Treatment Trial of Mangy One Humped-Camels (*Camelus dromedarius*) by *Aloe vera* Gel Leaves

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疥癬症に罹患したヒトコブラクダへのアロエの葉による治療の試み

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ABSTRACT. A total of ten one-humped camels (*Camelus dromedarius*) suffering from mange were used in this investigation. The clinical signs of affected animals were debility, various degrees of alopecia, severe dermatitis, pruritis, and thickening with scales on different areas of skin. All camels were treated for mange caused by *Sarcoptes scabiei* var. *cameli* by rubbing *Aloe vera* gel leaves topically on the affected skin lesions everyday. All skin lesions disappeared rapidly and unexpectedly, and the absence of mite from skin scraping.

Key words : *Aloe vera*, camel, mange

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Mange is an allergic irritant condition caused by burrowing of ectoparasitic infestation. It poses a major threat to health of camels and has a zoonotic importance [1, 2]. *Sarcoptes scabiei* var. *cameli* involves infestation by a pathologically important mange mite, which is considered to cause one of the most serious, highly contagious and debilitating skin diseases affecting camels. It is one of few diseases that seriously threat the well-being of the one-humped camel (*Camelus dromedaries*) in Arabi countries [3, 4].

Treatment and control of mangy camel by chemical insecticides Lindine and Diazinon with ivermectin injection were conducted by some investigators [5,6]. Chemical miticides have been used for control of mite infestation, however, their wide application not only pollutes the environment but also has adverse effects on both humans and animals [7]. On the other hand, herbal plants have been used for treatment of various disease conditions. Trials for treatment of mange by herbal products have been performed and discussed in dogs [7, 8] and camels [9].

There are over 250 species of aloes in the world, mostly native to Africa. Although most aloes have some medicinal or commercial value, the most commonly known is the *Aloe*

barbadensis better known as *Aloe vera*. *Aloe vera* gel is a most ingenious mixture of an antibiotic, an astringent coagulating agent, a pain inhibitor and a growth stimulator (also called a "wound hormone"), whose function is to accelerate the healing of injured surfaces. It is used for pain relief and healing of hemorrhoids [10]. Topical application of *Aloe vera* has been successful in treatment of sunburn frostbite, radiation injuries, some types of dermatitis, psoriasis, cuts, insect stings, poison ivy, ulcerations, abrasions, and other dermatologic problems [11].

The objective of this paper is to find and evaluate the efficacy of treatment with *Aloe vera* as an alternative easy, simple, effective biodegradable natural material for treatment of mite infestation among camels.

Ten one-humped camels with signs of mange in a zoo were used in this investigation. They were classified according to their infestation severity into three classes; moderate cases in which camels have scattered sporadic mangy patches on their skin (+); severe cases in which mange affects most of skin parts with thickening but without alopecia and keratinization (++); and most severe cases in which the skin lesion spreads over the whole entire body causing thickening, alopecia and

keratinization (+++) [12].

A part of the classical professional treatment, was given including application of sulphur ointment weekly to the affected skin lesions, spraying of Diazinon every 2 weeks, and single subcutaneous injection of ivermectin (Ivomec) at a dose rate $200 \mu\text{g}/\text{kg}$ body weight or their combination. However they failed to resolve the diseased condition in five camels.

Skin scraping was done at least 1 cm^2 by parallel strokes at the mange lesion edges by a scalpel blade (No. 22). Three or four scrapings were collected from each examined camel. Further skin scraping was performed after tying up a camel foreleg in the recumbent flexed position. Skin scraps were collected in a screw centrifuge tube. Potassium hydroxide solution (10%) was added to each sample and boiled in a water bath for 30 minutes. Then, the samples were centrifuged at 1,500 rpm for five minutes. The sediment was examined microscopically under low power lens ($\times 40$). Parasites obtained were identified after the method described by Marharet and Russel [13]. Investigated animals were examined on a daily basis after application of *Aloe vera* gel leaves.

Each two jugular vein blood samples were collected from five previously treated camels. The first sampling was taken at the start of application treatment of *Aloe vera* gel leaves for two weeks, and the second one was done at the end of treatment. Serum samples were collected. Amounts of total proteins, albumin, glucose, urea, creatinine, activities of aspartate aminotransferase (AST), and alanine aminotransferase (ALT) were measured using a kit supplied by Biomerieux (Bains/France). The pre-treatment and post-treatment biochemical obtained data were analyzed statistically as mean $\pm$ standard deviation using Student's *t*-test method [14].

The mature fresh, whole succulent leaves of wild *Aloe vera* were fleshy (Fig. 1), and removal of the thick outer cuticle with a sharp knife, revealed a mucilaginous inner colorless parenchyma gel that was used freshly at once [15]. All the investigated camels were treated by daily topical rubbing of *Aloe vera* gel leaves for two weeks. Five of the camels in

the first trial treat and five animals were in the second trail were retreated. These animals were failed to cure by several treatment programs before one month.

The skin scraping was positive for sarcoptic mites in all examined camels, even in the five previously treated animals (Fig. 2). The diseased camels showed debility, various degrees of alopecia, severe dermatitis, pruritis, and thickening with scales on various areas of the skin. The skin lesions were seen as bald irregular patches on the axillae, inguinal regions, brisket, neck, around the root of the tail and on the face, and both abdominal sides (Fig. 3).

The biochemical values significantly recovered to an acceptable level two weeks after cessation of treatment by rubbing with *Aloe vera* gel leaves (Table 1).

The severe lesions subside, itching and pruritis are relieved and new hair growth starts for a cure, within seven to ten days of treatment or after the third to fourth application of *Aloe vera* gel (Fig. 4). Scraping of the skin also showed the absence of mites within one week of treatment in moderate cases (+) ; and within ten days of treatment or the end of treatment, in both the severe (++) and most severe cases (+++) . The hair completely regrew to cover the alopecic skin lesion areas within thirty days of treatment (Fig. 5).

Given the failure of previous treatments of mangy camels, it seemed that sarcoptic mange mites on camels are resistant to one or other of the commonly used acaricides. Failure to control the disease might be attributed to inefficient application of the chemicals [3] or to the uses of a single dose of ivermectin [5]. Chemical miticides have been used for control of mite infestation. The injectable ivermectin had side effects on injected camels represented by oval or round indurated swellings on the infection side, and the clinical response of ivermectin was so slow that it took about five weeks to take its effect [5]. Several herbal medicines, such as *Aloe vera* gel, contain pharmacologically active ingredients that may aid in wound healing [16]. The curative power of *Aloe vera* gel against mite infestation might be promoted by phenol

Fig. 1 *Aloe barbadensis* (*Aloe vera*) plant.

Fig. 2 Isolated mange mite from the skin lesion of mangy camels.

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Fig. 3 Most severe mange case in which the skin lesion spreads almost over the entire body with thickening, alopecia and keratinization.

compounds and sulphur that act as an antiseptic that might kill the mite. The anti-inflammatory components of *Aloe vera* gel including several glycoproteins might overcome the dermatitis. *Aloe vera* gel acts as an antihistamine and contains salicylates that relieve pain, and stop itching. It contains some substances that stimulate growth of skin and connective tissue [17]. The clinical response to *Aloe vera* was rapid (within two weeks) compared with ivermectin injection and/or sulphur ointment.

Aloe vera gel can be obtained from the outdoor environment, so it is very available as a miticide of plant origin and will be of great help to farmers and animal breeders in a developing country like Egypt.

We can conclude that topical application of *Aloe vera* gel has a proven efficacy for mangy dermatitis of camels. This promising result needs further research with more evidence of the therapeutic potential of the *Aloe vera* inner gel.

要 約

疥癬症に罹患し、それらの臨床症状は衰弱、種々の脱毛、著しい皮膚病、かゆみ、皮膚の各部位の鱗屑を伴った肥厚の見えるヒトコブラクダ 10 頭を用いた。すべてのラクダの皮膚患部に毎日ヒゼンダニ属疥癬に対する治療としてアロエの葉を局

Fig. 4 Beginning of hair regrowth on affected alopecia skin areas of mangy camel treated by *Aloe vera* gel leaves.

Table 1 Blood serum profile in mangy camels before and two weeks post-treatment by *Aloe vera* leaves (means $\pm$ S.D.)

Criteria	Before treatment	Post-treatment
Total protein (mg/ dl)	6.7 $\pm$ 0.9	9.04 $\pm$ 0.9 ^{**}
Albumin (mg/ dl)	3.4 $\pm$ 0.6	4.7 $\pm$ 0.3 ^{**}
Globulin (mg/ dl)	3.3 $\pm$ 0.6	4.3 $\pm$ 0.9
Glucose (mg/ dl)	53.4 $\pm$ 10.1	71.9 $\pm$ 9.8 [*]
Urea (mg/ dl)	48.8 $\pm$ 6.3	37.1 $\pm$ 7.6 [*]
Creatinine (mg/ dl)	0.9 $\pm$ 0.3	0.4 $\pm$ 0.13 [*]
ALT (IU/L)	46.0 $\pm$ 16.4	38.1 $\pm$ 4.1
AST (IU/L)	115.1 $\pm$ 20.9	97.3 $\pm$ 16.8

^{*}Significant at P < 0.05

^{**}Significant at P < 0.01

所的に塗布した。2 週間の治療によって急速な治療効果が見られ、皮膚の僧は掻爬検査で疥癬がいなくなり、すべての皮膚病変が改善した。

キーワード: アロエ, 疥癬, ヒトコブラクダ

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Fig. 5 Completely regrown hair on affected alopecia skin areas of mangy camel treated by *Aloe vera* gel leaves.

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