Doramectin in Cattle

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Parasitic diseases have been responsible for great economic losses in cattle production worldwide since time immemorial , because they exhibit nonspecific signs and symptoms that often impede the diagnosis and ultimately cause high morbidity and mortality (Gosling , 2005) .

Among the many parasites that affect cattle, we have nematodes, which belong to the phylum *Nemathelminthes*. Roundworms are invertebrates with pointed ends. The body has no segmentation, and its size is quite variable. The body is covered with a whitish cuticle, which protects the parasite (Soulsby , 1987; Vignau et al, 2005) . Females may be oviparous, viviparous and ovivíparous. The eggs hatch within the host or in the environment, depending on species, are stimulated by reducing agents , moisture and appropriate temperatures . Nematodes process after ecdysis (cuticle formation, separation of the old cuticle, break out the old cuticle of the larva) always undergo four molts during development after hatching (larva 1 Larva 2 Larva 3 larva 4 and / or pre- adult). The adult parasites can be hosted in the eyes, mouth, tongue, stomach, intestine, liver, lungs and trachea cavities (Anderson, 2000; Vignau et al, 2005).

The main genera of nematodes that can affect cattle we have: *Trichostrongylus spp, Cooperia spp, Nematodirus sp, sp Bunostomum, Strongyloides sp, sp Haemonchus, Ostertagia sp, Dictyocaulus sp, and Onchocerca sp Thelazia* sp (Foreyt, 2001).

The proposed treatment for parasitic nematode infections includes a variety of drugs, including doramectin. Doramectin is a macrocyclic lactone belonging to the group of avermectin biosynthetic. Have slight structural differences with ivermectin, which gives it a longer plasma availability. It is administered at 200 mg / kg by SC route (EMEA, 2006) or using a dose of 0.5 mg / kg when a pour-on formulation (Merck, 2000) is used in cattle and is highly effective against nematodes and ectoparasites, however, is ineffective against cestodes and trematodes (Sumano and Ocampo, 2006).

Doramectin acts leading to increased permeability to chloride of membranes of the nervous system by inhibiting the electrical activity of nerve cells in the nematode. In Arthropods, doramectin also cause alteration on neuromuscular cells. The avermectins also increase the release of gamma amino butyric acid (GABA) in presynaptic neurons. GABA acts as an inhibitory neurotransmitter and blocks the stimulation of postsynaptic neuron adjacent in nematode or arthropod muscle fiber (Plumb , 2002 ; Sumano and Ocampo , 2006) .

In mammals, neuronal receptors that are binded to doramectin are located in CNS, and these compounds do not cross the blood-brain barrier, or only in small amounts are accumulated and does not affect its function. Moreover, mammals possess no chlorine channels glutamate dependent , making the avermectin group including doramectin , not toxic to mammals (Plumb , 2002; Sumano and Ocampo , 2006).

Experiments have demonstrated the effectiveness of doramectin against nematode. Thus we have that a single subcutaneous injection of doramectin at 200 mg/kg can reduce : 99.9 to 100% larval and adult stages of Ostertagia ostertagi , Cooperia spp. and Trichostrongylus axei in experimentally infected cattle (Watson et al, 1995), 99.2% and 90.7 % of Cooperia oncophora at 14 and 21 days after treatment , respectively , 100% and 99.9% at 21 Dictyocaulus viviparus and 28 days after treatment , respectively, and 99.9% and 93.7 % of Ostertagia ostertagi at 21 and 28 days after treatment, respectively in cattle (Weatherley et al, 1993) , 100% of Thelazia spp. both natural infections and experimental (Kennedy and Phillips , 1993) in 9 of 10

experiments showed that it can decrease in 21 days at 0 the number of eggs of Haemonchus spp , Ostertagia spp , Cooperia spp , Trichostrongylus spp and Nematodirus sp. detected in the feces. In the remaining experiment doramectin was able to reduce to 1 the fecal eggs of the species referred to 21 days after treatment (Phillips et al, 1996) .

It was also demonstrated that a single injection of doramectin at a dose mentioned and by the same route may also reduce the presence of eggs in the feces to 96.1-100 % for Haemonchus sp. Cooperia sp. Mecistocirrus sp. Trichostrongylus sp. , Ostertagia sp. , Bunostomum sp. , Strongyloides sp. and Trichuris sp. in cattle naturally infected in Japan (Saeki et al, 1995) in cattle artificially infected with 1000 infective larvae of Dictyocaulus viviparus can be 100 % effective with infections of 5 days, and mature infections of the parasite mentioned, until 35 days after infection (Whelan et al, 1995).

Loyacano et al (2001) demonstrated that the application of doramectin subcutaneously at 200 mg / Kg on cattle had a better effect on the gastrointestinal tract subclinical parasitism that ivermectin clorsulon in calves infected with nematodes and Fasciola hepatica , this being demonstrated on the growth performance , which was 0.79 kg/d for doramectin and 0.71 kg/d for the ivermectin group with clorsulon.

Furthermore, Hendrickx et al (1993) showed that application of doramectin in the dosage and the recommended route is 100% effective and safe in the treatment of the first , second and third stage of Hypoderma bovis in field infections in cattle. In another experiment, it was demonstrated that Doramectin is 99.3 % effective in controlling Chorioptes bovis infections in animals naturally infected up to a period of 35 days (Losson et al, 1998) . Moya- Borja (1997) showed that doramectin is 100% effective in protecting against infections Cochliomyia hominivorax up to 21 days after treatment. Tang (2008) showed that a commercial formula based on doramectin (Dectomec ® LA) is 100 % effective against ticks Boophilus microplus , from 48 hours to 21 days after application. While at 7 days post application, this commercial formula provided an 100% effective against larvae of flies of the genus Dermatobia hominis , keeping 100 % effective until day 35 post application.

There is demonstrated the great effectiveness of doramectin against endo-and ectoparasites, making it a great alternative to the wide variety of products to which a wide range of parasites has developed a strong resistance.

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