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The Effect of the Mixture of the Anthelmintic Plants on the Histological Changes in the Internal Organs of the Sheep

Antihelmintik Bitki Karışımının Koyun İç Organlarının Histolojik Değişimleri Üzerine Etkisi

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Abstract

Gastrointestinal nematode infections may cause great morbidity and mortality significantly worldwide, and serious economic losses in livestock farming. Many chemical compounds and plant metabolites have toxic effects on nematodes. Synthetic drugs have been considered as the most efficient way to control and treat parasite infections. However, these drugs are expensive and sometimes unavailable for people and show some side effects which has restricted the achievement of gastrointestinal nematodiasis control in sheep. Therefore, in recent years there has been an increasing interest in medicinal plants as an alternative anthelmintic source. The aim of this research were the investigation of the influence of the mixture of clover (*Trifolium pretense* L.) and liquorice (*Liquorice procera*) on the internal organs of the sheep. For this purpose, the sheep were separated into the groups were given at increasing therapeutic doses of the plant mixture (grass, clover and liquorice) as twice, three times and five times. The therapeutic dose of the clover and liquorice didn't cause pathological changes in the organs (kidney, heart and liver) at the level of the cells and tissue.

Keywords: Anthelmintic, Medicinal plants, Clover, Liquorice

Özet

Gastrointestinal nematod enfeksiyonları, dünya genelinde önemli ölçüde hastalıklara ve ölümlere ve canlı hayvancılıkta ciddi ekonomik kayıplara yol açmaktadır. Birçok kimyasal bileşenler ve bitki metabolitleri, nematodlar üzerinde toksik etkilere sahiptir. Sentetik ilaçlar, parazit enfeksiyonlarının kontrolü ve tedavisinde en etkili yol olarak düşünülmektedir. Ancak bu ilaçlar pahalı ve insanlar açısından ulaşımı zor olup koyunlarda gastrointestinal nematodyaz kontrolünü sınırlayan bazı yan etkiler göstermektedir. Bu nedenle, son yıllarda alternatif antihelmintik kaynağı olarak tıbbi bitkilere olan ilgi giderek artmaktadır. Bu araştırmanın amacı, yonca (*Trifolium pretense* L.) ve meyan kökü (*Liquorice procera*) karışımının koyun iç organlarına etkisinin araştırılmasıdır. Bu amaçla, gruplara ayrılan koyunlara arttırılmış terapötik dozda bitki karışımları (ot, yonca ve meyan kökü) iki, üç ve beş kez olmak üzere verilmiştir. Yonca ve meyan kökünün terapötik dozu, organlarda (böbrek, kalp ve karaciğer) hücreler ve doku düzeyinde patolojik değişikliklere neden olmamıştır.

Anahtar kelimeler: Antihelmintik, Tıbbi bitkiler, Yonca, Meyan kökü

1. INTRODUCTION

The usage of the medicine in different societies has continued since ancient times. Nevertheless, the chemical medicine has been used for the treatment purpose. Also, for the treatment of Gelmintose was used the chemical medicine. From this point of view, for the treatment of these problems many scientists have suggested the medicine plants. The

mass implementation of the anthelmintic plants prevents the environmental pollution in 11comparison with chemical medicine. In general, the plants significantly influence animal organism but the effect of the plants is removed quickly. Therefore, the cumulative properties of the plants are limited. The complex characteristics of the medicinal plants influence animal organism. For this reason, the search of anthelmintic effect of medicinal plants has great significance. The usage of the medicine plants for the treatment of the helminthic diseases attracts the attention of many scientists and the valuable investigations have been conducted on this field (Blagoveshenski, 1989; Damirov, Prilipko, Shukurov & Kerimov, 1988; Hajiyev, Eminov & Maharromov, 1993; Maharramov, 1991).

For the practical implementation of the medicine, the toxicological properties should be evaluated. During the investigation of the toxicological properties, three factors should be implemented in the modern toxicology: The parameters of the acute toxicology, the cumulative properties, the possible theratogenic effects.

The purpose of this study was evaluating the effects of the mixture of clover (Trifolium pretense L.) and liquorice (Liquorice procera) to the internal organs of the sheep. The effects of the plants on the livestock were determined with the influence to the general clinical condition, morphological indices of the blood, physico-chemical properties of the urine and internal organs of the animals. During the investigation, of the acute toxicity of clover and liquorice was detailed. The mixture of the plants refers to the class of the practical untoxic elements, so that its LD50 during the peroral and inabdominal injection equals to the unit increasing 1500 mg/kg (Sanochskii & Ulanova, 1978; Maharramov, 2013). The influence of the plants to the internal organs of the animals during the treatment can pass without clinical signs.

2. MATERIALS AND METHODS

The experiments were conducted in 40 sheep, split into four groups as ten heads in every group: three of them for the experiment and one group for control. The animals of the experimental and control groups were the equal according to the age, weight and stoutness. To the sheep of the first group during two days were given the therapeutic dose of the grass, clover and liquorice (0,5 kg/kg clover, 18 g/kg liquorice), the second group were fed the increasing therapeutic dose in three times (1,5 kg/kg clover, 54 g/kg liquorice), the third group were fed the increasing therapeutic dose in five times (2,5 kg/kg clover, 90 g/kg liquorice). The fourth group was under the control. During the experiment, general clinical conditions of experimental animals were controlled.

At the end of the research all experimental sheep were decapitated and the pieces of the tissues of the kidneys, spleen, heart, liver were extracted. The organs were fixed in 10% formalin. After the fixation, the thin cuts were prepared from the samples. Then, the cuts were fixed in 10% formalin again. At the following day the cuts were washed under the tap during three hours and replaced in 40% alcohol, one day later 70%, then 96% alcohol. Furthermore, the samples replaced in alcohol-ether 1:1, then celluloid solution. After that, the samples with the celloid solutions were fixed in the mould and for three hours were replaced in chloroform. After three hours, they were replaced to the prior developed alcohol. At the following days the cuts in 8-10 mm were prepared with microtome equipment. Each cut was fixed in 96% alcohol. The cuts were painted by method of hematoxylin and eosin staining were fixed on the subject slide (Korkmazov & Aliyev, 1995; “Methods of A Histologic Research”, 2018).

3. RESULTS AND DISCUSSIONS

The results of this research showed that in the spleen, cortex and medulla layers of the kidney, heart and liver of the test and control groups acquiring the therapeutic dose of the plant mix pathological changes at the level of the cells and tissue were not observed. In the kidneys of the animals receiving therapeutic dose third time, all blood vessels had the rocks of the limestone sediments. The special alterations were not detected in the liver and the lymphohistiocytic infiltrate was stated in the internidus tissue. The hyperplasia of the lymph like elements were determined in the spleen. It was defined that the the equal proportions of the lymphohistiocytic infiltrate with the myocardial cells had in the strome of the heart. In the third group, the cell infiltration and the hyperplasia of the spleen were determined in myocytes and epicardial cells. When hepatocytes became swelling, vessels were

full-blooded. In addition, kidney canals were full blood, when calcified stones were seen.

Thus, the therapeutic dose of the clover and liquorice has not the toxic influence at the level of cells and tissues. During three and five time increasing therapeutic dose, the weak patho-histological changes were stated. It showed that the clover and liquorice can be implemented against Strongylidae of the stomach-intestine tracts of the sheep even in five time increasing therapeutic dose.

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