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The Antihelminth Effect and Economic Efficiency of Clover and Absinth

Yonca ve Pelin Otu Bitkilerinin Antihelmintik Etkisi ve Ekonomik Etkinliği

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Abstract

There are applied different chemical substances against the helminthes which parasitize in sheep. Anthelmintics applied massively are excreted late from the organism by affecting of a direction on the animal organism that sometimes has a cumulative effect on them. In this study, the anthelmintic effects *in vitro* and *in vivo* conditions and economic efficiencies of the plants (clover, absinth) were investigated. The experimental animals which were naturally infected with the helminthes, grazed separately and together in the area with the same plants. The level of infection of the animals were detected with helminthovoscopic way and helminthological cutting to determine the anthelmintic efficiency of the plants. The economic efficiency was calculated on the basis of prevention of the harm from nematode worms. The plants showed high anthelmintic effect and each group of the animals was completely get rid of the parasites.

Keywords: Anthelmintic Effect, Economic Efficiency, Clover, Absinth

Özet

Koyunlarda parazit olarak yaşayan helmintlere karşı farklı kimyasal maddeler uygulanmaktadır. Kitlesel olarak uygulanan antihelmintikler, hayvan organizmasını tek yönde etkileyerek organizmalardan geç atılmakta ve bazı durumlarda organizmalar antihelmintikler üzerinde kümülatif bir etki göstermektedir. Bu çalışmada, bitkilerin (yonca, pelin otu) *in vitro* ve *in vivo* antihelmintik aktiviteleri ve ekonomik etkinlikleri araştırılmıştır. Helmintler ile doğal olarak enfekte olmuş deney hayvanları, ortak alanda ve aynı bitkilerle ayrı ayrı ve birlikte olmak üzere otlatılmıştır. Bitkilerin antihelmintik etkinliğini belirlemek amacıyla hayvanların enfeksiyon seviyeleri, helmintoskopi metodu ve helmintolojik kesim yöntemi ile tespit edilmiştir. Bitkilerin ekonomik verimliliği, nematodlardan kaynaklı zararın önlenmesi temel alınarak hesaplanmıştır. Bitkiler yüksek antihelmintik etkisi göstererek her bir grubtaki hayvanların parazitlerden tamamen kurtulduğu belirlenmiştir.

Anahtar Kelimeler: Antihelmintik Etki, Ekonomik Etkinlik, Yonca, Pelin Otu

1. INTRODUCTION

Gastrointestinal nematodes in small ruminants like sheep and goat cause significant animal diseases with production and economic losses in worldwide (Mengistu, Hoste, Karonen, Salminen, Hendriks & Pellikaan, 2017; Oliveira et al., 2017). The infections lead to several pathologic damages such as anemia, weakness, nutritional deficiency, weight loss and, in many cases, death in affected animals (Roeber, Jex & Gasser, 2013). The effective control of nematodes is usually predicated on strategic, repeated, management of

anthelmintics. For that purpose, synthetic, commercial drugs have mainly been used. However, the increase of nematode resistance, high cost, risk of environmental pollution and reduced animal production due to low efficiency has attracted interest as an alternative antihelmintics of bioactive compounds to medicinal plants and their secondary metabolites (Rochfort, Parker & Dunshea, 2008; Kamaraj & Rahuman, 2011).

In our first study, we studied the anthelmintic effect of plants over the conceivable mature helminthes out of the organism (Maharramov, 2001). When the helminthoside effect of the cooked plants over parasites are high, we continued to study their anthelmintic effect on the animals infected with Strongylidae. In this study, the anthelmintic effects in vitro and in vivo and the economic efficiencies of the cooked form of the plants which spread widely in Autonomous Republic and are excreted from the organism soon were researched. Clover (Trifolium pretense L.) which was constituted underlying the fodder of the experimental animals, is a perennial herb with three leaves and its blossoms are collected from the head group. Absinth (Artemisia absinthum) known as an anthelmintic plant since ancient times is mainly used in the treatment of cestodes. The research of the anthelmintic effect of the plants eaten by the animals, has great importance in terms of setting free them from helminthes substantially along with filling their forage reserves. In the view of this study, the regular grazing of animals in the area with a lot of such plants, will be cause them to be free from helminthes without any labor and means nectar.

2. MATERIALS AND METHODS

The surface organs of the plants cut into small parts, then were mixed with water at the rate of 1/10. After boiling in water bath for 30 minutes, the fodder was filtered through the cheesecloth (Damir, Prilipko, Shukurov & Kerimov, 1988). The petri dishes where the fodder was poured into were controlled to determine the motionless and death time of the conceivable helminthes, for learning the helminthicide effect of the plants out of organism. For this purpose, the helminthes were took out of the dish every 5-10 minutes and were inspected in the physiological solution. In this way, the anthelmintic effect of the plants on the animals infected first with Strongylidaes in cooked and brewed form. Fresh excrements from the animals before trie experience were taken to define their infection levels with helminthovoscopic ways. After giving of the solution, the anthelmintic efficiency of the plants was determined by examining the same excrement as to their eggs.

3 grams of excrement from each animal for 3 times were taken, mashed, added some water, winnowed out bigger particles and then, added some water to it again to examine the excrement for their helminth eggs. The same process was continued until the mixture became clear. At the end, the remained deposit was centrifuged, and the liquid part was discarded. The saturated solution of zinc-sulphate was added to the deposit and covered with cover glass. After centrifugation of the solution again, the cover glass was put into the thing glass and the eggs of sticky helminth were counted (Mammadov, Hajiyev, Shirinov & Ayayev, 1986). The excrement was taken from the animals of control group without solution along with the experiment group and helminthovoscopy was done.

The sheep were split up as control and experiment groups for defining the anthelmintic efficiency of the plants with helminthological cutting. In the research, the experiment and the control groups grazed with the plants which are known to have anthelmintic effect in the pastures under controlled condition. The levels of infection of the animals for each group were determined by taking excrement from them before the experiment. The animals of the groups had the same level of infection. At the end, the animals were killed and specified the efficiency of the plants in the view of the number of Strongylidaes (palisade worms) in their digestive system. The anthelmintic effect was determined with helminthovoscopic way and helminthological cutting in each group and calculateted the economic efficiency on the basis of the harm prevented.

3. RESULTS

The experiments were carried out for the purpose of learning the effect of plants on the Strongylidaes of digestive system *in vitro* condition after the haemonchuses (barber's pole worm) in the cooked surface part of the absinth in blossoming phase. The haemonchuses died in 2 hours 50 minutes,

whereas Strongylidaes died in 3 hours 20 minutes. But the death of tricholsephalyuses took place after a long time.

The death of Haemonchuses in the cooked surface part of absinth in blossoming phase happened in 4 hours 10 minutes and the death of Strongylidaes happened in 4 hours 50 minutes. The death of tricholsephalyuses lasted for a long time again up to 37 hours.

When the fodder made of the absinth were given to the animals naturally infected with Strongylidaes for 3 days 100 mg per each animal, under the results of helminthovoscopic examinations, the efficiency was specified as 49.5% in strongyloidiases. Otherwise, each animal grazed with the amount of 1 kg the green mass of the absinth, the efficiency was defined 48.4% in strongyloidiases. The efficiency of the preparations with helminthocide effect can be widely used in practice after it is specified with helminthological dissection. When each of the animals in the experiment was fed with 2 kg green clover for 10 days, the efficiency was 54.1% against haemonchuses, 50.8% against strongyloidiases and 29.1% against tricholsephalyuses based on helminthological dissection.

High level of efficiency (72.3%) were defined when 100 mg of the cooked form of the green mass of the absinth were given to the animals. The efficiency decreased till 51.2% in the animals given the quantity of 50 mg. The brewing made of green mass of the absinth low anthelmintic effect in comparison with the cooking. The efficiency was increased to 69% when the doubled dose was given to the animals. The anthelmintic efficiency of the fodder made of the dried surface parts of the plant was lower than the green mass. The anthelmintic efficiency was 39.9% because of the effect of the cooking in the group where the brewing made of it was given in 50 mg. The volume of the solution given to the animals was increased up to 100 mg in order to raise the efficiency of the brewing and thus, the efficiency of the preparation reached 62.3%. The following experiments on the green mass of absinth showed that it had strong helminthocide effect. The intensive efficiency of the solution made to drink the cooked which was made of green mass in the size of 50 mg for 2 days (the total dose 100 mg for each animal) in the animals, was 72.5%. The efficiency in the experiment animals which were given the cooked twice as much (100 mg for a day) for increasing the efficiency of the plants, reached 79.5%. There were stated pathological changes in the clinical symptoms of the animals which were in the experiment during the application of the absinth (Maharramov, 2000).

The anthelmintic and economic efficiencies of the animals were specified by allowing the animals naturally infected with Strongylidaes to enter the fields with the plants of helminthocide effect edible for animals. The sheep were fed weakly with the absinth because of its characteristic smell. Therefore, the experimental animals grazed first in the areas with the absinth and then the clover. The anthelmintic efficiency reached 72.6% in the animals grazed in the grass fields for 5 consecutive days under the helminthovoscopic examinations.

When the digestive system of the experimental animals cut with helminthological dissection, the anthelmintic efficiency reached 70.4% in haemonchuses, 69.2% in strongyloidiases and 17.4% in tricholsephalyuses.

The economic efficiency was calculated in the following formula based on setting free of Strongylidaes from the animals under the anthelmintic effect in the grass fields (Hajiyev, 2000; Maharramov, 2002).

S_z= Dchm 'Dchg'" Y_m Y_g

S_z: damage caused during strongyloidiases

Dchm: amount of decreased live weight

Dchg: price of 1 kg live weight

Y_m: amount of the lessened wool

Y_g: price of 1 kg wool.

In the study, sheep lose 3 kg live weight and 0.3 kg wool under the effect of strongyloidiases. The animals free from Strongylidaes under the effect of the anthelmintic plants, was 70% that it means the prevention of half of the harm the nematode worms did to the sheep averagely in the same amount. There is prevented 14-15 dollars of the total damage caused to sheep by strongyloidiases in a year regarding the value of the animal products in our republic. Without using any means and trouble in natural pastures for the purpose of freeing of animals from the helminthes and cure-preventive aims, the fact that the plants given to the animals also make up their fodder is very favorable for big farming economies.

4. DISCUSSION

The use of plants in the treatment of helminthes has an ancient history. Plants are widely applied as they have affective substance in a complex way (Hajiyev & Maharranov, 1996; Adilov, 1970; Berezekina & Demidov, 1979; Hajiyev & Eminov, 1985; Eminov, 1986; Ozguven & Tansı, 1999).

The gathering of grass in the phase of blossoming is considered more-expedient, because the amount of active affective substances in the same phase reaches its maximum level (Aliyev, Guliyev & Ibragimov, 1971). The affective substances are not decomposed-when the gathered grass is dried in a shadowy place. The preparation of the cooked from the gathered grass causes the passage of more parts of the affective substances to the composition of the solution (Rabinovich, 1988). Therefore, the plants were prepared from the surface parts gathered in the blossom phase and they were dried in the shadow for the anthelmintic effect.

The perishing of helminthes by the preparations with anthelmintic effect *in vitro* condition, happens as a result of disordering of the functions of respiratory, digestion, secretory and other systems. The freeing of the animals infected with helminthes doesn't always happen because of the death of helminth under the effect of the preparation. It sometimes happens with leaving of helminth the organism of an animal because of paralyzing of muscular lymph under the effect of the preparation. When the male fern which has the efficient anthelmintic effect in the treatment of cestodes, is given to pigs, bulls and hares infected with helminthes, it is excreted from the organism for the muscular system is paralyzed (Sokolov & Zamotayev, 1984). According to the researches the surviving of helmints proved it.

Regarding with the high level of the solution of the medicine in water caused the quick winnowing from the intestine and caused to the toxic influence to the organism. Beside the influence helmints of the boiled intestine of the plants winnowing from intestine influence complexly to the organism, sometimes has the toxic effect. According to the histological examinations of the internal organs the formation of the toxicose was research (Maharramov, 2008). According to the conducted experiments at the foothills pasture of Nakchevan the plants such as carapodium, valerian, horsetail, absinth and son on, we proved the fatal influence of the stated plants (Maharramov, 2000, 2002; Maharramov, 2001).

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