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EFFICACY IN THE EXPERIMENTAL APPLICATION OF A COMPLEX OF BIOLOGICALLY ACTIVE SUPPLEMENTS

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Abstract Results of morphological studies conducted in experimental animals (white rats) are presented. The morphological changes in the liver of experimental animals fed with biologically active agents were compared and the results of morphological studies justifying the prevention of toxic poisoning and pathogenetic prevention of intoxication were analyzed. Appropriate conclusions were drawn.

Keywords: toxic poisoning, liver morphology, biologically active agents, glycogen, dystrophy, experimental animals.

INTRODUCTION

Among the many useful properties inherent in plants, people distinguish medicinal properties. Nature is not only a source of food, but also the first doctor of man. Especially in maintaining a healthy lifestyle, plants play an important role as a source of food and medicine. They are sources of vegetable oils, starch, sugar, protein, vitamins, phytoncides, acids, tannins, and finally plants provide us with bread, honey and wax. Thanks to vegetable food, we get meat, milk, animal fats, cheese, wool, leather and other products. Many plants are carriers of various biologically active substances that determine the medicinal properties of herbal remedies widely used in medicine and veterinary medicine. Therefore, at present, science has isolated and studied the biologically active substances contained in natural drugs, synthesized them, which allowed the production of synthetic drugs by the chemical and pharmaceutical industries. We now know that synthetic drugs often have slightly different effects compared to natural analogues, for example, different absorption rates and, therefore, unequal speed of the coming treatment effect, with the possibility of allergic reactions, side effects, different storage periods, etc., due to different spatial arrangements of atoms in natural and synthetic drug molecules as confirmed by stereochemical studies. Despite the success of chemistry, which has given medicine and veterinary medicine many new effective drugs, the use of medicinal plants is becoming more widespread [1,3,7,8].

The advantage of phytotherapy lies in the fact that herbal preparations have sufficient pharmacotherapeutic effectiveness, with their reasonable use they do not have side (negative) effects on the body. The therapeutic effect of medicinal plants is related to the presence of biologically active substances in them.

Biologically active substances - vitamins (riboflavin, pyridoxine, ascorbic acid, folic acid, etc.) selectively affect individual liver functions [2]. The positive effect of the studied vitamins is manifested in the elimination or significant reduction and faster recovery of the changes in liver functions in animals poisoned with phospho-organic and pyrethroids. Taking these data into account, the selection of biologically

active substances (lipoic acid, calcium pangamate, potassium orotate, licorice root, and marigold fruits) was carried out as pathogenetic prevention and normalization factors of metabolic processes in poisoning with pesticides of the pesticide group [3,4].

The one-sided nature of changes in integral indicators of carbohydrate and protein metabolism in the blood of people working with pesticides and in the blood of experimental animals exposed to pesticides indicates the similarity of the main mechanisms of the emergence and development of metabolic changes in the body of experimental animals.

This is to prevent the negative impact of pesticides on the body of workers, taking into account the pathogenetic basis of their effect on the body requires the development of measures. This task was solved with the help of biologically active substances that have previously proven themselves in conditions where other factors have a negative effect on the body: the preparation of marigold fruits (to normalize oxidation-reduction processes), calcium pangamate (to activate the respiratory chain), lipoic acid (to activate and detoxify metabolic processes for), potassium orotate (to stimulate nucleic acid metabolism and detoxification of pesticides) and licorice root tincture (to regulate metabolism). An experimental study was conducted in order to consider the mechanism of toxic action of some pesticides (Fozalon and Baton ES), to develop and implement new, pathogenetically based approaches to the prevention of poisoning and the treatment of chronic intoxication with pesticides.

The purpose of the study. Basing the pathogenetic prevention of the poisoning process in experimental animals fed with a complex of biologically active agents and carrying out a comparative morphological analysis.

MATERIALS AND METHODS

In experimental conditions, 138 white male rats were fed with a complex of BAS drugs during acute and chronic poisoning modeling, and the results obtained were comparatively analyzed. In this, the experimental animals were divided into three groups, ie, the first group was intact (healthy), the second group was acutely and chronically poisoned, and the third group was acutely and chronically poisoned during feeding with BAS agents. Morphological examinations were studied with Van-Gieson, ShIK reaction and Hemotoxylin-Eosin stains on 30-60-90 days.

RESULTS

In order to determine the remedial effect of using a complex of biologically active supplements (BAS), observation and analysis were carried out under experimental conditions in rats in acute and chronic poisoning with Fozalon, a representative of Phospho-organic pesticides, and Baton ES, a representative of the pyrethroid group.

As a result of morphological studies, it was observed that swelling of vascular stromal elements, mucoid and fibrinoid swelling of intercellular substance and fibrous structures were noted. In this case, it was found that the trigeminal vessels were softened, the portal vein was dilated, full, the structural elements of the wall were swollen, softened and deformed, and the cellular elements were randomly located (Fig. 1).

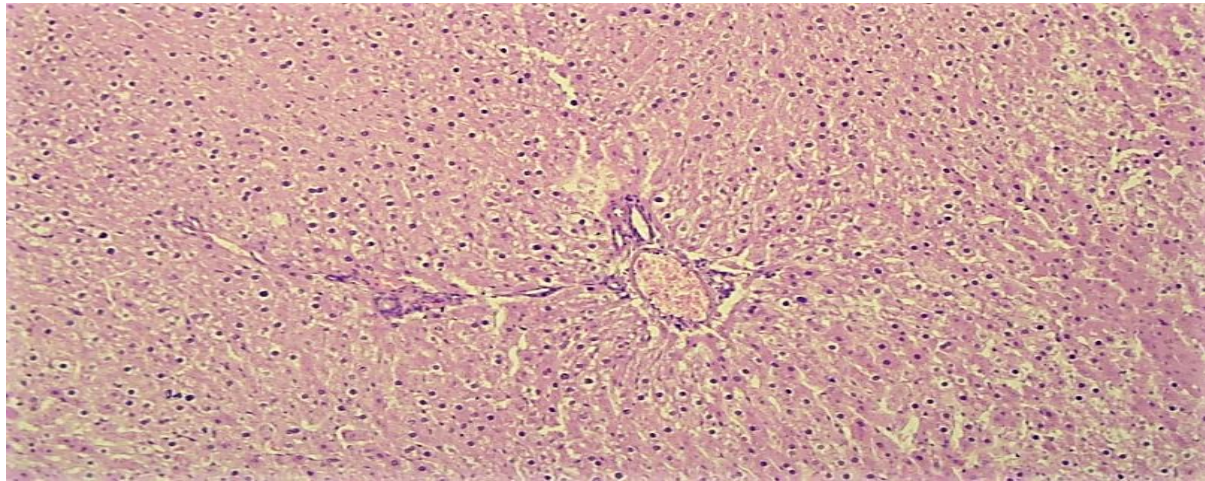


Figure 1. 30 days without treatment. Edema and disorganization of the vascular-stromal structures of the liver. Stain: V-Gs. Size: 10x10.

In addition, it was observed that the arteries became narrowed, fissured, and the swollen fibers of the surrounding connective tissue softened. In the histochemical examinations carried out to determine the fibrous structures of the connective tissue by the Van-Gieson method, fragmentation and softening of the fibrous structures stained red with picrofuchsin (see Fig. 2) were noted in the triad and in the wall of the central vein.

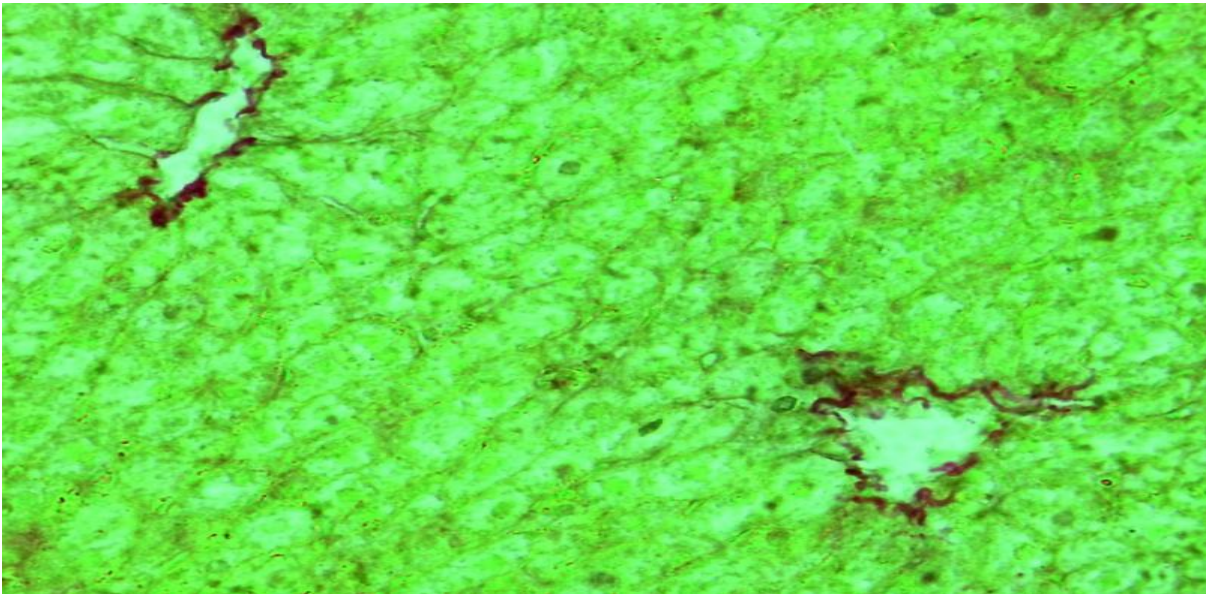


Figure 2. 30 days without treatment. Fragmentation and softening of the fibers around the liver blood vessels. Stain: V-Gs. Size: 10x20. Histochemical staining of liver tissue for the detection of glycogen in the cytoplasm of hepatocytes showed that in some hepatocytes, SHIK-positive substance was diffusely located and concentrated (see Figure 3), while in other hepatocytes, less abundant granules were

detected in the periphery of the cytoplasm.

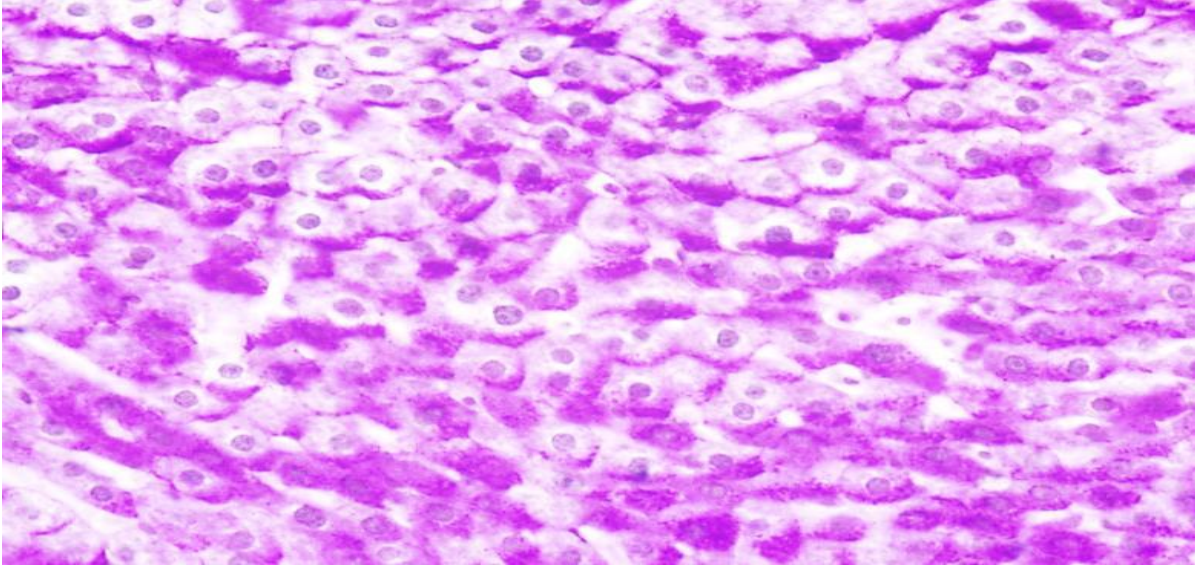


Figure 3. Without treatment. Uneven storage of glycogen in the cytoplasm of hepatocytes. Stain: SHIK-reaction. Size: 10x40.

Thus, by 30 days after poisoning with pesticides, damage to both vascular-stromal and parenchymatous elements is noted in the liver. In the wall of sinusoids and central veins, development of swelling, disorganization of fibrous structures and intercellular substance, softening of fibers, irregular arrangement of cell element by cell element was observed. It was noted the distribution of glycogen in the liver parenchyma and a decrease in its amount, the development of dystrophic changes in the cytoplasm of hepatocytes in the form of hyaline-droplet protein dystrophy. The development of chronic persistent toxic hepatitis was noted in the liver of animals with chronic poisoning with pesticides, which was manifested by increased inflammatory lymphohistiocytic infiltrate with the formation of fibrosis from fibrous and connective tissue cells. The presence of focal necrosis in the center of the lobular areas and layered necrosis in the pre-portal areas of the liver parenchyma was determined.

In contrast to the above-mentioned morphological changes, histochemical analyzes of experimental animals treated with BAS showed a positive effect on the prevention and cessation of liver toxicity. That is, moderate expansion of central veins, insignificant expansion of sinusoids and space of Diss was noted in the liver tissue. The opening of the sinusoids is empty, only in some places single erythrocytes and a protein mass are detected. The columnar structure is preserved, hepatocytes are located directly around the central vein, they have a well-stained cytoplasm with eosin, only in the cytoplasm of hepatocytes in the intramodular part of the liver lobe, insignificant vacuolar dystrophy is noted. At the same time, in the histochemical studies conducted to determine the state of glycogen, it is noted that in the cytoplasm of most hepatocytes, the SHIK-positive substance is preserved in a diffused form of the cytoplasmic area (see Figure 4).

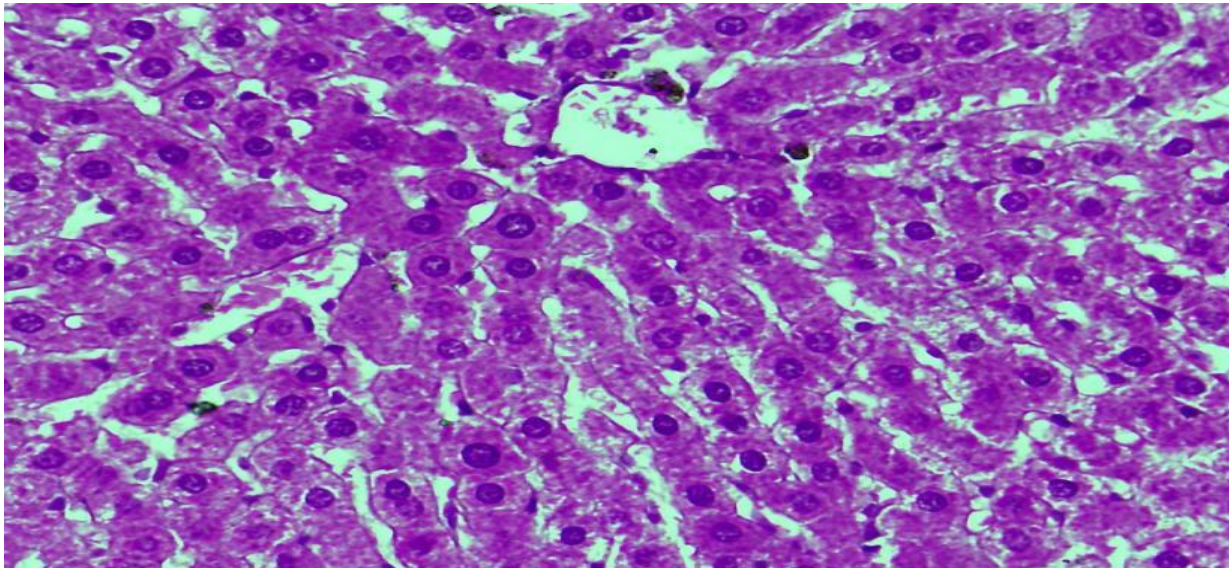


Figure 4. 30 days based on treatment. Sinusoids and central vein were moderately dilated, hepatocytes preserved their normal staining and histological structure. Stain: V-Gs. Size: 10x40.

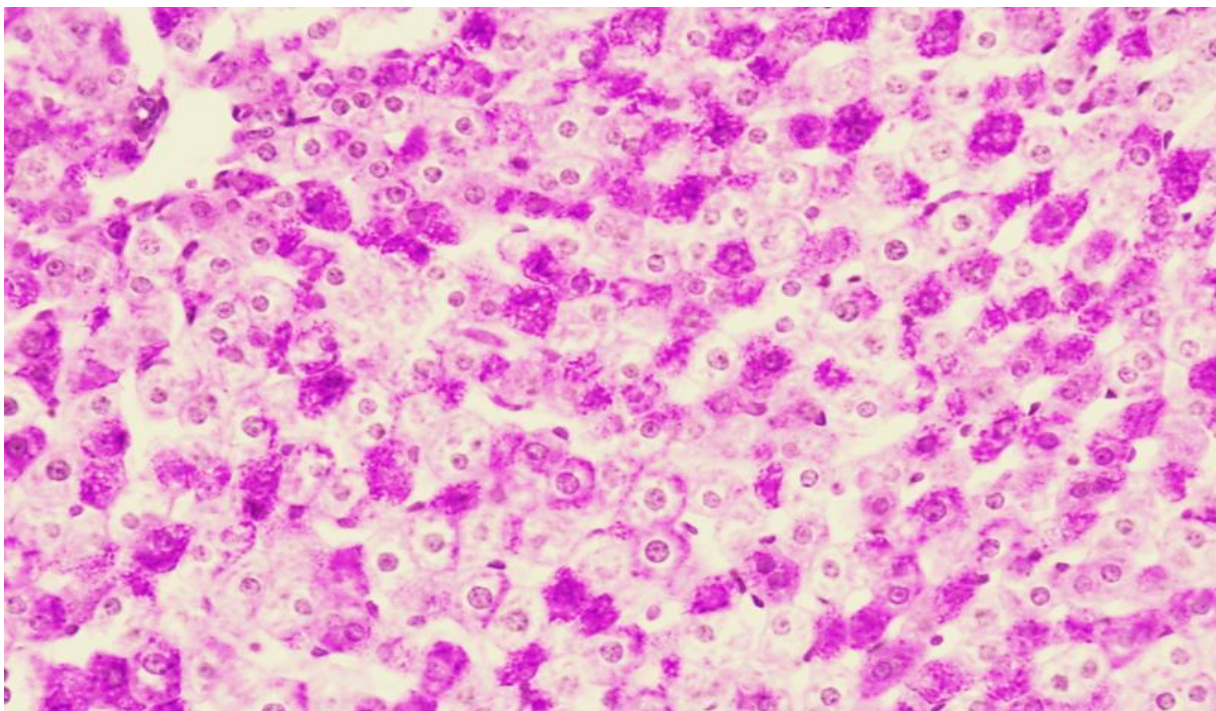


Figure 4. Day 30 of treatment. It was evident that most hepatocytes kept IIIK-positive material in their cytoplasm. Stain: SHIK-reaction. Size: 10x40.

Experimental animals fed with a complex of biologically active supplements have preserved the columnar and segmental structure of the liver parenchyma, hepatocytes are arranged along the columns, they have a normal histological structure. The cytoplasm of hepatocytes is uniform in shape and size, the outer membrane is well defined, the cytoplasm is evenly stained with eosin without signs of pathological changes. The nucleus of hepatocytes is located in the center of the

cell, rich in chromatin, some of them have nucleoli (see Fig. 5).

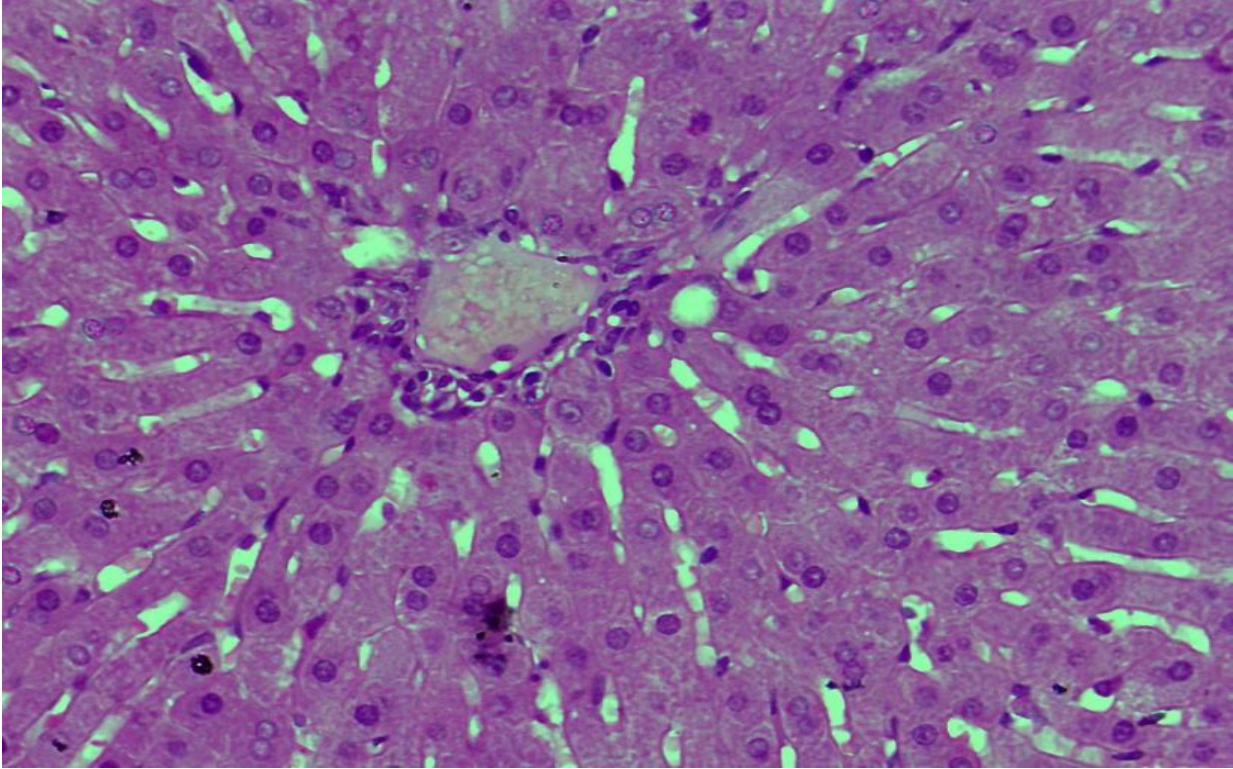


Figure 5. 60 days on the basis of treatment. Softening and disappearance of swelling in the liver tissue with preservation of the histological structure of hepatocytes. Stain: V-Gs. Size: 10x40.

As a result of histochemical studies, the presence of small homogeneous and fibrillar structures stained red with picrofuchsin remains in the portal tract tissue. The central vein is moderately enlarged, the walls are thin, the endothelial cells are dense (see Fig. 5).

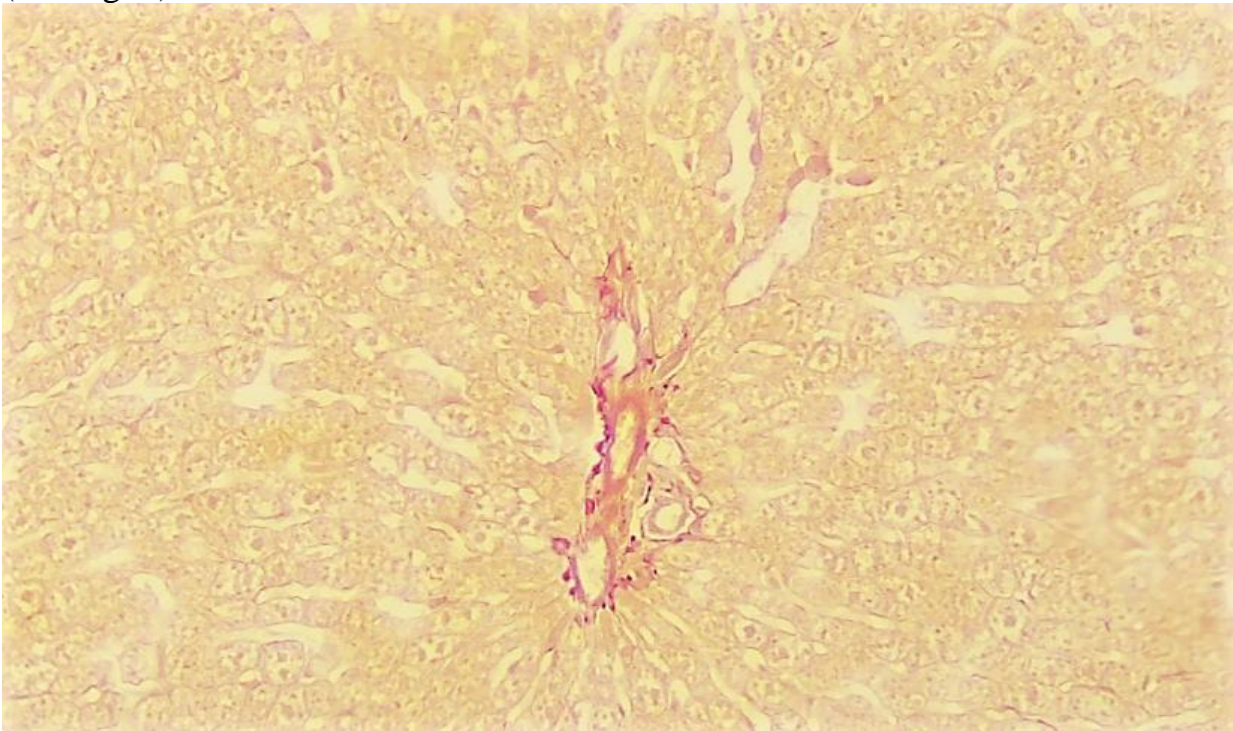


Figure 6. 90 days based on treatment. The average amount of picrofuchsin positive substances in the tissue of the portal tracts. Stain: according to van Gieson. Size: 10x40.

CONCLUSION

Thus, in the case of poisoning against the background of pesticide treatment, the results of microscopic examination of liver tissue showed that dystrophic, destructive, inflammatory, disregenerative change processes were decreased. In dynamics, stabilization of metabolic and dystrophic changes in the form of loss of protein or vacuolar dystrophy in hepatocytes or parenchyma, hepatocyte cytoplasm was noted, necrobiosis foci completely disappeared. Due to the reduction of destructive changes in the liver parenchyma, a reduction in the inflammatory process in vascular-stromal components was noted. Therefore, the volume of inflammatory lymphohistiocytic inflammation decreases, fibrosis does not develop. Morphological signs of chronic persistent hepatitis disappear under the influence of a complex of biologically active supplements.

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