Comparative efficacy of some antiparasitic products in the therapy of helminthic diseases in sheep

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SUMMARY. The studies performed in sheep from Bistrița Năsăud County with the aim of determining the therapeutical efficacy of certain anthelmintic products leaded to the following results. Before therapy, the control revealed a complex infestation in the 6 experimental groups: fasciolosis (E = 10 – 25%), dicroceliosis (E = 30 – 45%), gastrointestinal strongyles (E = 30 – 35%) and pulmonary nematodes: muleriosis (E = 0 – 15%), and protostrongylosis (E = 10 – 15%). The intensity of helminthic infestations was low (+) for hepatic flukes and pulmonary nematodes infestation and varied between 100 – 400 EPG for gastrointestinal strongyles. After therapy, in the treated groups there were no more helminthic infestations found, albendazole and triclabendazole proving a 100% efficacy.

Introduction

Helminthic diseases of sheep are an important group of diseases which affect this species producing important economical losses by wasting, decrease of milk production and wool quality and also abortion.

With this view, this study aimed the evaluation of the efficacy of some antiparasitic products with albendazole and triclabendazole in helminthic diseases of sheep.

Material and method

The studied products were:

1. Albendazole, in two forms:
   - GARDAL 10% (Intervet)
   - UNIALBEN 2,5% (United Animal Health Ltd.)

2. Triclabendazole, in one form:
   - FASCIOCID (Romvac Company S. A.)

Studies were performed between March and April 2004 on 120 sheep, adults and young from Bistrița-Năsăud county (Dumitra and Valea Ghinzii localities) divided in 6 groups as follows:

- Group G1 - 20 sheep, 10 adult and 10 young from Valea Ghinzii, treated with Gardal 10%, 10 mg/kg b.w. (5 ml of Gardal/one 50 kg sheep).
- Group G2 - 20 sheep, 10 adult and 10 young from Valea Ghinzii, treated with Gardal 10%, 15 mg/kg b.w. (7.5 ml of Gardal/one 50 kg sheep).
- Group U1 - 20 sheep, 10 adult and 10 young from Dumitra, treated with Unialben 2,5%, 10 mg/kg b.w. (20 ml of Unialben/one 50 kg sheep)
- Group U2 - 20 sheep, 10 adult and 10 young from Dumitra, treated with Unialben 2,5%, 15 mg/kg b.w. (30 ml of Unialben/one 50 kg sheep)
- Group F – 20 adult sheep from Dumitra, treated with Fasciocid 10 mg/kg b.w. (5 ml of Fasciocid/one 50 kg sheep)
- Group M – control group, 20 adult sheep naturally infested and untreated.

Before therapy, individual fecal samples were collected from each animal (directly from the rectum) and parasitic profile was established for all sheep using sedimentation, Willis, Baermann
and McMaster. Extensivity (%) and intensivity of infestation were also determined. Intensivity was expressed in EPG (eggs per fecal gram) for digestive nematode and using a “+” system for trematodes and pulmonanry nematodes (+ low infestation with 1 – 2 eggs or larvae/field; ++ - medium infestation with 2 – 5 eggs or larvae/field; +++ - high infestation with over 5 eggs or larvae/field).

The efficacy of therapy was determined 14 days after therapy. Fecal samples were collected from all animals and examined by the same methods.

Results and discussions

Antetherapeutical control revealed the presence of the helminthosis shown in table 1. Results obtained 14 days after therapy are shown in table 2.

Table 1
Helminthic diseases structure before therapy

<table>
<thead>
<tr>
<th>Group</th>
<th>Fasciolosis</th>
<th>Dicrocoeliosis</th>
<th>Gastrointestinal strongyles</th>
<th>Mulleriosis</th>
<th>Protostrongylusosis</th>
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<tr>
<td>G2</td>
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<td>7</td>
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<tr>
<td>U1</td>
<td>4</td>
<td>20 +</td>
<td>9</td>
<td>45 +</td>
<td>7</td>
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<td>15 +</td>
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Table 2
Helminthic diseases structure after therapy

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<tr>
<th>Group</th>
<th>Fasciolosis</th>
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The Albendazole, a benzimidazolic derivate with high anthelminthic efficacy is absorbed through the digestive tractus and is distributed in almost all viscera being metabolized in the liver. Its mechanism of action consist of inhibition of cytoplasmic tubules. Its toxical effect is manifested at the level of cell membranes by alteration in their permeability and decrease of nutrients absorption. It also modifies the electric resistance of membrane lipids. (Bosche et al.,1985 cited by Şuteu and Cozma, 1998).

For the family of of benzimidazoles, albendazole seems to be specific to ruminants, because there are many products which contain this substance. These products have various administration forms: solutions, suspensions, boli, pulvis, premix and are have variable efficacy on gastro-intestinal and pulmonary helminths in sheep. The results obtained by other authors are comparable with ours.

In our country, Cosoroabă et al. (1996) tests the anthelminthic efficacy of albendazole prepared in various formulations (Valbazen 11,36% - Smith Kline Beecham; Valbazen 2,5% - INMV “Pasteur”; Pastazol 2,5% - Romvac; Vermitan 2,5% - Chinoin, Ovizol 150 mg şi 300 mg – INMV “Pasteur”) in 8 groups of 15 sheep each. The authors reveal variable efficacy of these formulations between 51.3 and 100% for the larvae of Dictyocaulus filaria. and 87.6-100% for gastro-intestinal nematodes.

One can notice that our results are better. The authors put the inferior results on the basis of deficiencies in dosing the products because posology depends on the precision of dosing
systems and a correct evaluation of the weight of animals. They also say that there is a higher efficacy of suspensions than boli.

Borcoș et al. (1998) determine the efficacy of albendazole (Rombendazol) in the therapy of strongyloidosis in lambs and obtain a fecal shedding reduction percent of 86.9 28 days after therapy, lower than the percent obtained by us for both albendazole based products. By using Verminylului, 7 days after therapy, the strongyle infestation has the same incidence (10%) with the antitherapeutical one. The animals became negative only 8-14 days after therapy.

Worldwide, albendazole is one of the most tested products as regarding the efficacy in sheep helminthic diseases. Williams et al. (1997) determine the efficacy of albendazole against larvae and adults of *Ostertagia ostertagi*, other gastro-intestinal and pulmonary nematodes pulmonary in sheep. The authors obtain an efficacy of 74.1% against adults of *O. ostertagi*, 76.5% against preadult stages, and 75.3% against L1 – L4. The lower efficacy suggests, according to these authors, the chemical tolerance for the used doses (10 mg/kg b.w.– oral suspension), or a chemical resistance phenomenon. The role of the mechanism by which preadult stages replace adults and medicine biodisponibility are not excluded.

These hypothesis are confirmes by the same authors (1991) which reveal in the same experimental conditions an efficacy of 99.0% against adults of *O. ostertagi*, 93.5% against preadults and 84.9% against L1 – L4, values that are higher then those recorded six years later. Albendazole’a efficacy was 98 – 100% against adults and L4 of *Haemonchus* sp. and *Cooperia* sp., and adults of *Trichostrongylus axei*, respectively.

The maximal efficacy in our study, for both albendazole based products, proves that there is no chemical resistance. The sulphoxyde form in Gardal may increase albendazole’s efficacy, as this process takes place normally in the liver. This form has an increased biodisponibility, absorbton and efficacy.

The anti-fluke effect of albendazole in sheep was determined by Craig et al. (1992). The authors gave 10 mg/ kg b.w. in two forms: oral suspension and food additive with an efficacy of 91.4% and 82.9%, respectively against *Fasciola hepatica*.

Onar (1990) determines a 71.5% efficacy of albendazole against *Fasciola hepatica*, and 12.7% against *Dicrocoelium lanceolatum* in sheep. Lower efficacy can be explained by the 5 mg/kg b.w. dose, uneffective against trematodes, but with maximal action against gastro-intestinal cestodes and nematodes.

The variable therapeutic efficacy of albendazole, explained by different mechanisms (under dose, tolerance, resistance) is conditioned also by its biodisponibility and pharmacokinetics influenced by the sheep’s general condition (Sanchez et al, 1996, 1997).

For Triclabendazole, the active substance from Fasciocid, Stevenson et al. (2002) revealed a high efficacy in the treatment of digestive trematodes and nematodesin sheep. The authors determined the efficacy of Fasinex and obtain a 91 – 94.2% efficacy, depending on the dose and the day of post therapeutic control.

**Bibliography**


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