



Journal of
Entomology

ISSN 1812-5670



Academic
Journals Inc.

www.academicjournals.com

**Acaricidal Efficacy of Ivomec (Ivermectin) and Dectomax (Doramectin)
on Sarcoptic Mange Mites (*Sarcoptes* spp.) of Arabian Camels
(*Camelus dromedarius*) in Saudi Arabia**

M.H. Abdally

Department of Microbiology and Parasitology,
College of Veterinary Medicine and Animal Resources, King Faisal University,
P.O. Box 1757, Al-Ahsa, 31982, Kingdom of Saudi Arabia

Abstract: Acaricidal activities of Ivomec (Ivermectin) and Dectomax (Doramectin) were evaluated in camels infested with sarcoptic mange mites. The activity of Dectomax was stronger and last longer than Ivomec as it reduced the number of mites on the tested animals four weeks after treatment. The Ivomec (1% ivermectin) dose of 0.2 mg kg⁻¹ on body weight basis is not effective in killing the mite infestation in a short period of time. Whereas, the Dectomax (1% doramectin) dose of 0.2 mg kg⁻¹ on body weight basis killed all the mite infestation quickly and was effective for a longer period of time. The acaricidal efficacy of Ivomec (Ivermectin) was less than Dectomax (Doramectin) ($p < 0.05$) on sarcoptic mange mites (*Sarcoptes* spp.) of Camels (*Camelus dromedarius*) under the climatic conditions of Al-Ahsa, Saudi Arabia. The mean values of glucose, urea, creatine, creatinine, GOT and GPT in the serum increased in camels treated with Dectomax ($p > 0.05$) than those treated with Ivomec. The GOT values in the serum of camels treated with Dectomax were higher ($p > 0.05$) than the normal or Ivomec treated animals. In conclusion, this endectocide might have affected the normal functions of liver or other organs of camels. Further studies on the use of endectocides for controlling all the parasitic helminthes and arthropods in Saudi camels are strongly recommended covering all the seasons in a year.

Key words: Acaricidal efficacy, chemical activity, ivermectin, doramectin, mites, infestation, sarcoptic mange, camel disease

INTRODUCTION

In spite of the fact that mechanization had greatly supplanted camels quality as beasts of burden (Fahmy *et al.*, 1998). But still, they are very dear in Saudi Arabia and other Gulf States because they are recognized as an important wealthy patrimony resources from the ancestors (Abdally, 2008). In fact, camels are considered as hard and tough animals which can tolerate the harsh climate and extremes of temperature encountered in the desert (Abdally, 2008; Fahmy *et al.*, 1998). Unfortunately, mange infection affects these important animals and reduces their prices and causes huge losses of these wealthy patrimony resources. Because sarcoptic mange infection is a serious problem in many parts of the world posing a serious threat to animals health (Dorn *et al.*, 1986; Higgins, 1985; Melaku and Gibreah, 2001; Kumar *et al.*, 1992; Pegram and Higgins, 1992; Radostits *et al.*, 2000; Walker, 1994). Ectoparasites by means of topically applied acaricides has not been universally successful due to difficulties with dipping or spraying of large number of camels

(Fahmy *et al.*, 1998; Koefer and Glawischnig, 1985). This could be true especially in the Gulf States where materials and labor are expensive. Therefore, difficulties with dipping or spraying of large numbers of camels may contribute to the failure of controlling mites in some places in the desert. As, it is laborious and often encounters problems for the application of acaricide washes due to water shortage in those remote places. Due to these difficulties, some investigators suggested an efficacious ectoparasitic control with particular reference to new available chemical technologies which can be adapted to camels (Abdul-Rahman and Bornstein, 1991). Consequently, the present work was carried to determine the effective acaricides which are not harmful to camel health and the environment. Thus, the acaricidal efficacy of Ivomec (Ivermectin) and Dectomax (Doramectin) against sarcoptic mange mites was carried in camels at Oraierah, Al-Ahsa District, Kingdom of Saudi Arabia. Furthermore, the investigations on the effects of these two chemicals on renal and hepatic normal functions were conducted by detecting the mean values of glucose, urea, creatine, creatinine, GOT and GPT in the serum of healthy and infested camels before and after treatment.

MATERIALS AND METHODS

Twenty four camels with age ranging from 2-8 years and weighing 450-650 kg were selected for experiment. These camels belonged to some private owners in Oraierah at Al-Ahsa District, Eastern Region, Kingdom of Saudi Arabia. As a first step, each selected animal was examined for live mites by taking a skin scraping before and after treatment application. Then the microscopic examination for adult mites was carried on samples prepared in 10% KOH solution and identified according to Soulsby (1986) and Urquhart *et al.* (1987). The mean number of mites per microscopic field was calculated in each case. Later on, the mites infestation was evaluated by the number of live mites present on each camel and grouped as, + representing 1-10 live mites, ++ representing 10-100 live mites and +++ representing more than 100 live mites. This method was carried according to the procedure of Liebisch *et al.* (1986). Based on the preliminary results of mites infestation, the camels were divided into two main groups i.e., infested groups and healthy groups (Fig. 1- 3). There were twelve camels in each group. Further, each group of the selected camels was divided into three sub-groups each having four camels. The first sub-group was considered as control (untreated animals) while the second and the third group were



Fig. 1: Lesions of mange on the shoulder and chest region of 8 years old camel



Fig. 2: Lesions of mange on the ear of 2 years old camel



Fig. 3: Lesions of mange on the shoulder and neck of 4 years old camel

treated with Ivomec and Dectomax, respectively. The dose of Ivomec was 0.2 mg kg^{-1} of body weight (S/C injection) and that of Dectomax was 0.2 mg kg^{-1} of body weight (I/M injection). The examination of the skin scraping was repeated every week until the 8th week of post treatment.

To investigate the side effects of these experimental chemicals on the normal physiological functions of the treated animals, blood samples were taken from all the sub groups animals before (at the beginning of the investigation) and after treatment (8 weeks post treatment). After collecting the blood samples, these were left to clot for collecting their sera for analysis according to the procedure of Rosenberger *et al.* (1979). The collected sera samples were analyzed for glucose, urea, creatine, creatinine, GOT and GPT levels according to the recommended method of Kaneko (1989).

The experimental data were subjected to statistical analysis according to Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Among the various factors responsible for the improvement of general health of animals, effective control of ectoparasites infestations with effective pesticides such as endectocides is very important. Data revealed that the clearance of skin of infested camels from mange lesions occurred with both the Ivomec and Dectomax treatments (Table 1). Furthermore, no lesions were found during microscopic examination at 1st, 2nd and 3rd week post treatment with Ivomec. However, re-infestation was observed at 4th week post application of the compound. Contrary to these results, the animals treated with Dectomax did not show any lesions and re-infestation up to 8th week after treatment. The Dectomax was more effective for controlling the mange infestation than Ivomec ($p>0.05$). These results of camels agreed with the findings of cattle reported by Logan *et al.* (1993) who found that the duration of activity of Dectomax is longer as compared to Ivomec treatment. Also, similar results were reported by Roncalli *et al.* (1981), Gibney *et al.* (1985), Hen-Drickx *et al.* (1993) and Logan *et al.* (1993). The disappearance of skin lesions in camels treated with Dectomax up to 8th week after chemical application may be attributed to the longer action of the compound due to high lipid solubility of its molecules which consequently gave better protection with ease and quick results when compared with Ivomec (Logan *et al.*, 1993).

The serum analysis for renal and hepatic functions of healthy and infested animals with and without treatment with the two chemicals (before and after treatments) was presented (Table 2). The mean values of glucose, urea, creatine, creatinine, GOT and GPT in the sera of infested animals before treatment were 5.20 ± 0.35 mmol L⁻¹, 14.50 ± 4.18 mg dL⁻¹, 11.50 ± 4.18 , 119.5 ± 13.12 , 123.5 ± 13.12 and 14.5 ± 7.00 U L⁻¹, respectively. However, these values increased significantly after treatment by Dectomax ($p>0.05$) and were 5.11 ± 0.39 mmol L⁻¹,

Table 1: Effect of ivomec and dectomax on sarcoptic mange in camels

		Parasitic examinations									
		Weeks after treatment									
Treatment of animals	Animals	Before treatment	1st	2nd	3rd	4th	5th	6th	7th	8th	
Treated with ivomec	Healthy	-	-	-	-	-	-	-	-	-	
	Infested	+++	-	-	+	+	++	++	+++	+++	
Treated with dectomax	Healthy	-repeated	-	-	-	-	-	-	-	-	
	Infested	+++	-	-	-	-	-	-	-	-	
Control (untreated) animals	Healthy	- repeated	-	-	-	-	-	-	-	-	
	Infested	+++	+++	+++	+++	++	++	+++	+++	+++	

+: 1-10 live mites, ++: 10-100 live mites, +++: More than 100 live mites, -: No live mites

Table 2: Effect of ivomec and dectomax treatment on liver and kidney functions in camels infested with mites

Animal groups (4 camels in each group)		Sample time	Glucose (mmol L ⁻¹)	Urea (mg dL ⁻¹)	Creatine	Creatinin	GOT	GPT
					(U L ⁻¹)			
Normal (Healthy untreated)	Before treatment	5.40±0.41	15.6±2.31	12.31±4.81	122.10±13.21	241.20±10.00	17.0±0.8	
	After treatment	5.22±0.40	16.0±2.20	11.60±4.50	123.20±13.11	240.00±10.00	18.0±0.9	
Healthy treated with ivomec	Before treatment	5.24±0.40	15.6±2.20	10.61±4.50	121.20±13.11	239.00±10.00	16.5±0.9	
	After treatment	5.23±0.40	16.3±2.20	12.00±4.50	122.21±13.11	242.00±10.00	18.0±0.9	
Healthy treated with dectomax	Before treatment	5.50±0.41	15.0±2.31	11.41±4.81	122.10±13.21	240.20±10.00	17.0±0.8	
	After treatment	5.20±0.41	15.6±2.31	12.51±4.81	118.20±13.21	341.20±10.00	18.0±0.8	
Infested untreated	Before treatment	5.20±0.35	14.5±2.11	11.50±4.18	121.50±13.12	120.51±13.11	14.5±7.0	
	After treatment	5.50±0.31	15.5±2.21	11.50±4.18	120.50±13.12	121.50±13.12	13.5±8.0	
Infested treated with ivomec	Before treatment	5.20±0.35	14.5±2.11	11.50±4.18	120.50±13.12	121.50±13.12	14.5±7.0	
	After treatment	4.72±0.32	12.9±1.93	10.89±3.91	117.10±11.85	228.80±43.20	16.5±9.6	
Infested treated with dectomax	Before treatment	5.20±0.35	14.5±2.11	11.50±4.18	119.50±13.12	123.50±13.12	14.5±7.0	
	After treatment	5.11±0.39	13.7±2.01	11.20±4.02	122.70±13.10	347.60±48.50	17.9±8.8	

13.7±2.01 mg dL⁻¹, 11.2±4.02, 122.7±13.10, 247.6±48.50 and 17.9±8.8 U L⁻¹, respectively to approach normal values (the healthy animals free from mange infestation) which were 5.40±0.41 m mol L⁻¹, 15.6±2.31 mg dL⁻¹, 12.31±4.8, 122.1±13.21, 241.2±10.0 and 17.0±0.8 U L⁻¹, respectively. The values of glucose, urea, creatine, creatinine, GOT and GPT in the sera of infested animals treated by Ivomec were 4.72±0.32 mmol L⁻¹, 12.9±1.93 mg dL⁻¹, 10.89±3.91, 117.1±11.85, 228.8±43.20 and 17.9±8.8 U L⁻¹, respectively. Actually, the values of the above parameters were significantly less by Ivomec ($p \geq 0.05$) than Dectomax treated animals.

The increase in the values of different liver and kidney functions with the application of Dectomax than Ivomec could be attributed to improvement in the general health of the animals after treatment of mange lesions which showed improvement in their performance and was reflected in some parameters of liver and kidney functions toward the normal values (Liebish, 1986 and Stendel, 1986). It was observed that Dectomax, as a novel systemic endectocide, proved to be effective for controlling the sarcoptic mange in other animals (Bolt *et al.*, 2003; Roncalli *et al.*, 1981; Gibney *et al.*, 1985; Hen-Drickx *et al.*, 1993; Logan *et al.*, 1993).

It was also noted in this study that animals treated with Dectomax felt more comfortable and docile besides its high performance rate, efficacy of long protection period and quick relief of infested animals. However, the GOT values showed increases in the camels treated with Dectomax ($p \geq 0.05$) as compared to those treated with Ivomec and the control (untreated) animals. This was clear in healthy camels ($p > 0.05$) where, it was 241.20±10.00 for untreated, 242.00±10.00 for Ivomac treated and 341.20±10.00 for Dectomax treated camels. While in case of infested camels, it was 121.50±13.12 ($p \geq 0.05$), 228.80 ±43.20 ($p \geq 0.05$) and 347.6±48.50 ($p > 0.05$) for untreated, Ivomec treated and Dectomax treated animals, respectively. This gave an indication that treatment of Ivomec is more safe than Dectomax in the case of hepatic functions. As such, Dectomax treatment may have an acute effect on liver or other organs of camels. Further study regarding endectocides on Saudi camels against all the parasitic helminthes and arthropods is strongly recommended for all the seasons in a year.

ACKNOWLEDGMENTS

I thank The Camel Research Centre and The Veterinary Teaching Hospital at College of Veterinary Medicine and Animal Resources, King Faisal University for help and support in conducting this study. I also thankful to Mr. Nayief Al-Shehri for help in sample collection from camels. Finally I wish to express my great appreciation to my colleagues Dr. E.M. Al-Hassan, Dr. Ezuldeen Babikir and Professor Dr. A.M.M. Humaidah for their useful comments for improving the manuscript.

REFERENCES

- Abdally, M.H., 2008. Species of ticks on camels and their monthly population dynamics in Arar City, KSA. *Assiut Vet. Med. J.*, 54: 117-117.
- Abdulrahman, O.A.S. and S. Bornstein, 1991. Diseases of camels (*Camelus dromedarius*) in Somalia and prospects for better health. *Nomadic Peoples*, 29: 104-112.
- Bolt, C., A. Kodjo, M.C. Reynaud and G. Bourdoiseau, 2003. Efficacy of selamectin administered topically in the treatment of feline otoacariasis. *Vet. Parasitol.*, 112: 241-247.
- Dorn, H., H.D. Hamel and W. Stendel, 1986. The efficacy of flumethrin (Bayticol) against multihost cattle ticks in South Africa under field conditions. *Vet. Mediterranean Rev.*, 2: 147-157.

- Fahmy, M.M., M.M. El-Sayed and N.M. Ezzeldein, 1998. Acaricidal efficacy of dectomax (Doramectin) on ticks and mite natural infestation among camels (*Camelus dromedaries*) in Egypt. *Vet. Med. J. Giza*, 46 (4).
- Gibney, V.J., J.B. Compbell, D.J. Boxler, D.C. Clanton and G.H. Deutcher, 1985. Effect of various infestation levels of cattle lice (Mall ophage Trichodectidae and anopleura haematopinidae) on feed efficiency and weight gains of beef heifers. *J. Econ. Entomol.*, 78: 1304-1307.
- Hen-Drickx, M., L. Anderson, C. Boulard, D.G. Smith and A.J. Wetherley, 1993. Efficacy of doramectin against warble fly larvae (hypoderma bovis). *Vet. Parasitol.*, 49: 75-84.
- Higgins, A.J., 1985. The camel in health and disease. 4. Common ectoparasites of the camel and their control. *Br. Vet. J.*, 141: 197-215.
- Kaneko, J.J., 1989. *Clinical Biochemistry of Domestic Animals*. 4th Edn., Academic Press, New York, pp: 898.
- Koefler, J. and E. Glawischmig, 1985. Treatment trials of ectoparasitic infections with ivomec in cattle and calves. *Wien, Ticsraczt Monatsschr.*, 72: 197-199.
- Kumar, D., P.M. Raisinghani and G.S. Manohar, 1992. Sarcoptic mange in camels: A review. *Proceedings of the 1st International Camel Conference*, Feb. 2-6, Newmarket Press, UK., pp: 27-82.
- Liebisch, A., 1986. Bayticol pour-on: A new product and a new method for the control of stationary ectoparasites in cattle. *Vet. Med. Rev.*, 1: 17-27.
- Logan, N.B., A.J. Weatherley, F.E. Phillips, C.P. Wilkins and D.J. Shanks, 1993. Spectrum of activity of doramectin against cattle mites and lice. *Vet. Parasitol.*, 49: 67-73.
- Melaku, F. and F. Gibreah, 2001. A study on the productivity and diseases of camles in Eastern Ethiopia. *Trop. Anim. Health Produc.* 33: 265-274.
- Pegram, R.G. and A.J. Higgins, 1992. Camel ectoparasites: A review. *Proceedings of the 1st International Camel Conference*, Feb. 2-4, Newmarket Press, UK., pp: 67-78.
- Radostits, O.M., C.C. Gay, D.C. Blood, K.W. K. Hinchcliff and C. Gay, 2000. *Veterinary Medicine: A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses*. 9th Edn., WB Saunders, London, ISBN: 978-0702026041.
- Roncalli, R.A., W.H.O. Leaning and E.S. Brokken, 1981. Ivermectin efficacy evaluation in cattle. *Proc. Ann. Meet. AAVP*, 5: 19-20.
- Rosenberger, G., H.D. Dirksen, E. Grunert, D. Krause, M. Stober and R. Mack, 1979. *Clinical Examination of Cattle*. 1st Edn., Verlag Paul Parey, Berlin, Hamburg, Germany.
- Snedecor, G.W. and W.G. Cochran, 1989. *Statistical Methods*. 8th Edn., Iowa State University Press, Ames, Iowa, ISBN: 9780813815619.
- Soulsby, E.J.L., 1986. *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th Edn., Bailliere Tindall, London.
- Stendel, W., 1986. Studies on the distribution of flumethrin pour on the skin sur-face and hair coat of cattle. *Vet. Med. Rev.*, 1: 28-33.
- Urquhart, G.M., J. Armour, J.L. Duncan, A.M. Dunn and F.W. Jennings, 1987. *Veterinary Parasitology*. 1st Edn., Longman Scientific and Technica, England.
- Walker, A., 1994. *The Arthropods of Humans and Domestic Animals*. Chapman and Hall, London, pp: 179.