The efficacy of the product Albendazole 10% of gastrointestinal nematode parasitism in sheep tested

Testarea eficacitatii produsului Albendazole 10% în parazitismul cu nematozi gastrointestinali la ovine

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Abstract

Trichostrongylids are helminths of ruminants, located gastro intestinally. The disease generated by them is clinically manifested mainly by: diarrhea, weight loss, anemia and cachexia. They are produced by parasites belonging to the family Trichostrongylidae with genres: *Ostertagia, Haemonchus, Trichostrongylus, Cooperia* and *Nematodirus*. The study was accomplished in 2013 in Hidişeul de Sus village, Bihor County, and aimed to test the effectiveness of the Albendazole 10% in the natural infestations with gastrointestinal nematodes in sheep. Sheep studied consisted of 60 individuals from Turcana breed. Feces were examined by flotation method and to know the infestation level McMaster method was used, calculating the EPG value on day 0 of treatment, day 7 and day 14 post treatments. Anthelmintic efficacy (E%) of the used product was of 97.03% after the FECRT formula. For a more meaningful expression it was used also Presidente and Borgsteede relations, where the result of efficiency for the tested product was 98% for both formulas.

Rezumat

Trichostrongilidozele sunt helmintoze ale rumegătoarelor, cu localizare gastro-intestinală, manifestate clinic prin abatere, diaree, slăbire, anemie estivală, caşexie. Sunt produse de paraziţi ce aparţin familiei *Trichostrongylidae*, cu genurile: *Ostertagia*, *Haemonchus*, *Trichostrongylus*, *Cooperia* şi *Nematodirus*. Studiul a fost efectuat în anul 2013, în localitatea Hidișeul de sus din județul Bihor, şi îşi propune testarea eficacităţii produsului Albendazole 10% în infestatiile naturale cu nematode gastrointestinale la ovine. Turma de ovine a fost formată din 60 de indivizi din rasa Țurcană. Fecalele s-au examinat prin metoda de flotaţie iar pentru a cunoaşte nivelul infestației s-a recurs la metoda McMaster, calculând OPG în ziua 0 a tratamentului, O.P.G.-ul în ziua 7 p.t, iar în ziua 14 post tratament. Eficacitatea antihelmintică (E%) a produsului utilizat a fost de 97,03% după formula FECRT. Pentru o mai concludentă exprimare s-a recurs la relațiile Presidente şi Borgsteede, unde rezultatele au fost de 98% pentru ambele formule de calcul.

Introduction

Trichostrongylosis is a ruminant helmintosis found in the gastrointestinal tract with clinical signs like: apathy, diarrhea, weight loss, summery anemia, cachexia [4-6].

The disease has a seasonal evolution manifested clinically at the end of summer and in autumn. The infestation occurs at pasture, with food and water contaminated with trichostrongylids. It affects mostly young sheep, and in this case, the disease can be deadly [3].

Trichostrongylidosis is produced by parasites belonging of the family *Trichostrongylidae* and the most important genus is: *Ostertagia*, *Haemonchus*, *Trichostrongylus*, *Cooperia* and *Nematodirus*. The incorrect and injudicious administration of the anthelmintic products (based on albendazole) it generates the anthelmintic resistance. Trichostrongylids resistance on benzimidazoles is the most frequent between anthelmintics [9].

The aim of the study was to test the efficacy of the product Albendazole10% (Torox) in natural infestation with gastrointestinal nematodes in ovine. Similar studies were conducted in Romania by Indre et al. in 2011, were it shows the effectiveness of the product Gardal – 98.46% [8].

Materials and methods

The study was conducted during the year 2013 in Hidișeul de Sus from Bihor County, Romania. The flock was consisted from 60 sheep belonging to the breed Țurcană, with the age between 1-6 years old.

The sheep were identified by the rules in effect and were on pasture raised. Some sheep had clinical signs like: weight loss, apathy.

From each identified sheep were collected faecal samples directly from the rectum, stored into a cooling box and after that examined at the laboratory of Parasitology and Parasitical diseases from the Faculty of Veterinary Medicine Timişoara. The methods performed were: Willis method (qualitative method) and McMaster method (quantitative method). The parasitical charge (EPG-eggs per gram of feces) was counted prior to the treatment and in the zero day of treatment, but also in the seventh and 14th post treatment days. Were established two groups:

- **group A** (40 sheep) were treated with the product ALBENDAZOLE 10% and
- **group B** (20 sheep) the control group, was not treated.

The treatment was performed individually, administered orally with a 10 ml syringe, based on the weight of the sheep, in the morning, before the sheep should be fed, or taken out on pasture.

Each ml suspension of the product Albendazole 10% contains 100 mg albendazole. It was administered the recommended dosage: 0.5 ml/10 kg bodyweight, orally given.

Figure 1. The sheep from the study

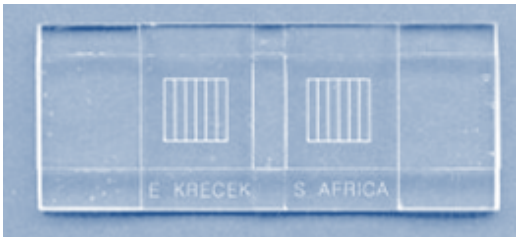

Figure 2. McMaster blade [12].

Description of ALBENDAZOLE 10% according to the TOROX Company prospectus

Albendazole 10%
Manufacturer: Torox
DCI: Albendazole 100g
Description:
10% is an anthelmintic albendazole in the form of an oral suspension in white plastic bottle.
Composition:
Each Albendazole 1 ml oral suspension contains: Albendazole 100 mg; Excipient to 1 ml.
Pharmacological actions:
Albendazole is a broad spectrum anthelmintic. It also has ovicidal action, thereby reducing contamination by grazing. Combat all parasites at the same time.
Indications:
To combat the following infections with parasites in domestic and wild ruminants and camelids:

- **gastrointestinal nematodes** in larval and adult stage: *Haemonchus, Ostertagia* (including its hypobiotic larvae), *Trichostrongylus, Oesophagostomum, Cooperia, Nematodirus, Capillaria, Bunostomum, Strongyloides* - small ruminants, cattle and camelids; *Chabertia* - sheep, *Marshallagia Marsh* and *Gaigeria pachyscelis* - sheep.
- **lung nematode larval and adult stage**: *Dyctiocaulus, Protostrongylus* spp. - In small ruminants.
- -**tapeworms adult liver (trematodes)** Fasciola *hepatica* - large and small ruminants; *Dicrocoelium dendriticum* - small ruminants; *Paramphistomum* - cattle.
- **tapeworms** (removal of segments and scolex): *Moniezia*.

Dosage and administration:
Only for oral administration.
Shake bottle before use.
Gastrointestinal worms, lung worms, tapeworms:

- **Ovine, Goats:** 0.5 ml/10 kg body weight;
- **Cattle, camelids:** 4 ml/50 kg body weight.

Liver flatworms (trematodes):

- **Ovine, Goats:** 0.5 to 0.75 ml/10kg body weight (for large worms); 1ml/10kg body weight (for small worms);

- **Cattle:** 5 ml / 50kg body weight (for *Fasciola hepatica*); 7.5 ml/50kg body weight (for *F. gigantica F. magna , Paramphystomum*) .

Animals constantly exposed to reinfection should be restated as required.

Contraindications: It does not exist.

Cautions:

Has been reported to be teratogenic in rats, rabbits and sheep, recommended doses should not be exceeded in animals with early pregnancy (the first month of gestation in sheep and goats in the first 6 weeks of gestation in cattle and camelids). For exact dosing is required precise determination of body weight.

Albendazole 10% is a very safe drug for ruminants.

Adverse effects:

It is not anticipated adverse effects after oral administration of recommended doses.

Waiting time:

- Meat: 14 days;
- Milk: 3 days.

Species: bovine, ovine.

The number of eggs per gram of feces (EPG) is calculated after the formula:

$$EPG = n \times 100 / 2$$

where:

"n" is the number of eggs found in both chambers of the McMaster blade [2].

The anthelmintic efficacy (E%) of the product utilized was calculated after the FECRT, Presidente and Borgsteede formulas.

$$E\% = \frac{\text{EPG before the treatment (0 day)} - \text{EPG 14th day}}{\text{EPG 0 day}} \times 100$$

For a better appreciation of FECRT, it was appealed, in addition to interpreting the results by the two relations: Presidente (1985) and Borgsteede (1987):

$$\text{Presidente (\%)} = \left(1 - \frac{T2}{T1} \times \frac{C1}{C2}\right) \times 100$$

$$\text{Borgsteede(\%)} = \left(1 - \frac{T2}{T1} \times \frac{\text{Global mean of the subjects 0 day}}{\text{Control group mean 14th day}}\right) \times 100$$

Where:

T1 and T2 represent coproscopy mean in 0 day and in 14th day from the treated group;

C1 and C2 represent arithmetic mean in 0 day and in 14th day from control goup.

Results and discussion

Some sheep had clinical signs manifested through: weight loss, apathy. After the treatment with Albendazole 10% the clinical signs were ameliorated and they have vanished after two-three days.

Were identified gastrointestinal nematodes eggs from genus: *Trichostrongylus, Nematodirus, Cooperia, Haemoncus and Ostertagia,* through the Willis flotation method.

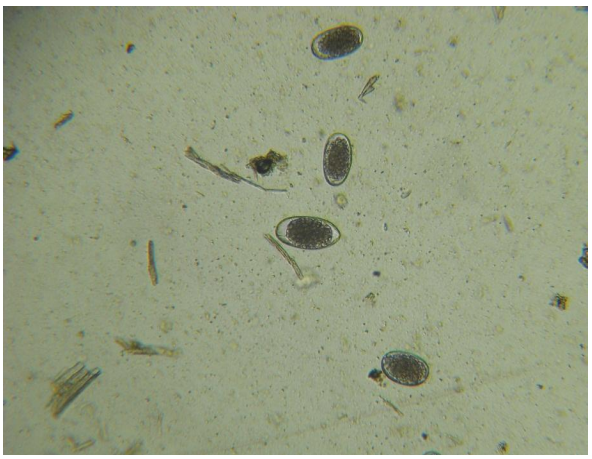

Figure 3. Gastrointestinal nematodes eggs.

For knowing the level of infestation on gram of feces was performed the McMaster method, so that in 0 day the EPG was 1350 (high infestation); in 7th day post treatment the EPG was 60; in 14th day post treatment the EPG was 40.

Anthelmintic efficacy (E%) of the utilized product was 97.03% after the FECRT formula:

$$E\% = \frac{1350-40}{1350} \times 100 = \frac{1310}{1350} \times 100 = 97.03\%$$

For a better appreciation of the effectiveness it was appealed at the: Presidente and Borgsteede formulas where the E% was 98%:

$$\text{Presidente (\%)} = \left(1 - \frac{40}{1350} \times \frac{1350}{1350}\right) \times 100 = 0.98 \times 100 = 98\%$$

$$\text{Borgsteede(\%)} = \left(1 - \frac{40}{1350} \times \frac{1350}{1350}\right) \times 100 = 0.98 \times 100 = 98\%$$

Soutello et al. (2010), in a similar study, were tested more types of anthelmintics in ruminants, counting the number of eggs from feces.

The anthelmintics administered were: moxidectin, ivermectin, levamisole phosphate and albendazole [11].

In the first 24 hours, levamisole had reduced the EPG significantly with 97%, after

36 hours post treatment moxidectin with 98.3% and albendazole with 95.9%.

In India, in 2013 a group of scientist led by Rialch, have investigated 14 flocks of sheep and goats, finding benzimidazoles resistance in 8 flocks out of 14 examined, with a FECRT between 54.95% - 90.86% [10].

A study was performed in Uganda by Byaruhanga et al. (2011) that shows anthelmintic efficacy of: 28.5% for albendazole, 91% for levamisole and 98% for ivermectin, against gastrointestinal nematodes [1].

Godara et al. (2011) have found an anthelmintic efficacy at: fenbendazole 23%, levamisole 63% and ivermectin 98.11%, against gastrointestinal nematodes in Jamnapari goats [7].

Similar studies were performed in our country by Indre et al. in 2011, were E% of the product GARDAL is 98.46% against gastrointestinal nematodes.

Conclusions

In Hidişeul de Sus, Bihor County, the sheep were natural parasitized with gastrointestinal nematodes.

The efficacy of the product Albendazole 10% was calculated by the FECRT formula and it was 97.03%.

The evolution EPG in 0 day and in 14th day post treatment in ovine groups recommend the administration of the product Albendazole 10% in the safety limit in infestation with gastrointestinal nematodes.

The efficacy of the same product (Albendazole 10%) was established through the Presidente and Borgsteede formulas and it was 98%. The clinical signs have vanished after three days from the product Albendazole 10% administration.

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