



Therapeutic Efficacy of Fresh Leaves of *Cynodon dactylon* For Sole Affections in Goat

Akshay M Shinde, Ratnakar V Raulkar*, Milind G Thorat, Mahesh V Ingawale, Shivani S Tingase and Saurabh S Yeole

Department of Veterinary Surgery and Radiology, MAFSU, Nagpur/PGIVAS, Akola, India

*Corresponding Author: Ratnakar V Raulkar, Department of Veterinary Surgery and Radiology, MAFSU, Nagpur/PGIVAS, Akola, India.

DOI: 10.31080/ASVS.2022.04.0413

Received: April 25, 2022

Published: May 27, 2022

© All rights are reserved by Ratnakar V Raulkar., et al.

Abstract

Therapeutic efficacy of fresh leaves of *Cynodon dactylon* on various sole affections was studied in goat. The research study was conducted on twenty sole affected goats presented at Teaching Veterinary Clinical Complex and at different goat farms in and around Akola. Selected twenty goats were randomly divided into two equal groups viz. Group I (n = 10) was subjected to cleaning of hoof with 10% KMnO₄ solution and corrective hoof trimming. In group-II (n = 10) cleaning of hoof with 10% KMnO₄ solution, corrective hoof trimming and topical application of fine paste of *C. dactylon* fresh leaves was done. The overall prevalence of hoof affections was found to be 48%, with more than one hoof affected in most of the cases of lameness. Cleaning of hoof with 10 % KMnO₄ solution, corrective hoof trimming and topical application of fine paste of fresh leaves of *C. dactylon* was found effective for management of various hoof affections in goats as compared to cleaning of hoof with 10 % KMnO₄ solution and corrective hoof trimming.

Keywords: *Cynodon dactylon*; Leaves; Sole Affections; Goats

Introduction

Goat is a member of family Bovidae subfamily Caprinae, popularly known as "poor man's cow". Foot diseases is a major cause of lameness in small ruminants and is responsible for great economic losses. Goats which are predisposed to lameness gain less body weight. Lameness can be caused by a number of factors such as wet housing floor, unkempt and overgrown hoof, fracture and trauma, systemic and local microbial infection, inflammation of anatomical structures and glands [18]. Mostly, lameness arises from diseases and lesions of hooves viz. overgrown hoof, punctured sole, cracked hoof, sole wear, sole ulcer, white line abscess, solar hemorrhages, fissured hoof and foot rot. The site and depth of injuries determine the extent of structural damage [26;10]. The hoof is a complex structure that plays a key role in many aspects of the animal's overall health and productivity. So trimming of goat hooves, foot bath, good feeding practices and maintenance of shed hygiene play vital roles in preventing painful hoof overgrowth and

many problems [3,9,16]. *C. dactylon*, known as Bermuda grass, Dhoob, durva grass, Harali, dog's tooth grass, Indian doab, and wiregrass, belonging to family Poaceae, is a grass found worldwide. Alcoholic extracts of *C. dactylon* (roots, leaves and seeds) have been found to possess antiulcer [21] analgesic and anti-pyretic [12], antiviral [5], wound healing [12], antimicrobial [23], antibacterial and anticarcinogenic [15] properties. In view of the promising properties of *C. dactylon*, KMnO₄ solution, corrective hoof trimming, and considering the economic losses, welfare issue the study was undertaken in Maharashtra.

Material and Methods

The study was conducted on 100 clinical cases presented at the Teaching Veterinary Clinical Complex of the Institute and by visiting different goat farms, goat owners, and Veterinary Dispensaries. Information regarding age, sex, number of lactations, castration in bucks, floor pattern, and nutritional status was recorded by col-

lecting history from the concerned owner or/and caretaker. Out of these 100 clinical cases, 20 animals were selected for the present study which were randomly divided into two equal groups viz. Group I and Group II, each consisting of 10 animals. The goats were subjected to the cleaning of hooves with 10 % KMnO₄ solution and thorough examination was carried out for the presence of hoof affection before inclusion in the study. In Group I (n = 10), affected goats were subjected to Cleaning of Hoof with 10 % KMnO₄ solution and corrective hoof trimming. In Group II (n = 10) affected goats were treated by Cleaning of Hoof with 10 % KMnO₄ solution, corrective hoof trimming plus Topical application of fine paste of fresh leaves of *C. dactylon*. Clinico-physiological observations included rectal temperature, respiratory rate and heart rate. Hematological parameters included hemoglobin, packed cell volume, total erythrocyte count and total leukocyte count. Biochemical parameters studied were serum total proteins, serum calcium and serum phosphorus. All these parameters were recorded on 0th, 10th, 20th and 30th day and the changes observed were noted.

The lameness score was recorded by observing goats while walking on flat surface [4]. Extent of trauma was evaluated on the basis of classification of lesion severity [14]. Biometrical studies like hoof angle of right hind lateral claw were measured with the help of protractor [22]. Hoof length, toe length and hoof diagonal

of right hind lateral claw were measured using a slide caliper [13]. Radiological examination was carried out whenever necessary so as to detect the abnormalities of surrounding hard tissues of the phalanx.

Results and Discussion

In present study, out of these 100 goats, 48 goats (08 males and 40 females) were found to be affected with hoof affections. The overall prevalence of hoof affections was found to be 48%. Higher incidence was of sole erosion (27.08%), followed by hoof overgrowth (22.92%), Punctured sole (10.42%), Foreign body in sole (8.33%), sole ulcer (8.33%), sole abscess (6.25%), sole haemorrhages (4.17%), hoof abscess (2.08%), traumatic injury to hoof (2.08%). Other types of hoof affections (8.33%) were abaxial wall avulsion, bruised sole and horizontal crack. Hoof affections were more in mature goats than young goats, more in females (40 out of 48) than male (08 out of 48). These findings are in accordance with [07,17,19]. Most of the goats were either in second or third lactation. Castration has no effect on occurrence of hoof affection in male goats. Similar observations were recorded by [24]. Out of 48 clinical cases about 30 (62.5%) were reared on pakka floor pattern while 18 (37.55%) were kept on kaccha floor pattern. Out of 48 hoof affected goats, 20 (41.67%) were semi stall fed, 16 (33.33%) were free grazing and 12 (25%) were stall fed goats. Observed findings corroborates with [20,24].

| Clinico-physiological Parameters | Group | Interval (days) | | | |
|----------------------------------|----------|-----------------|------------------|------------------|------------------|
| | | 0 th | 10 th | 20 th | 30 th |
| Rectal temperature | Group I | 103.70 ± 0.30 | 103.32 ± 0.20 | 102.94 ± 0.12 | 102.68 ± 0.10 |
| | Group II | 104.01 ± 0.30 | 103.50 ± 0.19 | 102.97 ± 0.14 | 102.58 ± 0.19 |
| Respiration rate | Group I | 27.90 ± 1.85 | 27.30 ± 1.20 | 26.10 ± 0.97 | 25.20 ± 0.97 |
| | Group II | 27.60 ± 1.93 | 27.70 ± 1.33 | 26.70 ± 0.88 | 25.90 ± 1.10 |
| Heart rate | Group I | 74.90 ± 2.32 | 74.30 ± 1.48 | 73.50 ± 0.88 | 72.20 ± 0.62 |
| | Group II | 75.30 ± 2.30 | 74.40 ± 1.60 | 72.50 ± 0.77 | 71.50 ± 0.99 |

Table 1: Mean ± SE values of clinico-physiological parameters at different intervals.

Rectal temperature (°F), Respiration rate (breaths/min), Heart rate (beats/min).

The mean value of rectal temperature for group II was higher (on 0th day) 104.01 ± 0.30°F before treatment which decreased

to (on 30th day) 102.58 ± 0.19 °F after treatment. This increase in temperature before treatment might be due to generalized infection which decreased after treatment with topical application of fine paste of *C. dactylon* fresh leaves. Non-significant difference was found in respiratory and heart rates. Similar observations were recorded by [08; 09; 11]

| Haemato-biochemical parameters | Group | Interval (days) | | | |
|--|----------|-----------------|------------------|------------------|------------------|
| | | 0 th | 10 th | 20 th | 30 th |
| Haemoglobin(gm/dl) | Group I | 08.62 ± 0.43 | 08.80 ± 0.39 | 08.95 ± 0.36 | 09.07 ± 0.34 |
| | Group II | 08.74 ± 0.25 | 08.74 ± 0.25 | 08.96 ± 0.20 | 09.13 ± 0.17 |
| Packed cell volume (%) | Group I | 25.22 ± 1.48 | 25.50 ± 1.31 | 26.03 ± 1.10 | 26.51 ± 1.00 |
| | Group II | 24.27 ± 1.24 | 24.82 ± 1.18 | 25.46 ± 1.14 | 25.93 ± 1.22 |
| Total erythrocyte count (x 10 ⁶ /cu.mm) | Group I | 14.85 ± 0.54 | 14.86 ± 0.54 | 14.83 ± 0.51 | 14.294 ± 0.66 |
| | Group II | 14.27 ± 1.05 | 14.27 ± 1.05 | 14.28 ± 1.05 | 14.296 ± 1.05 |
| Total leukocyte count (x 10 ³ /cu.mm) | Group I | 16.66 ± 1.67 | 13.62 ± 0.72 | 12.90 ± 0.59 | 12.00 ± 0.45 |
| | Group II | 17.99 ± 1.60 | 16.22 ± 1.30 | 13.82 ± 0.85 | 12.05 ± 0.75 |
| Serum total proteins(g/dl) | Group I | 06.29 ± 0.05 | 06.31 ± 0.04 | 06.32 ± 0.03 | 06.33 ± 0.03 |
| | Group II | 06.31 ± 0.06 | 06.34 ± 0.05 | 06.35 ± 0.04 | 06.37 ± 0.03 |
| Serum calcium (mg/dl) | Group I | 09.80 ± 0.18 | 09.79 ± 0.19 | 09.74 ± 0.18 | 09.70 ± 0.18 |
| | Group II | 10.08 ± 0.26 | 10.10 ± 0.25 | 10.13 ± 0.25 | 10.14 ± 0.25 |
| Serum phosphorus (mg/dl) | Group I | 06.40 ± 0.19 | 06.38 ± 0.18 | 06.34 ± 0.19 | 06.39 ± 0.18 |
| | Group II | 06.21 ± 0.22 | 06.29 ± 0.21 | 06.25 ± 0.18 | 06.29 ± 0.21 |

Table 2: Mean ± SE of haemato-biochemical value at different intervals.

The mean values of hemoglobin, packed cell volume and total erythrocyte count, total leukocyte count total proteins, serum calcium and serum phosphorus were within normal physiological range. The present results are in correspondence with earlier reports [01; 06;24;25].

Lameness scores observed in different hoof and sole affections

Lameness was observed in 5 clinical cases. Two cases from group I suffered from traumatic injury to hoof and sole abscess. Lameness score observed in both the cases was 2. Three cases were from group II and suffered from foreign body in sole with lameness score as 3, sole abscess with lameness score as 3 and hoof abscess with lameness score as 2 respectively. In group II complete recovery from lameness was observed in all the 3 cases on 30th day while in group I complete recovery was not observed in both the cases on 30th day. In the present study, the recoveries from lesions were more in goats of Group II than Group I. It might be due to application of *C. dactylon* paste on hoof affections in group II indicating anti-inflammatory effect of *C. dactylon*.

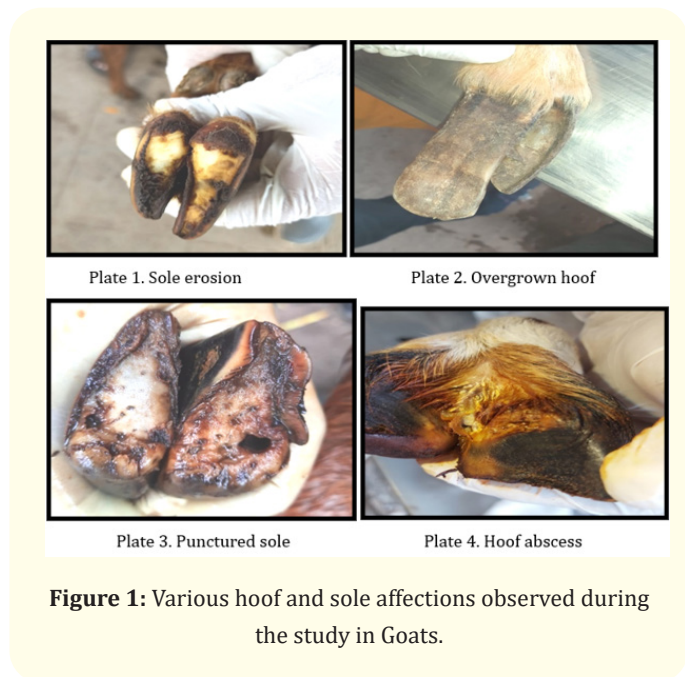


Figure 1: Various hoof and sole affections observed during the study in Goats.

| Group | Case No. | Hoof and sole affections | Severity of lesion | |
|-----------|----------|-------------------------------------|--|--|
| | | | Before treatment (0 th day) | After treatment (30 th day) |
| Group (I) | 1 | Traumatic injury to hoof | Moderate | Moderate |
| | 2 | Sole abscess | Severe | Severe |
| | 3 | Sole erosion+ hoof over-growth | Moderate | Moderate |
| | 4 | Sole erosion | Moderate | Moderate |
| | 5 | Punctured sole | Mild | Mild |
| | 6 | Sole ulcer | Moderate | Moderate |
| | 7 | Sole erosion | Moderate | Moderate |
| | 8 | Foreign body in sole + sole erosion | Moderate | Moderate |
| | 9 | Punctured sole + hoof overgrowth | Moderate | Moderate |
| | 10 | Sole erosion | Mild | Mild |

| Group | Case no. | Hoof and sole affections | Severity of lesion | |
|------------|----------|--|--|--|
| | | | Before treatment (0 th day) | After treatment (30 th day) |
| Group (II) | 1 | Foreign body in sole + sole haemorrhages | Severe | Recovered |
| | 2 | Sole abscess | Severe | Recovered |
| | 3 | Punctured sole + foreign body in sole | Moderate | Recovered |
| | 4 | Hoof abscess | Severe | Mild |
| | 5 | Sole erosion | Moderate | Mild |
| | 6 | Sole haemorrhages + hoof overgrowth | Moderate | Recovered |
| | 7 | Punctured Sole | Mild | Recovered |
| | 8 | Sole erosion | Moderate | Mild |
| | 9 | Sole ulcer + sole erosion | Moderate | Moderate |
| | 10 | Sole abscess | Moderate | Mild |

Table 3: Severity of lesions and hoof and sole affections before and after treatment in Goats.

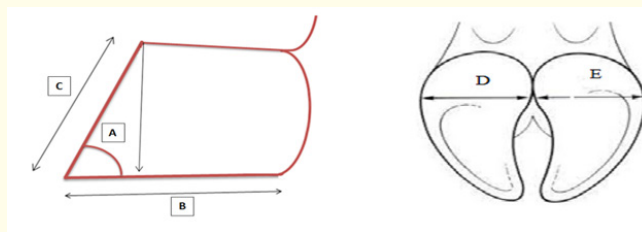


Figure 2: Different biometrical measurements of hoof.

A-Hoof angle; B- Hoof length; C- Toe length; D- Hoof diagonal

| Sr.No. | Hoof affection | Hoof angle (°) | Hoof length (cm) | Toe length (cm) | Hoof diagonal (cm) |
|--------|-----------------|----------------|------------------|-----------------|--------------------|
| 1 | Sole erosion | 45 | 4.5 | 5.5 | 3.5 |
| 2 | Sole erosion | 50 | 4 | 3 | 2.8 |
| 3 | Hoof overgrowth | 50 | 6.5 | 4.5 | 4 |
| 4 | Hoof abscess | 55 | 4 | 3.5 | 4 |

Table 4: Biometrical measurements of different hoof affections in Goats.

Radiological examination

In cases of sole erosion and ulceration, radiograph revealed no alterations in bone structure of phalanx. Radiographic changes were not observed in affected goats with lameness, which might be due to early state of affection or nature of disease that only affected soft tissues of hoof. Similar observation was made by [02; 24]

Conclusions

Maintenance of shed with clean and dry floor is very necessary to prevent the various hoof affections. Cleaning of Hoof with 10 % KMnO₄ solution, Corrective Hoof trimming with topical application of fine paste of fresh leaves of *Cynodon dactylon* is found to be effective for management of various hoof affections in goats as compared to cleaning of hoof with 10 % KMnO₄ solution and corrective hoof trimming.

Bibliography

- Al-Derawie HAN. "Clinical, haematological with some biochemical study of acute laminitis in drought horses in Basrah". *Basrah Journal of Veterinary Research* 11.1 (2012): 66-73.
- Angell JW., et al. "Clinical and radiographic features of contagious ovine digital dermatitis and a novel lesion grading system". *Veterinary Record* 176.21 (2015): 544-544.
- Anonymous. "Goats hoof care" (2016)/
- Anzuino K., et al. "Assessment of welfare on 24 commercial UK dairy goat farms based on direct observations". *Veterinary Record* 167 (2010): 777-780.
- Balasubramanian G., et al. "Oral administration of antiviral plant extract of *Cynodon dactylon* on a large scale production against white spot syndrome virus (WSSV) in *Penaeus monodon*". *Aquaculture* 279.1-4 (2008): 2-5.
- Bitrus AA., et al. "Clinical management of foot rot in goats: A case report of lameness". *Journal of Advanced Veterinary and Animal Research* 4.1 (2017): 110-116.
- Chakrabarti A and PC Chandran. "Foot disorders of goats (*Capra hircus*) in Bihar, India". *International Journal of Environment, Ecology, Family and Urban Studies* 1.6 (2016): 171-176.
- Chavan SK. "Surgico-Therapeutic Mangement of Hoof Affections in Goats". Thesis submitted to Maharashtra Animal Fishery Sciences University, Nagpur (2018).
- Dar KH., et al. "Comparative efficacy of different treatment regimens for the management of acute footrot in sheep of Kashmir Valley". *Journal of Veterinary Science and Technology* 6.262 (2015): 2.
- Devendra C and McLeroy G B. "Goat and sheep production in the tropics". Essex, GB: Longman Scientific and Technical (1982).
- Garg VK and RL Khosa. "Analgesic and anti-pyretic activity of aqueous extract of *Cynodon dactylon*". *Pharmacologyonline* 3 (2008): 12-18.
- Garg VK., et al. "Wound healing activity of aqueous extract of *Cynodon dactylon*". *Pharmacologyonline* 1 (2009): 1246-1255.
- Greenough PR., et al. "Conformation, Growth, and Heritable Factors". In: Lameness in Cattle. (Greenough, P. R., A. D. Weaver, Eds.), Saunders Elsevier, Philadelphia, London, Toronto, Montreal, Sydney, Tokyo (1997): 71-86.
- Groenevelt M., et al. "A case report of lameness in two dairy goat herds; a suspected combination of nutritional factors concurrent with treponeme infection". *BMC Research Notes* 8 (2015): 791.

- 15 Hariharan D., *et al.* "Synthesis and characterization of TiO₂ nanoparticles using *Cynodon dactylon* leaf extract for anti-bacterial and anticancer (A549 cell lines) activity". *Journal of Nanomedicine Research* 5.6 (2017): 138-142.
- 16 Kaler J., *et al.* "A clinical trial comparing parenteral oxytetracycline and enrofloxacin on time to recovery in sheep lame with acute or chronic footrot in Kashmir, India". *Biomed Central Veterinary Research* 8.12 (2012): 1746-6148.
- 17 Kumawat S. "A clinical study on foot affections in goats (*Capra hircus*)". Thesis submitted to University of Veterinary and Animal Sciences, Bikaner, Rajasthan (2013).
- 18 Mohammed A., *et al.* "Lameness in sheep and goats in relation to hoof conditions in Sahel Zone of Nigeria". *Bulletin of Animal Health and Production in Africa* 44 (1996): 97-100.
- 19 Nonga HE., *et al.* "Occurrences and management of lameness in goats: A case study of Magadu farm, Morogoro, Tanzania". *Small Animal Research* 82 (2009): 149-151.
- 20 Nuss K. "The role of biomechanical factors in two development of sole ulcer in dairy cattle". In Cattle Lameness Conference, Worcester. The Dairy Group, Taunton, UK (2014): 1-11.
- 21 Patil MB., *et al.* "Antiulcer properties of alcoholic extract of *Cynodon dactylon* in rats. In III WOCMAP Congress on Medicinal and Aromatic Plants". *Traditional Medicine and Nutraceuticals* 680 (2003): 115-118.
- 22 Randhawa SS. "Prevalence, biomechanics, pathogenesis and clinico-therapeutic studies on foot lameness in dairy animals". Thesis submitted to Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab (2006).
- 23 Rao AS., *et al.* "Potential antibacterial and anti-fungal activity of aqueous extract of *Cynodon dactylon*". *International Journal of Pharmaceutical Research and Development* 2.11 (2011): 2889-2893.
- 24 Raulkar RV. "Surgico-therapeutic strategies for management of hoof affections in cattle". Thesis submitted to Maharashtra Animal and Fishery Sciences University, Nagpur (2017): 1-176.
- 25 Saleh WMM., *et al.* "Clinical and Bacteriological Diagnosis of Foot-rot in Beef bulls in Basra". *Biomedical Journal* 1 (2019): 5.
- 26 Weaver AD. "Bovine surgery and lameness". *Veterinary Record* 108 (1980): 178-223.