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The Effect of Kepromec Pour-on Against Respiratory and Gastrointestinal Nematodes in Cows

[1]Amirparviz Rezaeisaber and [2]Mehrdad Nazeri
[1]Department of Clinical Science, [2]Department of Veterinary Medicine, Tabriz Branch,
Islamic Azad University, Tabriz, Iran

Abstract: Internal parasitism of feedlot cattle has been documented to reduce performance and impair immune function. GI nematodes are chronic pervasive infections that contribute worldwide to morbidity and mortality in humans and in livestock. The objective of this study was to evaluation of Kepromec pour-on effect on decreasing of gastrointestinal nematodes. In this study, 60 male and female hybrid cows were allocated into two 30 individual groups. Then, Kepromec pour-on was administrated at the dose of 1 mg 20 kg^{-1}. Results showed that Kepromec pour-on has about 90% efficacy on GI nematodes. Thus, use of Kepromec to prohibition of GI nematodes is recommended.

Key words: Kepromec, respiratory and gastrointestinal tract, nematodes, cow, evaluation, Iran

INTRODUCTION

Internal parasitism of feedlot cattle has been documented to reduce performance and impair immune function (Gomez-Munoz *et al*., 2004; Snider *et al*., 1986; Wiggin and Gibbs, 1990). GI nematodes are chronic pervasive infections that contribute worldwide to morbidity and mortality in humans (Albonico *et al*., 1999; Bundy *et al*., 1996; Hall and Chan, 1994; WHO, 1992) and in livestock (Coop and Holmes, 1996; Coop and Kyriazakis, 1999; Van Houtert and Sykes, 1996; Howlader *et al*., 2002; Ragbetli *et al*., 2009; Ceylan *et al*., 2010). Their co-existence with malnutrition has been recognized for decades by veterinarians and health care workers who have observed that malnutrition and intestinal parasitism share a similar geographical distribution with the same individuals experiencing both conditions simultaneously (Pelletier, 1994).

Researchers have explained this association by providing scientific evidence both that infection leads to malnutrition through impaired digestion and absorption (Stephenson and Holland, 1987) and that malnutrition increases susceptibility to infection through impaired local and systemic host defense mechanisms (Brandtzaeg, 1998; Ernst *et al*., 1999; Koski and Scott, 2001). Disease severity is typically related to worm burdens. Helminthiasis in small ruminant affects production losses due to mortalities; reduce weight gain and other losses of production (Chaudary *et al*., 2007). However, the effects of helminthes infections on production of particular livestock species depend mostly upon the age of the animal, breed, parasite species involved and the intensity of the worm population. Several factors are known to determine the epidemiological pattern of the associated disease condition. These include weather condition, husbandry practice and the physiological status of the animal (Khan *et al*., 1989; Tembely *et al*., 1997; Waller *et al*., 2004). Kepromec (22, 23-dihydroavermectin B_{1a}+22, 23-dihydroavermectin B_{1b}) is a broad-spectrum antiparasitic avermectin medicine. It is sold under brand names Stromectol in the United States, Ivomec in Europe by Merial Animal Health, Mectizan in Canada by Merck and Ivexterm in Mexico by Valeant Pharmaceuticals International. It is traditionally used against worms. It is mainly used in animals and humans in the treatment of worm infestations (such as strongyloidiasis, ascariasis, trichuriasis, filariasis and enterobiasis).

Kepromec, under the brand name Mectizan is currently being used to help eliminate river blindness (onchocerciasis) in the Americas and stop transmission of lymphatic filariasis and onchocerciasis around the world. Currently, large amounts of kepromec are donated by Merck to fight river blindness in countries that are unable to afford the drug. The drug rapidly kills microfilariae but not the adult worms. A single oral dose of kepromec, taken annually for the 10-15 years life span of the adult worms is all that is needed to protect the individual from onchocerciasis. Kepromec and other avermectins

Corresponding Author: Amirparviz Rezaeisaber, Department of Clinical Science, Tabriz Branch, Islamic Azad University, Tabriz, Iran

(insecticides most frequently used in home use ant baits) are macrocyclic lactones derived from the bacterium *Streptomyces avermitilis*. Kepromec kills by interfering with nervous system and muscle function in particular by enhancing inhibitory neurotransmission. The drug binds and activates Glutamate-gated Chloride channels (GluCls). GluCls are invertebrate-specific members of the Cys-loop family of ligand-gated ion channels present in neurons and myocytes.

MATERIALS AND METHODS

In this study researchers selected 60 male and female hybrid cows which are tested and approved that they have parasitic disease. Then, these animals were divided into 2 groups by chance, controls which are not received Kepromec pour-on and treatment group which are received Kepromec pour-on. In treatment group, Kepromec pour-on based on factory recommendation was administrated at dose of 1 mL/10 kg. After elapsing time, on days 1, 7, 21 and 28 of study, samples were taken and to next measures were transported to Veterinary Faculty of Islamic Azad university, Tabriz branch. Then to recognizing the eggs and larva we used of Mc-Master Slide and Stoll Method methods, respectively. Data were analyzed by Dunn's multiple comparisons test and ANOVA test and $p<0.001$ considered as significant differences.

RESULTS AND DISCUSSION

In this study obtained parasites from feces of cows includes: *Trichostrongylus* sp., *Haemonchus* sp., *Trichuris* sp., *Nematodirus* sp., *Dictyocaulus* sp. Mean Egg Per Gram of feces (EPG) and Larva Per Gram of feces (LPG) and effect of Kepromec pour-on in control of nematodes detected on different days after treatment are shown in Table 1 and 2. At the end of the study, based on below formula the effect of Kepromec pour-on at different days after treatment were calculated and are shown in Table 3. Achieved data showed that kepromec pour-on has potent effect in controlling of the gastrointestinal nematodes.

Obtained data showed that kepromec pour-on has more effect (approximately 90%) in prohibition of gastrointestinal parasites. This study is consistent with Uribe *et al*. (1989) researches results which have been reported that Ivermectin pour-on efficacy is 99%. They also reported that this drug has preventive effect on protozoan such as Eimeria, Amoeba and Cryptosporidium

Table 1: Mean of EPG in treatment and control groups before and after treatment

		Mean of EPG				
Groups	Parasites	Mean of 3 enumeration before treatment	1 day after treatment	7 days after treatment	21 days after treatment	28 days after treatment
Treatment group	*Trichostrongylus colubriformis*	730	152	18	7	-
	Haemonchus contortus	1280	320	24	3	1
	Trichuris trichiura	520	56	34	2	-
	Nematodirus spathiger	780	34	12	5	2
Control group	*Trichostrongylus colubriformis*	730	728	690	862	891
	Haemonchus contortus	1280	1072	820	942	913
	Trichuris trichiura	520	493	524	681	702
	Nematodirus spathiger	780	582	638	612	520

Table 2: Mean of LPG in treatment and control groups before and after treatment

		Mean of LPG				
Groups	Parasites	Mean of 3 enumeration before treatment	1 day after treatment	7 days after treatment	21 days after treatment	28 days after treatment
Treatment group	*Dictyocaulus viviparus*	486	401	320	12	-
Control group	*Dictyocaulus viviparus*	486	492	524	561	598

Table 3: Effect of Kepromec pour-on at different days after treatment

Parasites	Drug efficacy on day 1 after treatment (%)	Drug efficacy on day 7 after treatment (%)	Drug efficacy on day 21 after treatment (%)	Drug efficacy on day 28 after treatment (%)
Trichostrongylus colubriformis	80.56	97.39	99.18	100.00
Haemonchus contortus	70.14	97.07	99.68	99.89
Trichuris trichiura	88.64	93.72	99.70	100.00
Nematodirus spathiger	94.15	98.11	99.18	99.61
Dictyocaulus viviparus	18.49	38.93	97.86	100.00

(Uribe *et al*., 1989). Based on researcher's reports, Ivermectin 0.4 mg/kg/BW as tablet for 10 weeks decreases 100% of eggs and at the dose of 0.2 mg/kg/BW as subcutaneous and at the dose of 0.5 mg/kg/BW as pour-on route not only controlled parasitic infections but prevented of new patent natural infections. Also, in other study revealed that Ivermectin at the dose of 0.5 mg/kg/BW were effective on *Haemonchus contortus*, *Oesphagustomum columbianum*, *Bunostomum phlebostomum* and *Thalazia* species (Adams, 1995; Campbell and Benz, 1984; Egerton *et al*., 1988; Garg *et al*., 2007).

CONCLUSION

In this study, results demonstrate that genesis Ivermectin pour-on has high effect on gastrointestinal nematodes and use of this drug to controlling and prevention of parasitic infections is recommended.

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