

The reaction of hepatocytes to the effects of pesticides

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Abstract. The work is devoted to the study of the effect of pesticides on the morphological structure of the liver in experimental animals. The work was performed in a scientific laboratory. Modeling was performed in 138 outbred white rats. The morphological changes in dynamics were studied and appropriate conclusions were drawn on structural changes and the possibilities of correction were indicated.

1 Introduction

It has long been known that pesticides cause significant changes in the structure and metabolism of tissues, cells and subcellular structures, being non-specific structural and metabolic poisons. An analysis of the dependence of the action of pyrethroids and their structure made it possible to establish that some pyrethroids are more toxic to warm-blooded animals. They show their toxic effect regardless of the route of their penetration into the body [1-16]. However, the study of the effect of Baton EC and Fozalon on the liver remains poorly understood.

2 Material and methods

The study of the toxicity and mechanism of action of pesticides (Baton EC and Fozalon) on the body of white rats and rabbits in conditions of optimum air temperature.

Experimental studies to study the toxicity and mechanism of action of pesticides were carried out on 138 male white rats and 36 rabbits under conditions of optimum air temperature. Experimental studies aimed to study the toxicity and mechanism of action of the pyrethroid group pesticides most often used in agriculture (especially in horticulture) of the Republic (Baton EC, Fozalon). The experimental part of the work was carried out under optimal temperature conditions: exposure to pesticides at the optimum (22.4 ± 2.1 °C) air temperature. All studied parameters in experimental animals were compared with those of animals in the control group. The control animals were kept in the vivarium under the same conditions as the experimental ones.

The chronic effect of pesticides on the animal organism was studied in sublethal (3/4 LD50) and toxic (1/20 LD50) doses. Experimental animals daily for 30-90 days were injected into the stomach with an emulsion of pesticides under conditions of optimal air

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temperature. After the end of the experiments, the rats were decapitated and the liver was quickly removed for research.

Morphology and functional state of the liver in normal conditions" presents scientifically based, modern advances in the study of angio-architectonics and histostructure of the liver in normal conditions in experimental animals.

Results of our own research. Provides data in dynamics 30-60-90 days from the beginning of the seed.

Thus, according to the results of histomorphological studies, it was found that the following picture is observed in intact experimental animals: Portal tracts are represented by triads: arteriole, venue and bile ducts. Arterioles have a well-defined intima, an internal elastic membrane, and several layers of smooth muscle cells in the middle layer of the wall. The lumen of the sinusoids is wide; limited to one layer of the endothelium, their wall is devoid of smooth muscle cells. The interlobular bile ducts are located in the center of the portal tract; the wall is lined with cuboid epithelial cells. The nuclei of these cells are small, rounded, and the cytoplasm is poorly developed. The stroma of the portal tracts contains single macrophages, histiocytes, lymphocytes and polymorphonuclear leukocytes. Sinusoidal capillaries inside the lobules are very small vessels, their walls are lined with endothelium. Leukocyte infiltrates and connective tissue fibers in the parenchyma and in the peri-portal tracts are not detected (Fig. 1).

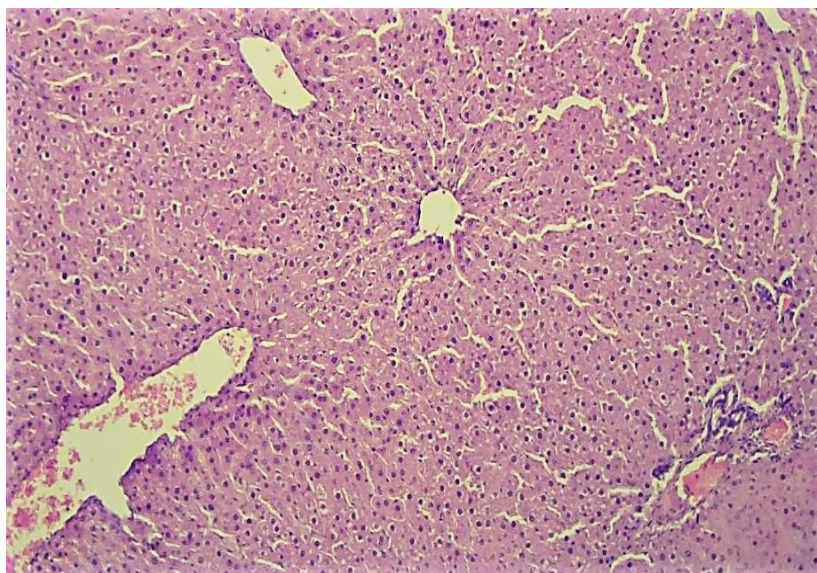


Fig. 1. Normal lobular and bar structure of the liver parenchyma, good differentiation of the central veins and triads. Coloring: G-E. SW: 10x10.

On the 60-90th day of chronic pesticide poisoning of animals in the liver, the development of chronic persistent toxic hepatitis is noted, which manifested itself as an increase in inflammatory lymphohistiocytic infiltrate with the formation of fibrosis from connective tissue cells and fibers. From the side of the liver parenchyma, the presence of stepped necrosis in the peri portal zones and focal necrosis in the center of the lobular areas is determined (Fig. 2, 3, 4, 5, 6).

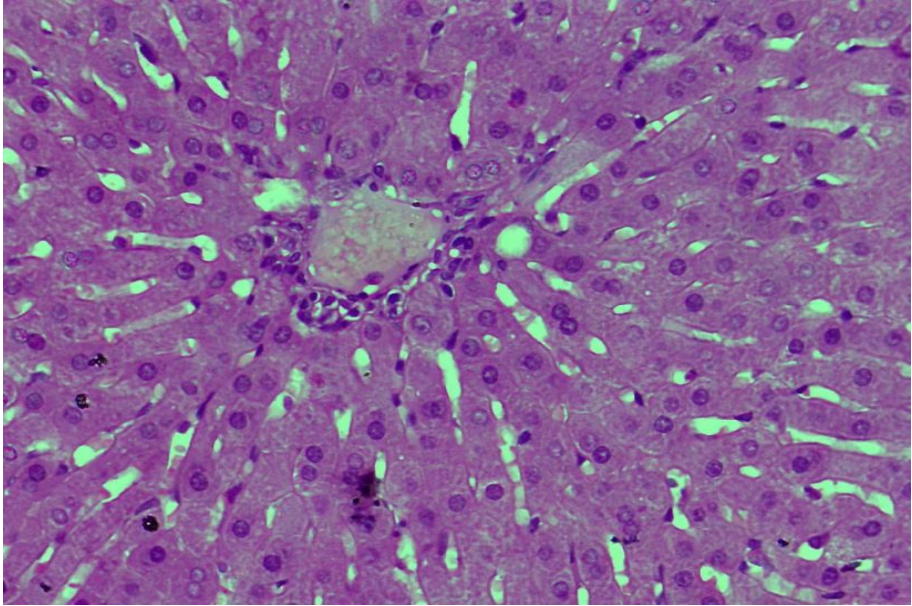


Fig. 2. 60 days against the background of treatment. The disappearance of edema and loosening in the liver tissue with the preservation of the histostructure of hepatocytes. Coloring: G-E. SW: 10x40.

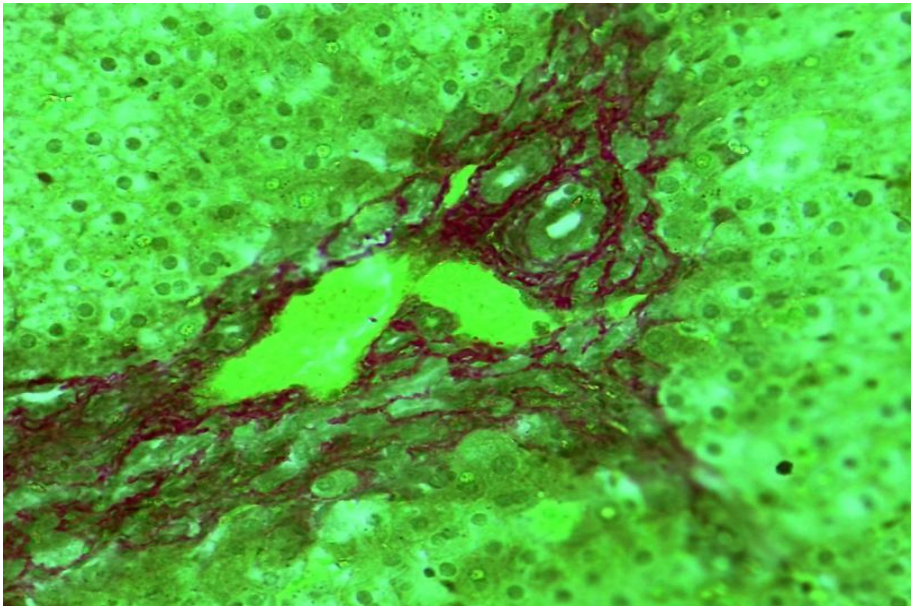


Fig. 3. 60 days without treatment. An increase in the number of fibrous structures along the portal tracts. Coloring: van Gieson. Uv: 10x40.

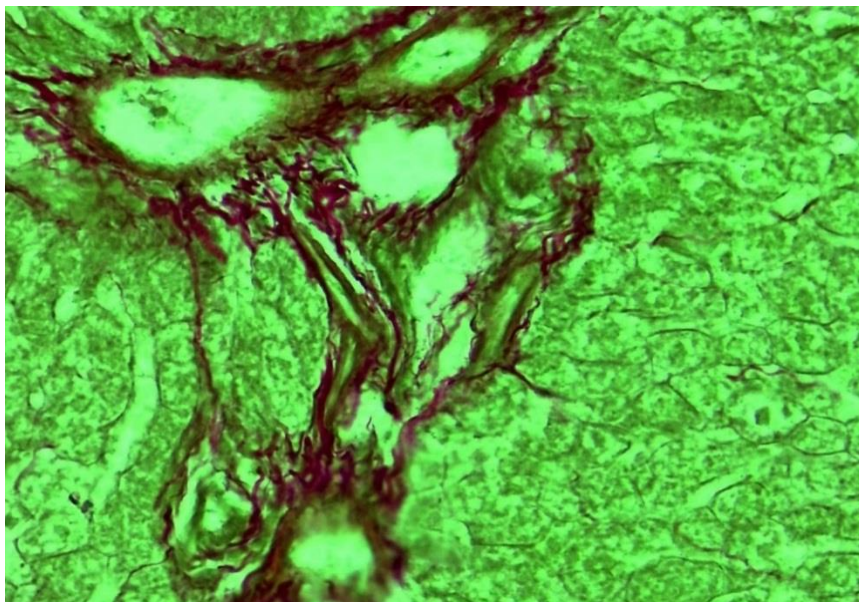


Fig. 4. 90 days without treatment. An increase in the number of fibrous structures along the portal tracts. Coloring: van Gieson. Uv: 10x40.

The results of microscopic examination of the liver tissue of pesticide poisoning during treatment showed that the processes of dystrophic, destructive, inflammatory, dysregenerative changes subsided. In the parenchyma or in hepatocytes in dynamics, stabilization of metabolic and dystrophic changes are noted in the form of disappearance of protein and vacuolar dystrophy in the cytoplasm of hepatocytes, foci of necrobiosis completely disappear (Fig. 3).

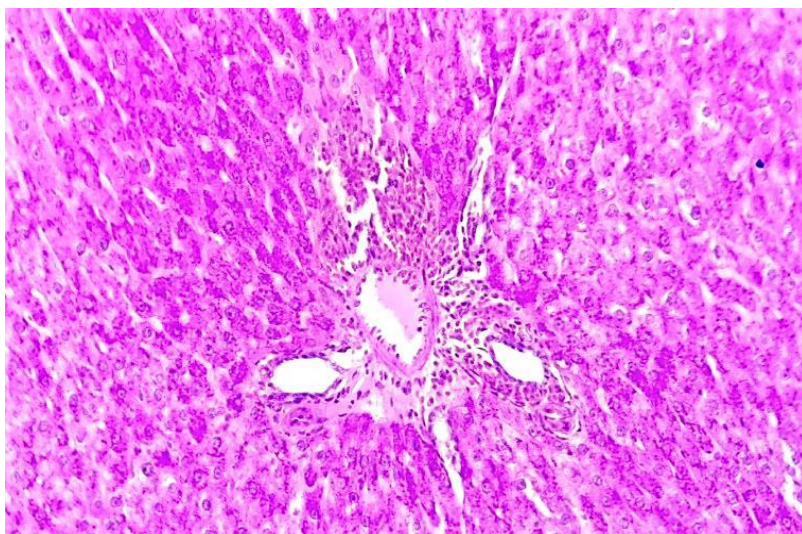


Fig. 5. 60 days against the background of treatment. Increase in glycogen content by hepatocytes. Coloring: CHIC reaction. Uv: 10x40.

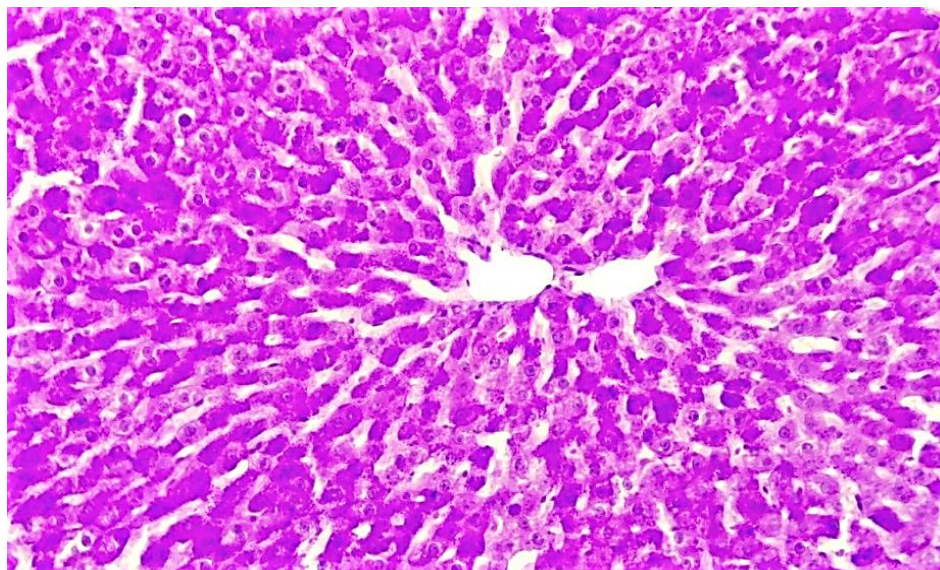


Fig. 6. 90 days against the background of treatment. Increase in glycogen content by hepatocytes. Coloring: CHIC reaction. Uv: 10x40.

Due to the subsiding of destructive changes on the part of the liver parenchyma in the vascular-stromal components, the inflammatory process subsides, the volume of inflammatory lymphohistiocytic infiltration decreases, and fibrosis does not develop. The morphological signs of chronic persistent hepatitis disappear, only signs of moderate proliferative changes on the side of the walls of the vessels of both the central vein and portal tracts remain.

3 Conclusion

For the first time it was proved that under the influence of pesticides Fozalon and Baton EC on the 60-90 days of chronic poisoning of animals in the liver, the development of chronic persistent toxic hepatitis is noted, which is manifested by an increase in inflammatory lymphohistiocytic infiltrate with the formation of fibrosis from connective tissue cells and fibers. Poisoning with pesticides against the background of treatment contributes to the subsiding of the processes of dystrophic, destructive, inflammatory, dysregenerative changes. In the parenchyma or in hepatocytes in dynamics, stabilization of metabolic and dystrophic changes is noted in the form of disappearance of protein and vacuolar dystrophy in the cytoplasm of hepatocytes, foci of necrobiosis completely disappear. The morphological signs of chronic persistent hepatitis disappear, only signs of moderate proliferative changes on the side of the walls of the vessels of both the central vein and portal tracts remain.

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