroxide solution for dissolution of hairs and epidermal scales. The digested material was then centrifuged and microscopic examination of sediment was done under 10x and 40x objectives for the presence

of mites. Morphological identification of the mite was confirmed as described by Wall and Shearer (2001) [5].

### Haemato-biochemical examination

Approximately, 3 ml of blood samples were obtained from jugular vein in vacutainer containing EDTA as an anticoagulant. Blood samples were collected from the confirmed cases of mange infested goats on day 0 (before therapy) and on day 15 (after therapy) and, only on day 0 from healthy control group. Haematological analysis was performed using automatic veterinary hematology analyzer (Exigo haematology analyzer, Boule Medical AB, Sweden) and biochemical examination involved estimation of total protein and albumin using ready to use test kits through biochemical analyzer (RANDOX-RX Monaco, United Kingdom).

### Treatment Protocol

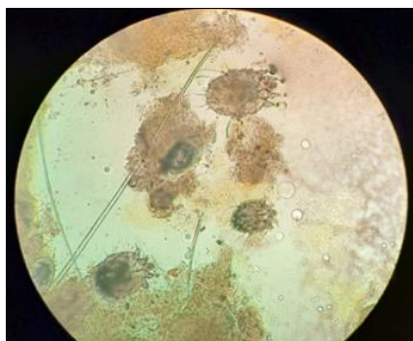
The diseased goats were treated with Inj. Ivermectin @ 0.2 mg/kg SC at weekly intervals along with Inj. Chlorpheniramine maleate @ 0.25 mg/kg IM and Inj. Vetade @ 2 ml IM (Inj. Vitamin A, D<sub>3</sub> and E) for 5 days. Haematinic preparation @ 5 ml for 15 days was advised to be administered once daily orally for 15 days.

### Statistical analysis

For statistical analysis, the data were tabulated and the mean values of the control and diseased groups were compared using independent-samples T test (Snedecor and Cochran, 1994) [6].

### Results and Discussion

Microscopic examination of skin scrapings revealed presence of *S. scabiei* mites having characteristic features such as rounded mouth part, short posterior legs, empodial claws and pulvillus on first 2 pairs of legs and transverse ridges on dorsal surface of the body (Fig. 1) (Wall and Shearer, 2001) [5]. Sarcoptic mange is an economically devastating parasitic infestation and its management is important in goat rearing countries for profitable goat farming (Jadhav *et al.*, 2020) [7]. Detailed examination the affected areas were found to be superficially excoriated along with itching, alopecia, scratching and pruritis in the affected animals. The lesions were predominant on ventral aspect of the abdomen and hind limbs (Fig. 2). Itching, focal to generalized alopecia, scratching, pruritis and, thickened and wrinkled skin with scabs and crust formation observed in affected goats in the present study were similar to those reported by Constable *et al.* (2017) [8]. History revealed poor husbandry practices followed by the owner including overcrowding and unhygienic conditions.



**Fig 1:** *Sarcoptes scabiei* mite in goat



**Fig 2:** Thickening of skin, alopecia, lichenification and alopecia in affected a goat

Overcrowding and unhygienic conditions of farms predisposed the goats in the present study to mange, which is in harmony with the findings of Giadinis *et al.* (2011) [9]. Detailed clinical examination of the diseased goats recorded normal body temperature ( $101.15 \pm 0.20^{\circ}$  F), tachycardia ( $102.20 \pm 0.35$  bpm), tachypnea ( $37.76 \pm 0.11$ /min) and pale conjunctival mucus membrane in affected goats which is in agreement with Jadhav *et al.* (2020) [7].

Decrease of cellular contents in the blood after mite infestation leads to decrease in Hb, TEC and PCV concentration, the recorded hematological alterations (Table 1) in the present study are in allignment with Hafeez *et al.* (2007) [10] and Sengupta *et al.* (2008) [11]. The leucocytosis observed is attributed to disruption of skin barrier in the affected animal due to mite infestation which further allows penetration of microorganisms eliciting the production of leucocytes (Adejimi *et al.*, 2000) [12]. Eosinophilia exhibited in the present study by the goats is probably due to allergic reaction caused by the mite allergens causing the immune system to become reactive. Almost, similar alterations in the studied biochemical parameters have also been reported from mite infested goat attributed to compromised organ functions (Kumar *et al.*, 2016) [13].

**Table 1:** Mean values (+SE) of haemato-biochemical parameters in diseased goats (n=15) (pre- and post-treatment) and healthy control group goats (n=6)

Parameters	Healthy Control (n=6)	Diseased Goats (n=15)	
		Before treatment (Day 0)	After treatment (Day 15)
Hb (g/dl)	11.01±0.10 <sup>a</sup>	7.04±0.70 <sup>b</sup>	10.02±0.10 <sup>c</sup>
TEC ( $\times 10^6/\mu\text{l}$ )	8.78±0.16 <sup>a</sup>	6.80±0.90 <sup>b</sup>	8.00±0.08 <sup>c</sup>
TLC ( $\times 10^3/\mu\text{l}$ )	8.93±0.17 <sup>a</sup>	12.00±0.12 <sup>b</sup>	9.01±0.50 <sup>c</sup>
PCV (%)	35.01±0.12 <sup>a</sup>	24.01±0.09 <sup>b</sup>	31.76±0.12 <sup>c</sup>
Lymphocytes (%)	61.65±0.05 <sup>a</sup>	70.69±0.16 <sup>b</sup>	65.94±0.15 <sup>c</sup>
Monocytes (%)	1.25±0.00 <sup>a</sup>	0.50±0.03 <sup>b</sup>	0.90±0.03 <sup>c</sup>
Neutrophils (%)	29.50±0.07 <sup>a</sup>	20.00±0.08 <sup>b</sup>	25.24±0.07 <sup>c</sup>
Eosinophils (%)	7.00±0.11 <sup>a</sup>	8.50±0.05 <sup>b</sup>	7.50±0.05 <sup>c</sup>
Basophils (%)	0.60±0.03 <sup>a</sup>	0.31±0.03 <sup>b</sup>	0.42±0.03 <sup>c</sup>
Total protein (gm/dl)	8.36±0.13 <sup>a</sup>	6.41±0.06 <sup>b</sup>	7.40±0.05 <sup>c</sup>
Albumin (gm/dl)	3.64±0.08 <sup>a</sup>	2.51±0.05 <sup>b</sup>	3.15±0.10 <sup>c</sup>

Mean bearing different superscripts differ from each other significantly ( $p < 0.01$ )

In the present study, resolution of clinical signs such as regeneration of hairs, reduction in intensity of itching and disappearance of scabs was noticed 15 days post-treatment which is in agreement with the findings of Parmar and Chandra (2018) [15] and Jadhav *et al.* (2020) [7]. Also, improvement in haemato-biochemical findings post treatment

was observed in the present study (Table 1). Ivermectin produces parasite paralysis by ingestion or contact and eventually death of the invertebrate and several sub lethal metabolic disorders Reports on therapeutic management of sarcoptic mange in goats with parenteral ivermectin administration dates long back demonstrating its successful application in reducing the level of infection of *S. scabiei* in goats (Manurung *et al.*, 1990) <sup>[14]</sup>. Supportive therapy provided relieved the intensity of presenting symptoms and distress relative to mange infestation and, hastened healing. The present investigation had put light on clinico-hemato-biochemical and therapeutic management of sarcoptes with ivermectin infested goats with requirement of further research with more sample size.

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