

Trial on the Efficiency of Topline® Against Natural Tick Infestations of Dromedaries in Mauritania

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Abstract

Topline®, as a 1% “pour-on” solution of fipronil, is produced by Merial Company. Fipronil is an acaricide used to control ticks and biting flies of cattle. Dromedaries are regularly infested by ticks. The effectiveness and residual activity of fipronil as a 1% w/w pour-on formulation (Topline®) was studied in a trial on ticks of calves of dromedaries near Nouakchott, Mauritania.

Results showed a great effectiveness of Topline®. The results were similar to those obtained on cattle in Cameroon.

Keywords: Topline®; Fipronil; Dromedary; Mauritania; Efficacy; Ticks

Introduction

Mauritania is a vast and desert country. Under such climatic conditions, camels are the animals adapted par excellence to such arid area where pluviometry is low. In Mauritania an estimate of 1.4 M dromedaries are counted [1,2].

Vis-a-vis recent changes of livestock due to climatic change, the dromedary plays now an important role in food safety and the fight against poverty in Mauritania by means of the innovations which contributed to revolutionize its breeding. These innovations are represented by an improvement of its system of breeding, an improvement of the transformation of milk and its derivatives (pasteurization of fresh milk, cheese produced from pure milk of camels) and an improvement of the collect and the marketing of the camel milk [3].

Dromedaries are sober and rustic animals. This rusticity however does not make them safe from various pathologies [4-6]. They are generally massively infested by ticks on most parts of the body, including anus, vulva, udders, eyelids, tail and interdigital spaces. The tick species mostly met is *Hyalomma dromedarii* [7-9], widely distributed throughout North Africa, the northern regions of West, Central, and East Africa, Arabia, Asia Minor, the Middle East, and Central and South Asia [10]. However in countries like Kenya and Ethiopia, according to the seasons, the population of the ticks infesting the dromedary is varied [11].

Topline® is recorded for the treatment and control of infestations of external parasites: ticks, horn flies, biting and suckling lice on cattle. Its results ensure a long protection [12]. Taking into account the harmful role of the ticks through their direct and indirect effects on periurban dromedaries with dairy vocation in Mauritania where the stockbreeders are constrained to use regularly and massively empirical acaricidal methods, it became obvious to provide reliable drugs to them. It is within this framework that this trial was made, with the objective to test the effectiveness and the residual activity of Topline® on ticks of dromedaries.

Material and Methods

Site of the trial

The site of the trial was near Nouakchott, the capital of Mauritania, in the Commune of Ryad, in district PK7 (latitude, y=18.1225; longitude, x= -16.1227). A system of breeding periurban camels for marketing fresh camel milk was started in the periphery of Nouakchott. The population of these dromedaries is estimated at between 2,000 and 2,500 heads [13].

Animals resources

This farm was specialized in the sale of fresh camel milk. There are 26 female camels in lactation and 27 camel calves, aged from 3 to 10 months and 1 male 2 years old, a total of 54 individuals. To this number 1 male of 8 years and 1 female camel should be added, which belonged to a neighbour. The camel calves are parked in an enclosure, separated from their mothers. They do not go to pasture and are mixed with the other animals only at the time of the milking.

The trial was therefore made on 9 camels: 6 for the treatment and 3 for the control. Seven camel calves, aged from 3 to 7 months and the 2 camels aged from 2 and 8 years. These 9 camels were divided into 2 batches.

Acaricide

The acaricide used in the study was fipronil, ((±)-5-amino-1-(2,6)-dichloro- α , α , α -trifluoro- p -tolyl)-4-trifluoromethyl-sulfinylpyrazole-3-carbonitrile). The material was formulated for use as a pour-on [12]. Topline® as a 1% pour-on solution of fipronil, is produced by Merial Company (France). It was applied at the dose of 1ml/10 kg bodyweight. It is not allowed for animals in lactation.

Constitution of the batches

These 9 camels were divided into 2 batches:

- Topline® cohort made up of 6 camels: 5 calves and 1 male of 2 years. They received a single treatment of Topline® pour-on at 1 ml per 10 kg. The references: Batch number 029/14; Manufactured date: Feb /14; Expiry date: Feb 16.
- Control cohort composed of 3 camels: 2 camel calves and 1 male of 8 years.

Protocol of the trial

Each animal was identified by a painted number on the neck. For each individual, the weight was determined using a barymetric ribbon, and entered with the age and the sex in an individual record sheet. When data of the barymetric ribbon specific for dromedaries were not obtained, like the cattle, the determination of the weight was made by the circumference of the trunk starting from the bump. The number of cm read of the barymetric ribbon, corresponds to the weight of the animal in kg [14]. If the knowledge of the weight will not be exploited in the results, it is on the other hand significant to determine the dose of the treatment because this one will depend on the weight of the animal

After identification, ticks on the control animals were removed manually. The collected ticks preserved in tubes containing alcohol were numbered according to the anatomical area of the body where they were taken, and identified at the parasitology lab at the National Centre of Livestock and Veterinary Research (CNERV, Nouakchott). All these operations were carried out on day 0 (D0). All parts of the body, in particular the anus, the tail, the interior of the ears and the interdigital spaces were scrupulously controlled.

The 6 animals received a single treatment of Topline®. Topline® was applied along the dorsal line, from the head to the root tail. The 6 treated animals were inspected for ticks on day 0, (D0), D1, D3, D9, D15, D22, D28, D35 and D42. After each counting, the ticks were left in site on the animal in order to compare new and old ticks fixations.

The trial began on January 31st 2015 (day 0) and ended on March 14th, 2015 (day 42).

Results

Twenty-seven adult ticks were collected manually from the three control animals. They belonged to one tick species: *Hyalomma dromedarii* (Table 1). Some ticks were fixed at the anus, inside the nasal cavities, in the interdigital spaces and under the eyelids.

Animal	Number of collected ticks	Species	Males	Females
6	3	<i>H. dromedarii</i>	02	01
7	23	<i>H. dromedarii</i>	17	06
8	1	<i>H. dromedarii</i>	01	0
Total	27	<i>H. dromedarii</i>	20	7

Table 1: Identification of the ticks from the control animals

All the ticks found fixed on the treated animals (D1 to D42) were newly fixed ticks, often not gorged with blood. (Table 2) shows the results of treated animals compared to the controls.

The effect of the treatment was very evident and quick. Indeed, on D1, 21 ticks had died and 25 were in the process of dying. On D3, 6 dead ticks were still fixed and 2 live ones fixed. On the control animals at D0, 27 fixed ticks were removed manually. At D1, 11 new ticks were fixed and 9 were fixed on D3.

Day	Date	Treated animals (6)		Control animals (3)
		Live ticks	Dead ticks	Number of ticks (all live)
31/01/2014	D0	95	0	27
01/02/2015	D1	25*	21	11
03/02/2015	D3	2	6	9
09/02/2015	D9	0	1	0
15/02/2015	D15	0	0	0
22/02/2015	D22	1	0	0
28/02/2015	D28	0	0	0
07/03/2015	D35	0	0	0
14/03/2015	D42	0	0	0

*Females were too flaccid and had lost volume considerably

Table 2: Results

The follow-up of the one treated animal, n° 9 which was very infested at D0 was illustrated by (Table 3) and the pictures from D1 to D42 (Figure 1a b and c: anus of the animal and Figure 2a and b: interior of the ear of the animal). Very infested at D0, the number of fixed ticks was reduced considerably at D1 and no tick is fixed starting from D9.

Day	Live ticks	Dead ticks
D0	69	0
D1	24	14
D3	1	3
D9	0	1
D15	0	0
D22	1	0
D28	0	0
D35	0	0
D42	0	0

Table 3: Individual results of n°9



Figure: 1a, D1 n°9, Ticks were too flaccid losing much of their volume



Figure: 1b, D22 n°9, only one fixed tick



Figure: 1c, D42 n°9 clean anus without effects of fixed ticks



Figure: 2a, D1, n°9 Interior of the ear with flaccid ticks



Figure: 2b, D42 Clean ear without effects of fixed ticks

Discussion

The results of the study demonstrate that a single pour-on treatment of fipronil was effective as both a therapeutic and prophylactic acaricide against all parasitic stages of cattle ticks and that the efficacy was dose related. As a therapeutic agent, there was a corresponding and often significant reduction in tick numbers and reproductive potential with each increase in concentration [12].

In our study camel calves were only lightly infested, older animals are different. Indeed, control animal n°7, aged 8 years, carried 27 ticks on D0, and n°9 (treated) carried 69 ticks. All the identified ticks are adults of one species: *Hyalomma dromedarii*. These results are similar to those obtained in Southern Algeria, Burkina and Niger [7-9].

The results of animal 9 are characteristic of the effects of Topline®: the ticks newly fixed in contact with the product die and detach. Therefore, it may happen that we find the animal with 0 ticks at the next control. They were similar to those recorded on cattle in Cameroon treated by Topline®: fast mortalities of the ticks, few fixed ticks or presence of new fixed ticks –not blood logged [15]. As at D1, many ticks were died and detached before the control, these results convinced the stockbreeder who, in D3 proposed to us to go 145 Kms from Nouakchott to treat much infested adults dromedaries that are and not in lactation.

From these results of this trial, we considered:

- Camel calves were less infested than adults. The reason is that contrary to many stockbreeders who leave their camel calves to graze with their mothers whose udders are protected by a support known locally under the name of "chemol" thus preventing the calf camel from sucking, at the farm the camel calves are maintained in an enclosure. This is the reason these calves are lightly infested by ticks.
- Also the environment and the period would not seem to be very favourable to the development of the tick infestations.
- Dromedaries are covered by long hairs. Thus, after application of Topline®, the diffusion of the product is not similar to what was observed in the cattle. We observed a thin red line on the back which persists only during 3 days. This red line is especially seen in animals whose the peeling is clear even white.

This study showed that Topline®, as 1% "pour one" solution of fipronil is a very effective against the ticks. However, as motioned by MERIAL, this acaricide is proscribed to the animals whose milk is intended for human consumption. Such information was widely disseminated near all the farmers [15].

Conclusion

The application of Topline® (fipronil) on dromedaries has no adverse effect on the behavior or health of the animal, and induces the drop of the killed ticks, which is very impressive for the farmer. It seems to accumulate several days in the ticks before it is active. This activity is manifested by the death of the ticks but probably also, at a lower concentration, by modification or disturbance of the tick physiology.

The results presented in this trial show that fipronil as a pour-on is very effective against *Hyalomma dromedarii* its effectiveness and its residual effect are comparable with results observed in cattle. Indeed, on D3 the fixed ticks on all treated animals disappeared.

As dromedaries have long hairs along the line of the back, for a better diffusion of the product by pour-on, the authors suggest shaving the backline of dromedaries before applying the product.

This trial should be continued on a higher number of highly infested adults (non-lactating females or males) who are in an environment favourable to reinfestations by ticks.

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