



ISSN: 2456-2912

VET 2024; 9(1): 395-398

© 2024 VET

[www.veterinarypaper.com](http://www.veterinarypaper.com)

Received: 05-10-2023

Accepted: 10-11-2023

**MK Dhaka**

Department of Veterinary  
Clinical Medicine, Ethics and  
Jurisprudence, the College of  
Veterinary and Animal Sciences,  
RAJUVAS, Bikaner, Rajasthan,  
India

**Sunita Choudhary**

Department of Veterinary  
Clinical Medicine, Ethics and  
Jurisprudence, the College of  
Veterinary and Animal Sciences,  
RAJUVAS, Bikaner, Rajasthan,  
India

**FC Tuteja**

ICAR-National Research Centre  
on Camel, Bikaner, Rajasthan,  
India

**S Siyak**

Department of Livestock  
Production management, CVAS,  
RAJUVAS, Bikaner, Rajasthan,  
India

**JP Kachhawaha**

Department of Veterinary  
Clinical Medicine, Ethics and  
Jurisprudence, the College of  
Veterinary and Animal Sciences,  
RAJUVAS, Bikaner, Rajasthan,  
India

**Corresponding Author:**

**MK Dhaka**

Department of Veterinary  
Clinical Medicine, Ethics and  
Jurisprudence, the College of  
Veterinary and Animal Sciences,  
RAJUVAS, Bikaner, Rajasthan,  
India

## Common salt supplemented with mineral mixture provides rapid symptomatic relief in pica-affected camels

MK Dhaka, Sunita Choudhary, FC Tuteja, S Siyak and JP Kachhawaha

DOI: <https://doi.org/10.22271/veterinary.2024.v9.i1f.894>

### Abstract

The proposed study was carried out at an organized camel herd at NRCC, Bikaner. Initially, the incidence study was carried out among 44 camels. Based on clinical observation 21 camels were shown signs of pica. Among them 11.36% were shown osteophagia; 4.55% geophagia and 4.55% lithophagia; 9.09% coprophagia; 4.55% lignophagia and whereas 13.64% eat more than one objectionable object. After that 18 severely pica-affected camels were selected and divided into 3 groups to evaluate the responsiveness of treatment, mineral mixture (group A) and mineral mixture common salt (group B) with untreated control group (group C) camels. The silica content of fecal material and Mean bite per hour decreased significantly post-treatment in both treated groups (Group-A and B) compare to pre-treatment. Body weight was found to increase post-treatment in both treated groups (Group-A and Group-B) compare to pre-treatment. The results indicated that the mineral supplementation alone or in combination with common salt is beneficial for the treatment of pica. However additional salt supplementation was observed over mineral supplementation and found better results.

**Keywords:** Osteophagia, geophagia, lithophagia, coprophagia, lignophagia, mineral mixture and common salt

### Introduction

Camel is the most suitable mammal for use in extreme climatic conditions <sup>[1, 2]</sup>. The people most closely associated with the camel in Rajasthan belong to the Raika community and in Gujarat are Maldars. These camel keepers have developed their own ways to treat diseases in camels, based on beliefs, traditional knowledge, skills, methods, and practices. Camel farming is mainly both the organized (Tola keepers) and unorganized (One to few animal keepers) farmers do not follow any scientific feeding plan and only the available feeds are being offered to the camels.

Pica is a depraved or abnormal appetite. It is usually associated with animals that chew/eat inanimate objects which are usually not considered feedstuffs. This behavior can be classified according to the types of material involved are the chewing of bones (Osteophagia), eating of stones (Lithophagia), eating of soil or sand (Geophagia), chewing and eating of wood (Lignophagia), hair (Trichophagia), paper (Papyrophagia), glass (Hyalophagia), faeces (Coprophagia), metal (Metallophagia), urine (Urophagia). Pica has potential side effects that most commonly affect the intestine and bowel. Complications can include constipation, cramping, pain, obstruction, perforation from sharp objects like rocks or gravel, contamination, and infection from soil-dwelling parasites, diarrhea, and colic <sup>[3-5]</sup>.

Survey work on ethno-veterinary practices revealed that farmers provide common salts to camels if they develop symptoms of pica. Moreover, camel herders of Gujarat state revealed that Kharai camels living near sea do not develop symptoms of pica, whereas Kachhi camels living in the desert develop symptoms of pica. Local farmers knowledge explains, this is due to the high salt intake of Kharai camels either by browsing on salty bushes (Halophytes) growing near the sea and also due to intake of salty sea water. According to camel pastoralists salt is required to have better health and fertility of camels <sup>[6]</sup>.

Though these ailments are not always fatal but indirectly economical losses are incurred due to reduced production. The inability to work or death of the animal results in severe monetary loss, which shatters the socio-economic status of camel owner. Since the incidence of pica in camels is increasing year by year and there do not appear to be satisfactory therapeutic and or preventive approaches, resulting in loss of productivity. Recently an incidence of pica as high as 51.66 percent has been recorded in camels [7, 8].

### Materials and Methods

Recording of all the 18 camels was further carried out to know the bites per hour for eating non-food items. Each animal was observed for eight hours during day time, in the camel corrals. Animals number, age, sex, breed, approximate body weight, and abnormal behaviour of all these camels were recorded while taking these observations. A detailed history of previous illness, feeding practice management and physical examination for associated signs and symptoms of rough hair coat, anaemia, weakness etc. was recorded for every pica-affected camel.

In the Feeding trial experiment, all the selected 18 male camels were divided into three groups comprising six animals in each group. In this trial six animals of group-A were fed with a specially designed mineral mixture daily at the rate of 30 gram per animal per day mixed with fodder for two months, six animals of group-B were fed mineral mixture 30

grams + 20 gram common salt per animal per day mixed with fodder for two months, whereas six animals of group-C were fed with same basal fodder for two months.

Faecal qualitative examination was conducted to record the gastrointestinal parasitic infections in camel population on the basis of the presence/absence of eggs/cysts/oocysts in the faeces by using centrifugal floatation and sedimentation techniques [9].

Soil pass out in faeces was examined by ash in the inorganic residue left after ignition of a faecal sample in the muffle furnace at 550-600 °C for 2-3 hours. The residue left after dissolving the inorganic portion of total ash represented acid insoluble ash (AIA), the majority containing sand and silica [10].

### Results and Discussion

#### Incidence of pica with clinical symptoms in the particular age group camels

Observations of the total 44 male camels in the age group of 2-4 revealed that a total of 21 (47.73%) camels were suffering from pica. Common clinical symptoms observed were osteophagia (11.36%) followed by geophagia (4.55%), lithophagia (4.55%), coprophagia (9.09%) lignophagia (4.55%) and more than one object (13.64%) in the camels (Table. 1), depending upon the availability of the particular objects in the vicinity of the animals.

**Table 1:** Clinical signs observed in pica affected and healthy camels

Symptoms	No of pica affected camels (n=21)	Percentage (%)	No of pica healthy camels (n=23)	Percentage (%)
Weakness	11	52.38	4	17.39
Rough hair coat	03	14.29	01	4.34
Anaemia	02	9.52	0	0
Emaciation	02	9.52	01	4.34

Note:-n= number of study animals.

In the present study, the health status of the camels was recorded in a particular herd. Number of cases with poor health status was higher in the pica affected camels compared to camels not revealing symptoms of pica. General weakness was observed by thinness of the hump. Other observed symptoms were roughness of the hair coat, anaemia and emaciation. Common symptoms of weakness, roughness of

the hair coat and emaciation in camels affected in pica has also been reported by Gautam and Bansal (1972) [11], Kachhawaha *et al.* (2013) [12] and Koted (2019) [8]. Parsani *et al.* (2008) mentioned pica a clinical sign in parasitic diseases [13]. The camel with heavy helminth infection shows anorexia, loss of body weight, loss of body condition, rough hair coat, anaemia, oedematous swellings of lower body parts and pica.

**Table 2:** Symptoms of deprived appetite in Camels affected with pica

Abnormal materials eaten by camels	No. of camels affected	Percentage (%)
Osteophagia (Chewing of bones)	05	11.36
Geophagia (Soil or mud eating)	02	4.55
Lithophagia (Brick or concrete wall eating)	02	4.55
Coprophagia (faeces eating)	04	9.09
Lignophagia (Wood eating)	02	4.55
More than one object eating	06	13.64
Total pica affected camels	21	47.73

We also observed symptoms of deprived appetite in Camels affected with pica (Table 2 and Figure 1). Geophagia 'mitti khana' in camel affected with pica has been reported by Gautam and Bansal (1972) [11], Sharma and Satija (1974) [14], Sahmat (2008) [15] and Koted (2019) [7]. Osteophagia in camels has also been observed by Schwartz and Dioli (1992) [16], Shamat (2008) [15] and Koted (2019) [7] in case of pica. Coprophagia and Lithophagia in camels has been reported by Koted (2019) [7]. Oesophageal obstruction in camels due to

nonfeed items has been reported by Ramadan and Abdin-Bey (1990) [17]. Additionally, on faecal examination of the 21 pica affected camels revealed that none of the camel was affected with heavy parasitic load. Whereas parasitic infestations were recorded in four camels, these were identified as Trichuris (2), Nematodirus (1) and Strongyle (1) by eggs morphology. Since no heavy parasitic infestation was recorded, therefore no special deworming was under taken.



**Fig 1:** Symptoms of deprived appetite in camels affected with pica

**Table 3:** Mean±SE value of silica and ash content in faeces of treated and untreated control groups of pica affected camels

Parameter	Group- A (Mineral mixture feeding)		Group- B (Mineral Mixture + Salt feeding)		Group C (Untreated controls)	
	0 day	60 day	0 day	60 day	0 day	60 day
Silica content (%)	7.37 <sup>a</sup> ±1.86	2.15 <sup>bb</sup> ±0.39	8.20 <sup>a</sup> ±1.17	1.45 <sup>bb</sup> ±0.34	6.80±0.55	6.50 <sup>A</sup> ±1.03
Range	3 -14	1 - 3	5 - 13	1 - 3	3 - 8	3 - 11
Total Ash content (%)	10.54 <sup>a</sup> ±1.76	6.31 <sup>bb</sup> ±0.62	11.46 <sup>a</sup> ±1.21	6.23 <sup>bb</sup> ±0.83	10.2±0.63	10.41 <sup>A</sup> ±0.99
Range	6 -17	4 - 8	8 -16	4 -10	5 -13	7-14

**Note:** 1. Mean±SE bearing different superscript (A, B) between treated and control group differ significantly ( $p < 0.05$ ). 2. Mean±SE bearing different superscript (a, b) within treated group differ significantly ( $p < 0.05$ ).

**Efficacy of treatment for pica in camels**

There was reduction in bite per hour for eating non-food items in the treated groups-A (79%) and B (81%). Significant difference was recorded with the mineral mixture supplementation and salt supplementation before and after the treatment trail in the present study (Table 3). Non supplementations lead to increase in bite per hour for non-food items. For achieving 100 per cent efficacy with mineral

mixture supplementation either period of supplementation may be prolonged or the daily dose of supplementation may be increased. The pica affected camels were feeding with specially designed mineral mixture at the rate of 50 gm per day per animal for two months was found satisfactory improving in terms of relieving the camels from symptoms of pica.

**Table 4:** Efficacy in Group A, Group B and group C post treatment in eliminating signs of pica in camels

Groups	No. of camels eating abnormal things		0 <sup>th</sup> day (Pre-treatment)		60 <sup>th</sup> day (Post-treatment)	
	Before treatment	After 60 days of treatment	Mean Bite/ hour	Range	Mean bite/hour	Range
Treated group - A	6	Average 79 per cent reduction in bite/hour to abnormal materials in all the 6/6 camels.	21.67 <sup>a</sup> ±2.40	32 - 12	4.5 <sup>b</sup> ±0.88	8 - 0
Treated group -B	6	Average 81 per cent reduction in bite/hour to abnormal materials in all the 6/6 camels	22 <sup>a</sup> ±3.28	23 - 17	4.17 <sup>b</sup> ±2.86	8 - 0
Untreated control group - C	6	Average 12 per cent increase in bite/hour to abnormal materials in all the 6/6 camels	14.83±2.93	17 - 6	16.58±1.44	22 - 9

**Note:** Mean±SE bearing different superscript (a, b) within treated group differ significantly ( $p < 0.05$ ).

In feeding treatment trail experiment, significant decrease in mean bite per hour recorded in both treated group A and B on day 60 compared to day 0 of the treatment (Table 4).



**Table 5:** Mean±SE body weight of camels in group A, group B and group C recorded on both pre (day 0) and post treatment (day 60).

Group	Body weight (Kg) 0 <sup>th</sup> day (pre-treatment)		Body weight (Kg) 60 <sup>th</sup> day (post treatment)		Average increase over 60 <sup>th</sup> day	Percent increase over 60 <sup>th</sup> day
	Mean	Range	Mean	Range		
Group- A	355.00±10.19	314 - 381	364.83±10.48	327 - 396	9.83±2.17	2.76
Group- B	393.17±27.05	314 - 487	405.67±27.45	323 - 501	12.50±0.89	3.18
Group- C	357.67±24.05	263 - 445	364.83±23.79	270 - 448	7.17±1.40	2.01

There was increase in the body weight of all the three study groups including the control group. This increase was marginal higher in the treated groups compared to control group (Table 5). Previously, Koted (2019) also reported that feeding specially designed mineral mixture at the rate of 50 gm per day per animal for two months was found satisfactory in improving in terms of relieving the camels from symptoms of pica [7].

### Conclusion

Common clinical symptoms in pica affected camels observed were osteophagia followed by geophagia, lithophagia, coprophagia and lignophagia. Associated signs in pica affected camels commonly observed were general weakness, thinness of the hump, roughness of the hair coat, anaemia and emaciation. The silica content of faecal material and Mean bite per hours were decreased significantly post treatment in both treated groups (Group-A and B) compare to pre-treatment. Body weight was found increase post treatment in both treated groups (Group-A and Group-B) compare to pre-treatment. Based on clinical signs and symptoms effect of additional salt supplementation with mineral supplementation in the pica affected camels was found better.

### Acknowledgements

A part of this study belongs to MVSc thesis work of MK Dhaka.

### References

1. Yagil R. The Desert Camel. Basel: Verlag Karger; c1985.
2. Wilson R. Longman Group Ltd., UK; c1984.
3. Bertone J, Traub-Dargatz J, Wrigley R, Bennett D, Williams R. Diarrhea associated with sand in the gastrointestinal tract of horses. J Am Vet Med Assoc. 1988;193:1409-1412.
4. Husted L, Andersen M, Borggaard O, Houe H, Olsen S. Risk factors for faecal sand excretion in Icelandic horses. Equine Vet J. 2005;37:351-355.
5. Firyal S. Pica (Depraved appetite; allotrophagia) in domestic animals and man. Pak Vet J. 2007;27:208.
6. Dioli M. In: The 5th Conference of the International Society of Camelid Research and Development. Laâyoune, Morocco; 12<sup>th</sup>-15<sup>th</sup> November.
7. Koted R. Clinico-haemato-biochemical and Therapeutic Studies on Pica in Camels (*Camelus dromedarius*). M.V. Sc. Thesis. Bikaner: RAJUVAS; c2019.
8. Koted R, *et al.* Etio-pathology and therapeutics of pica in dromedary camels; c2021.
9. Soulsby E. Helminths. Arthropods and Protozoa of domesticated animals. 1982, 291.
10. Sastry V, Kamra D, Pathak N. Laboratory manual of animal nutrition. Izatnagar, India: Indian Veterinary Research Institute; c1999. p. 255.
11. Gautam P, Bansal S. Save your camel from pica-'Mini Khana'. Indian Farming. 1972, 21.
12. Kachhawah S, Chand K, Jangid B. Health problems and their management in camel herds of southern Rajasthan. J Camel Pract Res. 2013;20:113-120.
13. Parsani H, Singh V, Momin R. Common parasitic diseases of camel. Vet World. 2008;1:317-318.
14. Sharma S, Satija K. Trials with promintic in clinical cases of pica in camels. Indian Vet J; c1974.
15. Shamat AMA. Chemical composition and mineral content of soil, plant and animal tissues in some camel production areas in the Sudan. PhD thesis. University of Khartoum, Sudan; c2008.
16. Schwartz H, Dioli M. The one-humped camel in Eastern Africa. A pictorial guide to diseases, health care and management. Margraf; c1992.
17. Ramadan R, Abdin-Bey M. Obstruction of the oesophagus in camels. Indian Vet J. 1990;67:363-364.