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Research Article

Morphological And Some Functional Changes In Animals At Poisoning With Mouthroom

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ABSTRACT

"The plant flora of the republics of Central Asia is rich and diverse. It is known that about 8000 species of various plants grow on the territory of Uzbekistan alone. Botanical study, systematization of these plants, taking into account ecological characteristics, study of chemical substances contained in various parts of plants and their changes in connection with Thus, as a result of the research carried out under the guidance of a corresponding member of the USSR Academy of Sciences, academician of the Academy of Sciences of the Russian Federation Yu. found alkaloids and from them isolated I181.

A team of chemists led by Academician of the Academy of Sciences of the USSR and the Academy of Sciences of the RUA S. Sadykov, having studied about 3,000 plant species, identified 300 plants among them, which also contain alkaloids and have various properties.

RELEVANCE. Alkaloid plants, on the one hand, being our wealth for obtaining valuable chemical and medicinal substances, on the other, under certain conditions, can cause intoxication and, consequently, the development of various diseases in both animals and humans.

Alkaloid-bearing weeds, due to their ecological features and wide distribution, mostly grow among agricultural crops and their seeds, contaminating the latter, can get into the composition of both food and feed grains. When eating grain contaminated with seeds of weeds, diseases arise, united under one name - elementary toxicosis. In this regard, the study of diseases resulting from the action of weeds is an extremely urgent task, since, despite the widespread use of herbicides, the improvement of agrotechnical methods of weed control and other appropriate government measures taken both to destroy weeds and to control after taking contaminated grain, it is not uncommon for the development of elementary toxicosis on this soil. In addition, it is necessary to take into account that there are favorable conditions for the growth of these weeds on the cultivated virgin, fallow and dry lands.

The World Health Organization considers the study of the action of poisonous weeds as one of the primary tasks. So, in the chronicle of the WHO (No. 1.8, 1964) it is emphasized that "... the discovery of hepatotoxic compounds in some plants indicates the possibility of containing other toxic substances, and they can be the cause of various diseases of mysterious etiology."

Among the least studied weeds, in the light of what has been said, one can also include pink bitter - Asgorhthilonnicris S.A.M

It should be emphasized that certain diseases arising from poisoning by poisonous weeds are accompanied by damage to most of the internal organs, but first of all to the liver, as an organ that, due to its anatomical and physiological characteristics, stands in the way of the entry of toxic substances into the body.

By analogy with other plants, it must be assumed that pink bitterness can have a similar effect on the body.

Thanks to the efforts of a number of scientists of our republic, both in clinical conditions and experimentally, more or less fully "the issues of clinic, pathobiochemistry, pathogenesis and pathomorphology, such alimentary toxicosis as heliotropic dystophia of the liver and trichodesmotoxicosis, which in the recent past had an epidemic character, have been studied. In this respect, another weed of plants remains almost unexplored in terms of toxicology, pathobiochemistry and pathomorphology - pink bitterness, by the way, growing under the same conditions as pubescent heliotrope and gray trichodesma.

Pink mustard is a widespread weed of which Uzbekistan is considered to be its homeland, although it is found far beyond its borders. It should be noted that "cases of poisoning of animals with pink bitterness were observed by the scientists of Azerbaijan.

MATERIAL AND RESEARCH METHODS. In the literature available to us, we did not manage to meet people with only pink bitterness describing cases of poisoning. At the same time, given the presence of toxic properties both in the seeds and in the stems of pink mustard, there is reason to believe that when they enter the body as part of cereals contaminated with them, in all likelihood, intoxication phenomena may develop in one form or another, and Naturally, in this case, due to its anatomical and physiological characteristics, the liver tissue can also be affected.

It is pertinent to note that a number of diseases of the gastrointestinal tract and liver with an unclear etiology are often encountered in clinical practice. Most researchers emphasize that such diseases (enteritis, colitis, enterocolitis, hepatitis, cirrhosis, etc.) are more common in people living in rural areas. There is reason to assume that poisonous weeds, including pink bitterness, can be one of the etiological factors in the development of diseases with an unknown etiology. In addition, even if poisoning with pink bitterness does not have its own specific features, and therefore is not the cause of the development of any specific nosological form, then it is quite reasonable to assume that in the development of such well-known diseases as heliotropic dystrophy of the liver, trichodesmotoxicosis, it can play a certain role, largely determining the nature and degree of morpho-functional changes and the pathogenesis of these diseases. This is quite understandable if we take into account the growth of pink mustard together with pubescent heliotrope and gray-haired trichodesma. It should also be borne in mind the constant potential for disease of farm animals due to weed poisoning, which causes great damage to livestock.

THE PURPOSE AND OBJECTIVES OF THE STUDY ARE:

1. Investigation of the toxicological properties of pink mustard growing in the regions of the Republic of Uzbekistan. and detecting changes in toxic properties depending on environmental conditions, as well as on the time of its storage.

2. Study of the morphological picture of internal organs when various doses of pink bitterness enter the body.

3. Establishment of the nature and degree, histological, histochemical and cytological changes in the liver in case of poisoning with pink bitterness.

4. Determination of some functional biochemical. indicators reflecting the activity of the liver, in case of poisoning of animals with pink bitterness.

5. Study of the issues of reversibility of structural and histochemical changes in the pathologically altered liver as a result of poisoning with pink bitterness.

6. Comparative study of the nature and degree of morphofunctional changes in the liver in case of body poisoning with heliotrope pubescent, trichodesma. gray-haired and pink bitterness, as well as with their combined effects.

Characteristics of the material, setting of experiments and research methods

To solve the assigned tasks, the following were undertaken:

1. Expeditionary research, which consisted in organizing trips to the main grain-sowing regions - Samarkand and Kashkadarya regions of RU for 2-3 years in a row in order to study the ecological characteristics of pink bitterness and the degree of contamination of grain crops by it. For comparison, the same features were studied in relation to pubescent heliotrope. and gray-haired trichodesma.

2. Study of toxicological, properties, pink bitterness, depending on the growing conditions, shelf life (from 1 month to 5 years) and the introduction of various doses. These experiments were undertaken due to the fact that the safety of alkaloids and other chemical components in biological objects, including c. pink mustard, as you know, depends on the storage conditions. It was necessary to establish the persistence of the active toxic principles and the possibility of spontaneous neutralization of this weed plant after a certain time.

Determination of the persistence of the toxic principles contained in the seeds of bitterness contributes, in turn, to the clarification of the suitability of the and contaminated by it. stored grain crops.

3. Study of the pathomorphological and pathobiochemical characteristics of the liver when the organism of animals is damaged, with relatively small, medium and large doses of seeds: pink bitterness.

4. Study of the morphofunctional features of the liver and other organs under the combined action of rose mustard seeds and heliotrin alkaloids, as well as trichodesmin. These studies were undertaken by us on the basis that under natural conditions grain crops are littered with products (seeds, leaves, stem, etc.) not only of one weed plant, but most often of several. Our observations confirm the presence of seeds of pink mustard, heliotrope pubescent and gray-haired trichodesma in grain crops. It was necessary to find out what are the features of the damage to the organism under various quantitative-combined effects of seeds and alkaloids of these weeds.

Material and research methods. Experimental studies were carried out on 625 white rats of both sexes with an initial weight of 130-180 grams. and on 210 guinea pigs with an initial weight of 200-450 grams. Therefore, a total of 835 animals were used, which throughout the experiments were on ordinary laboratory food.

The duration of the experiments is from one week to 6 months. The experimental animals were subjected to research (by slaughter-decapitation), a week later and 1, 2, 3 and 6 months later from the beginning of the experiment.

Seeds of pink mustard were crushed in a mortar to a flour-like state and injected into the stomach as a suspension using a thin probe in various (50, 250, 500 and 1000 mg / 100 g of body weight) doses.

The alkaloid of heliotrope pubescent - heliotrin was administered in the form of a 2% solution at the rate of 2 and 5 mg / 100 g of the animal's body weight once every 6 days, and the alkaloid of trichodesma gray - trehodesmin in the form of a 1% solution at the rate of 1 mg / 100 g of weight body 2 times a week.

In total, 10 series of experiments were carried out, including 22 groups, which, depending on the nature of the experiment and the timing of the study, were divided into the following:

1. Determination of the toxicity of pink mustard by introducing it in doses of 50 mg / 100 g; 250 mg / 100 g; 500 mg / 100 g. and 1000 mg / 100 g. guinea pigs and white rats.

2. Establishing the degree of toxicity of pink mustard, depending on the duration of its storage (up to 5 years).

3. Study of the pathomorphological picture of the liver and some functional and biochemical parameters in chronic poisoning of animals with various doses (50, 250, 500 and 1000 mg / 100 g for 30 days) of pink bitterness.

4. Elucidation of the possibilities of the development of the regenerative process in the liver after its defeat with pink bitterness (the study of animals was carried out after 1, 2, 3 and 6 months after the termination of 30 days of poisoning).

For a comparative study of the action of pink mustard with the actions of heliotrin (2 and 5 mg / 100 g) and trichodesmin (1 mg / 100 g), as well as the identification of the features of the combined effect of their effect on the liver tissue and on some functional and biochemical parameters, the following series were carried out experiences:

5. Introduction of heliotrin (in doses of 2 and 5 mg / 100 g, once every 6 days).

6. Introduction of Trichodesmin (1 mg / 100 g, 2 times a week).

7. Combined administration of heliotrin (2 mg and 5 mg / 100 g) and trichodesmin (1 mg / 100 g).

8. Combined administration of pink mustard (50, 250 and 500 mg / 100 g and heliotrin (2 and 5 mg / 100 g).

9.Combined administration of pink mustard (500, 250 and 500 mg / 100 g) and trichodesmin (1 mg / 100 g).

10. Simultaneous administration of pink mustard (50, 250, 500 mg / 100 g) heliotrin (2 and 5 mg / 100 g) and trichodesmin (1 mg / 100 g).

Each of these series was accompanied by a study of selected parameters in intact (healthy) animals.

When studying the toxic effect of heliotrin and trichodesmin, we proceeded from the data obtained by the employees of our laboratory (A. Kh. Khankhodzhaev, K. F. Fazylov and V. F. Smirnov).

All experimental animals (including intact control animals) were subjected to morphological and functional biochemical studies.

Research methods used.

Since the main task of this work was the morphological characteristics of the internal organs and, first of all, the liver, both under the action of pink bitterness and in combination with alkaloids - heliotron and trichodesmin, we studied the structure in four directions:

1. In general morphological - staining with hematoxylin eosin - for a general overview of the architectonics of the liver and paint (impregnation with sulfur sulfur) according to Donskov. By the same methods, in addition to the liver, the following organs were examined: the brain, heart, lung, stomach, small intestine, large intestine, pancreas and adrenal glands.

2. In histochemical: detection of glycogen - staining according to Shabadash; neutral fat - according to Kain; total protein - according to Beiheg; ribonucleic acid (RNA) - more; and deoxyribonucleic acid (DNA) - according to Felgen-Rossenbeck; alkaline phosphatase - according to Gomori; succinate dehydrogenase - according to the Shelton and Schneider method and cytochrome oxidase - according to Greff.

3.In cytological - identification of the state of the Golgi apparatus - by the method of silvering according to Aoyam and mitochondria - with staining according to Kuhl and Altman.

4.In the ultrastructural - the identification of submicroscopic changes in hepatocytes. In this regard / for the purpose of electron microscopic analysis - the liver tissue was processed according to Palade. After fixation for two hours in a buffered 1% solution of osmium tetroxide (pH 7.2-7.4), the material was poured into a mixture of methyl-i-butyl methacrylate in a ratio of 1: 5.

The sections were prepared using the LKB-480A and UMTP-1 ultramicrotomes and studied with a Jem-7 electron microscope.

In addition to the above, changes in the weight and body and the general condition of the experimental animals were monitored. When slaughtered, individual organs, primarily the liver, were weighed and the relative weight of the organ was calculated in relation to the total body weight of the animal.

Along with this, 2-3 days before the study (slaughter), the antitoxic function of the liver was determined in most of the experimental animals by the well-known Kvik-Pytel method.

In some experimental animals, also 2-3 days before slaughter, the absorption and excretory function of hepatocytes was studied by the radioisotope method. For this, the animals were injected with a Bengal rose labeled with iodine-131, followed by scanning and automatic recording of the hepatogram.

To judge the functional-biochemical shifts, the following definitions were carried out: precipitation of protein fractions with zinc sulfate according to Kunkel; thymol test according to McLagan; protein spectrum of blood serum - by the content of total protein (refractometric) and protein fractions by electrophoresis on agar - according to the method of A.T. Ilkov and T. Nikolaev, modified by J. Davlyatov, the content of total and residual nitrogen in the liver was determined (combustion according to Kjeldahl with subsequent colorimetric determination according to Folin), and from them

- the amount of protein and calculated the coefficient of proteolysis Residual nitrogen / Protein nitrogen × 100 for a general judgment on the state of the processes of synthesis and decay of protein in the organ.

The content of β-lipoproteins in the serum and in the liver was determined (according to Burstein-Sameille, as modified by Kellen, Link,), in the latter, the content of total lipids was determined (in the Soxhlet apparatus). Determined the content of glycogen in the liver - (according to Seifter et al.) And the level of sugar in the blood (anthrone method). In addition, the activity of alanine aminotransferase - (ALT) and aspartate aminotransferase - (AST) was determined by the method of S. Reitman and S. Frenkel modified by B. F. Korovin, N. A. Belov, A. S. Kantorovich (1960), alkaline phosphatase (ALP) - according to D. N. Yakhnina, as well as the activity of aldolase (according to the method of V. I. Ananyev and V. N. Obukhova).

Research results.

In order to study some of the ecological features of pink bitterness, we, together with a group of employees, have organized expeditions to the main grain-sowing regions of the republic for 3 years.

As shown by the literature data and the results of our expeditionary studies in the Samarkand and Kashkadarya regions, pink bitterness in RU is widespread, especially in the foothill regions, on newly developed virgin and rainfed lands.

The data obtained indicate that in the Andijan, Bukhara, Samarkand, Surkhandarya, Tashkent, Fergana, Namangan, Khorezm regions, almost all areas are littered with pink bitterness, and in the Karakalpak Republic - the Khodjeyli region.

The most unfavorable area in terms of infestation with pink bitterness is the Kashkadarya region, the regions of which are completely littered with it. Hence, there is an urgent need to take into account, especially in connection with the increase in the sown area of grain or other agricultural crops, the possibility of spreading bitterness to all new regions of the republic, since, like other perennial plants, seed reproduction in pink mustard has a colossal role from the quarantine point of view. It should be emphasized that it is precisely as a result of the transfer of seeds that the weed spreads to new farms - districts, oblasts. This circumstance requires a great deal of attention in relation to the appropriate agrotechnical and administrative measures to prevent contamination of sown areas and grain crops with the seeds of poisonous weeds, including pink mustard.

Expeditionary studies have shown that until recent years, due importance was not attached to the presence of pink mustard seeds in cereals. To this day, plant protection workers and the quarantine service devote their main attention and care to the destruction of gray trichodesma and pubescent heliotrope, although it should be emphasized that the measures taken in relation to them are still clearly insufficient, and experimental studies serving as the basis for combating these weeds (data of O. A. Azizova,; A. I. Magrupov,) require further clarification. With regard to pink bitterness, absolutely insufficient attention is paid to its destruction.

It should be emphasized that often when grain crops are clogged, not only products are available - the seeds of some heliotrope pubescent, gray-haired trichodesma, but also other weeds, including pink bitterness.

Along with the question of the degree of weediness of grain crops, of considerable interest is the question of whether the storage of grain contaminated with weed products has any effect on clean, uncontaminated grain.

Botanical and chemical analysis of samples of contaminated grain (carried out by us together with employees of the laboratory of chemistry of alkaloids of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan) showed that in various samples of grain crops, especially wheat obtained from different regions of the republic, an admixture of the following weeds is found: heliotrope pubescent , trichodesma gray-haired, neat, bindweed and pink bitterness. This indicated that there was no need to take measures for the separate storage of contaminated (especially with the seeds of Trichodesma gray.) and uncontaminated grain.

It is known that many of these weeds have toxic properties, and therefore, naturally, the question arises how long this toxic property associated with the presence of alkaloids in them, first of all, persists under various storage conditions. The study of these issues is associated with the determination of the chemical property in. various parts of weeds (in leaves, stem, etc.).

From toxic substances contained in weeds, along with alkaloids, glucosides, essential oils and the so-called glucoalkaloids are released. The latter constitute the main part of the chemical composition of the weed we study - pink bitterness.

The results of our studies show that the process of poisoning and poisoning in pink mustard is not stable, but constantly changes depending on the zonal ecological conditions of the area and the characteristics of each plant during its development. The content of alkaloids and other compounds is not the same in different parts of the same plant at a certain stage of its vegetation. It should be noted that plants differ in the content of active substances and their degree of toxicity, even in. within a close geographical location, and in this, the composition of the soil, the exposure of plants in relation to the cardinal points, etc. matter. In the study of pink mustard growing in different regions of RU, we determined the substances contained in them, conventionally taken as the sum of alkaloids, since In this case, the generally accepted method for the extraction of substances such as alkaloids was used - the Mayer's method and the method using silicotungstic acid. Moreover, in both cases, alkaloids are found in the seeds of mustard (in total).

Determination of the content of the sum of alkaloids of pink bitterness growing in various regions of RU showed the following: in samples taken in Kashkadarya region, it is 0.025% ", in Samarkand region - 0.022%", Tashkent region - 0.018-0.02%, Syrdarya region - 0.01-0.015% "and in the Bukhara region - 0.003-0.005%".

Consequently, depending on the place of growth, the content of alkaloids in pink mustard is different.

The study of the content of alkaloids in the seeds of pink mustard, depending on the storage period, showed that storage of seeds in a dry place from 1 to 5 years does not cause any special changes and the amount of alkaloids remains almost unchanged.

To compile the toxicological characteristics of this • weed, we have determined: the minimum toxic dose that causes the minimum effect (MTD), the average lethal (LD50) and absolutely lethal dose (LD100) for warm-blooded animals - guinea pigs (210 in total) and white rats (total 160).

At the same time, the time of the appearance of the first signs of intoxication, changes in general condition, behavior, weight, changes in the blood, macroscopic and microscopic changes in the internal were taken into account. organs, primarily the liver of experimental animals. At the same time, 10% aqueous extract or pink mustard powder was orally administered in various doses: 0.25; 0.5; 0.75, 1.0; 2.0; 3.0; 4.0; 5.0; 6.0; 7.0; 8.0; 9.0 and 10 g / kg of body weight of guinea pigs and from 1.0 to 10.0 g / kg of body weight of white rats.

The results showed that the introduction of pink mustard seeds at a dose of 3 g / kg corresponds to the minimum toxic dose (in this case, one animal out of ten died at the 7th week of the experiment); 6 g / kg — an average lethal dose (5 out of 10 animals died within 2-5 weeks). With the introduction of 10 g / kg of body weight, all animals died within 2-5 weeks, which corresponded to an absolutely lethal dose for guinea pigs.

On the basis of similar studies, it was found that the minimum toxic dose of pink mustard for white rats is equal to 4 g / kg of body weight (one in 8 died at 8 weeks); the average lethal dose is 6.6-6.8 g / kg (4 out of 8 died at 1-4 weeks). The absolute lethal dose for rats was the same as for guinea pigs, i.e. it was equal to 10 g / kg body weight (all animals died within 1-4 weeks).

The study of the cumulative effect (the seeds of pink mustard were injected daily intragastrically using a probe at the rate of 1/10, 1/5, 1/3, 1/2, 4/5 LD50) for three months showed that the severity of the cumulative properties depends on the fractionality of the introduced dose. The less the fraction of the administered dose, the less pronounced are the cumulative properties. The cumulation coefficient was 40.2.

At autopsy of dead animals, the most characteristic macroscopic changes were congestive plethora in the internal organs and multiple foci of hemorrhage. Moreover, hemorrhages were most pronounced along the mucous membrane of the gastrointestinal tract, in the brain and under the epicardium. At the same time, the liver increased sharply in size and its tissue was flabby, had a clay color.

A comparative macroscopic study of internal organs showed that the liver tissue is affected to a greater extent, which is accompanied by a violation of its antitoxic and some metabolic functions, which in. to a certain extent, they are similar to the changes arising from the action of already known poisonous weeds - heliotrope pubescent and gray-haired trichodesma (N.I. Ismailov; Sh. G. Mukminova; A. Kh. Khankhodzhaev).

In order to document the toxicity of pink mustard in relation to internal organs, as well as to identify characteristic changes, possibly "specific", selective action in relation to the structure of individual organs, we studied the general morphological picture of the internal (brain, heart, lungs, stomach, thin and colon, kidney, spleen, liver, etc.) organs.

The results of the study show that when animals are poisoned with various doses of pink bitterness, swelling of the pia mater, plethora of blood vessels of the white matter of the brain, and the phenomenon of stasis are observed. In the neurons of the cortex, the cerebral hemispheres, as well as the subcortical nuclei, swelling, tigrolysis, vacuolar dystrophy are noted, reaching in some nerve cells up to. cytolysis. An increase in trabant oligodendrogliocytes is noted around the neurons.

In the myocardium and epicardium, the phenomena of stasis of lymph and blood are found, round-cell infiltration around the vessels, muscle fibers in a state of turbid swelling, single microfocus of necrosis are determined.

In the lung tissue, changes are noted in the microvasculature with diapedetic hemorrhages. In the peribronchial and perivascular tissues, there is a pronounced infiltration with lymphoid-histiocytic cells. Changes in the stroma resemble a picture of interstitial pneumonia.

In the renal tissue, a turbid swelling of the epithelium of the convoluted tubules is found: with an almost complete disappearance of their lumens. The glomeruli are in a different state: uneven blood filling of their capillaries, in some proliferation of cellular elements, and in others - edema in the lumen of Shumlyansky's capsule, infiltration of the stroma, especially the medulla, lymphoid-histiocytic cells, with an admixture of single neutrophilic leukocytes.

In the mucous membrane of the gastrointestinal tract, there is a swelling of the cytoplasm of the integumentary epithelium and moderate infiltration of the round-cell elements of the stroma of the mucosa. Congestive plethora in the wall of the stomach and intestines.

From the side of the adrenal glands, there is a plethora of blood vessels in the cortical layer, focal hemorrhages in the reticular layer. In the adrenal cortex there are small round-cell infiltrates.

In the spleen, stromal fibrosis, desquamative sinus catarrh, follicular hypoplasia are found.

The most pronounced changes were found in the structure of the liver. When animals are slaughtered, plethora of the liver and a slight increase in its volume after a week from the beginning of the experiment with daily administration of pink bitterness are observed macroscopically. In the future, the consistency of the liver becomes flabby, the liver acquires a clay color with a yellowish tinge. With the introduction of small doses of pink mustard (50 mg / 100 g), changes in the liver are insignificant. Even after 30 days from the beginning of the administration of the drug, only moderate venous congestion, minor round-cell infiltrates along the portal tract are noted. Fatty degeneration is determined in single hepatocytes. These changes are combined with severe hypertrophy of most hepatocytes. Histochemical changes are also insignificant.

With an increase in the dose of pink bitterness, structural changes in the liver become more pronounced, especially with the introduction of 500 and 1000 mg / 100 g. Along with congestive plethora, a pronounced expansion of the Disse space is determined. In most hepatocytes, granular and fatty degeneration, the latter is determined in hepatocytes located on the periphery of the hepatic lobules. In the latter, the accumulation of neutral fat, a decrease in the content of glycogen, RNA, a decrease in the activity of oxidative enzymes and alkaline phosphatase was established by histochemical methods. In hypertrophied and binuclear hepatocytes, the content and activity of these substances remains high. With the introduction of 1000 mg / 100 g, the degree of changes in hepatocytes increases. Fatty and protein dystrophies reach their maximum. Many cells undergo fat necrosis. The content of RNA and glycogen is sharply reduced in most liver cells, up to complete disappearance. The activity of succinate dehydrogenase and cytochrome oxidase is also sharply reduced.

The study of the ultrastructure of hepatocytes of animals one month after the beginning of the introduction of pink mustard (at a dose of 250 mg / 100 g) made it possible to establish a pronounced swelling of mitochondria, a decrease in the electron density of their matrix, with the destruction of cristae. The endoplasmic reticulum cisterns are expanded with their fragmentation in separate cells. There is an increase in lipid inclusions located throughout the cytoplasm, sometimes in the lumen of sinusoids, as well as a decrease in ribosomes, both attached and free.

Thus, the results of the study in dynamics show that as the time (and dose) of poisoning of animals with pink bitterness increases, there is an increase in dystrophic changes and, along with this, there are shifts in the content of individual components of cells.

The study of the toxicological features of pink mustard, pathomorphological changes in the liver (histomorphological, histochemical and ultrastructural picture of the organ), which developed as a result of the introduction of its seeds to animals, prompted the need to study some biochemical parameters that characterize, to a certain extent, the functional abilities of the liver. For this purpose, we applied some research methods, which made it possible to form a certain idea of the functional state of the liver in dynamics, with an increase in pathological processes that arise when animals are poisoned with pink bitterness.

Thus, the results of studying the absorption-excretory function of the liver by injecting the animals with a Bengal rose labeled with I131 showed the same type of hepatograms of control intact animals: the maximum activity in the liver was noted after 8.0 ± 2.8 minutes. and reaches 34.9 ± 3.0 of the administered dose. At the same time, the analysis of the hepotogram made by the end of the first week of poisoning with pink bitterness showed a significant decrease in the maximum activity of polygonal cells (23.2% instead of 34.9% in control animals). After 2-3 weeks from the beginning of the introduction of pink bitterness, the ability of polygonal hepatic cells was significantly reduced (respectively 12.6 ± 1.0 and 10.4 + 2.0%). This indicates pronounced pathomorphological changes in the liver parenchyma under the action of bitterness, as a result of which hepatocytes, to a certain extent, have lost their ability to absorb labeled Bengal rose: I-131.

It should be noted that similar low hepatogram values were obtained by S. B. Karimova, E. I. Vasilyeva, L. A. Melnikov, A. M. Ovchinnikov, I. S. Osipov, M. N. Fateeva, R. N. Turaev both in chronic interstitial hepatitis with symptoms of incipient cirrhosis and in acute stagnation of bile in the liver with secondary periportal fibrosis. According to these authors, the hepatogram indices are the same in severe liver dystrophy and hepatitis.

. To study the protein-forming function of the liver, we determined the content of total protein and protein fractions in blood serum and total protein in the liver by nitrogen. The results show that in chronic liver damage with pink bitterness, a pronounced decrease in protein content in the liver tissue is observed, which was the result of inhibition of synthetic and an increase in proteolytic processes of the liver under the influence of pink mustard. This is evidenced by a decrease in the content of protein nitrogen, and an increase in the coefficient of liver proteolysis. According to these shifts, there is a decrease in the total protein content in serum (up to 61.2 g% at a rate of 73.2 g%), pronounced hypoalbuminemia (up to 16.5 g% at a rate of 42 g%) and an increase in the content of all globulin fractions.

The changes found in animals poisoned with pink mustard in terms of the content of total protein and protein fractions of blood serum are in many ways reminiscent of those changes that are observed in toxic heliotropic hepatitis and trichodesmotoxicosis.

In the dynamics of poisoning of animals with pink bitterness as a result of liver damage, protein synthesis in polygonal cells is obviously significantly inhibited, while protein synthesis in Kupffer's cells and in periportal mesenchymal cells is likely to increase. As a result of all this, an increase in globulin fractions occurs.

Violation of protein synthesis processes and protein composition of blood is also evidenced by the results of colloidal reactions, which indicate an increase in globulin fractions in blood serum.

In case of poisoning of animals with pink mustard, as mentioned above, the activity of some enzymes (AST, ALT, alkaline phosphatase and aldolase), directly or indirectly related to the functional activity of the liver, was studied.

The introduction of pink mustard (50 mg / 100 g) for one week caused an increase in AST activity to 20.0-25.0 units. in the norm 14.0-20.0; in case of poisoning within 2-3 weeks up to 30.0-32.0 units, and within 4 weeks a little more - up to 31.0-37.0 units. The activity of AST, even three months after the cessation of poisoning of animals with pink bitterness, is not normalized (remains at the level of 23.0-27.0 units).

The results of the study of ALT activity show that by the end of the first week of the introduction of pink bitterness there is a release - the release of the enzyme from the liver tissue into the blood, which

causes an increase in the activity of this enzyme. The degree of increase in the activity of the enzyme, in turn, to a certain extent reflects the degree of damage to the liver cells. The activity of alkaline phosphatase increases in all periods of observation from 13.0 to 30.0 units. (in intact - 3.8 units) The activity of aldolase decreased in the norm from 45.0–47.0 units to 23.0–25.0 units.

In experiments with the study of the reversibility arising from poisoning with pink bitterness of pathological changes, it was revealed that the activity of alkaline phosphatase three months after the cessation of the introduction of weed seeds decreases by 5-10 units. compared to the period of poisoning. This circumstance, to a certain extent, indicates a certain restoration of the functional capacity of the liver.

Along with the indicators of protein metabolism, we determined the content of glycogen in the liver. In intact rats, the content in the organ averaged 1.9 mg%, and in the liver of rats poisoned with pink bitterness in all periods of the study, its content was significantly reduced and on average was in the range of 0.9-1.0 mg%.

As you know, the content of glycogen in the liver indicates a deep lesion of the liver, which is associated with the activity of the pathological process and the degree of metabolic disturbances and polygonal cells of the liver. It should be emphasized that the results of the biochemical determination of the glycogen content in the liver corresponded to the data revealed during the histochemical study of this component in the cytoplasm of hepatocytes.

The detoxifying function of the liver, the transformation of toxic substances into harmless compounds, is largely due to the presence of a sufficient amount of glycogen in the liver. The results of our studies to determine the antitoxic function of the liver (Kvik-Pytel test) in case of poisoning of animals with pink bitterness showed a decrease in the detoxifying ability of the liver at all stages of the study (from 8.1 - 11.5 in the norm, 5.5 - 5.17).

Of particular interest was the state of fat-lipoid metabolism when the liver was damaged by pink bitterness. The data obtained on the determination of the content of cholesterol in the blood serum testified to the latter histochemically, the appearance and increase of fatty drops in the cytoplasm of hepatocytes, consisting of neutral fat, was revealed. With the introduction of large doses of pink mustard, the accumulation of lipid inclusions is even more pronounced.

The task of the work included not only the ascertaining of pathomorphological and some functional changes in the liver in the dynamics of poisoning with pink bitterness, but also the study of the issue of the reversibility of the resulting structural and functional changes in this case.

The problem of the reversibility of pathologically altered organs in general, and the liver in particular, with various lesions, attracts special attention in terms of how deep the violations are and there are opportunities that ensure the development of the regenerative process. Based on this, we studied the possibility of spontaneous reversibility after the cessation of poisoning (within 30 days at a dose of 500 mg / 100 g of body weight) pink bitterness at various times - after 1, 2, 3 and 6 months.

The results of the study showed that after one, two and three months during the period of repair, morphological changes in the liver remain without any special signs of reverse development. Even 6 months after the cessation of the introduction of pink bitterness, pronounced dystrophic changes are noted. Macroscopically, the liver is flabby, full-blooded, with a yellowish tinge. Microscopically, hepatic tissue plethora, expansion of the Disse space is noted. In the course of the portal tract, lymphoid-histiocytic infiltrates were preserved. The latter are also determined inside the hepatic lobules. Discomplexation of the hepatic tracts is noted. Hepatic cells at the periphery of the lobules

are subject to more pronounced fatty degeneration, as evidenced by the histochemically determined accumulation of neutral fats in them.

Studies 6 months after the cessation of poisoning show that in the cytoplasm of hepatocytes, in comparison with the previous stages, the content of glycogen is increased, and RNA remains low. The activity of redox enzymes increases slightly, although it does not reach the initial level.

The number of mitochondria in hepatocytes (light microscopy) is significantly reduced than in intact control animals of the same age. The Golgi apparatus appears as grains around the cell nucleus. In the nucleus, chromatin grains are of various sizes and are mainly located under the envelope.

When determining some functional and biochemical parameters in the period of reparation after the cessation of poisoning with pink bitterness (after 3 and especially 6 months), the following changes were established: liver cells. In this period, there is a tendency towards normalization of the activity of the studied enzymes in the serum of AST and ALT, alkaline phosphatase and aldolase. The content of total protein and protein fractions in the blood serum and up to 6 months after the termination of the introduction of pink mustard remains impaired, showing a slight tendency to normalization.

Thus, as the results of morphofunctional studies show, the restoration of the normal structure of the liver does not occur even 6 months after the termination of the administration of pink bitterness. At the same time, if from the side of individual indicators of the function (excretory, enzymatic) of the liver there is a tendency to normalization, then the protein-synthesis function of the liver remains without any special signs of normalization during the investigated periods (up to 6 months) of the reparation period and after the cessation of poisoning.

Comparison of the results of the study of the effect of heliotrin and trichodesma gray (together with the laboratory staff) showed that the general pathomorphological changes after: the introduction of a large dose of pink mustard (1000 mg / 100 g) in many respects resemble the actions of heliotrin and trichodesmin.

In order to study the combined action of these poisonous weeds, their alkaloids were introduced by us in various doses and combinations.

It is known that pubescent heliotrope and gray-haired trichodesma are more toxic than pink bitterness and can obscure the picture of pink bitterness poisoning when they enter food together. In this regard, it seemed to us expedient to carry out experiments by layering intoxication with pink bitterness in case of poisoning with heliotrin and trichodesmin. To clarify this issue, heliotrin in doses of 5 mg / 100 g, once every six days, simultaneously with pink mustard was injected for 30 days and 500 mg / 100 g every other day.

In experiments with the introduction of heliotrin (2 mg / 100 g) in combination with pink mustard (50 mg / 100 g), the picture of liver damage significantly differs from the pathomorphological picture that was found when each of them was administered separately.

So, with the combined administration of pink mustard (50 mg / 100 g) with heliotrin (2 mg / 100 g), along with pronounced granular and fatty degeneration of hepatocytes, discirculatory changes with lymphoid-histiocytic infiltration of the interstitial tissue, small foci of hepatocyte necrosis are revealed. At the same time, RNA, glycogen in the cytoplasm of hepatocytes significantly decreases, with a more pronounced accumulation of lipids in hepatocytes. With an increase in the dose of pink mustard to 250 and 500 mg / 100 g, pathomorphological changes increase. The degree of infiltrative processes in the stroma increases, dystrophic changes in hepatocytes acquire a more pronounced

character with a sharp decrease in the content of RNA, glycogen and enzyme activity. The foci of necrosis also become more numerous.

With the simultaneous administration of trichodesmine (1 mg / 100 g) 'and pink mustard (50, 250, 500 mg / 100 g), pathomorphological changes in the liver are more pronounced, compared with the separate administration of each substance separately. In the liver, there is an expansion of the Disse space, discomplexation of the hepatic tracts, granular degeneration of hepatocytes with necrosis of individual cells. These changes are accompanied by a decrease in the content of RNA, glycogen. It should be noted that, at the same time, the degree of these changes is less significant compared to the combined administration of pink mustard with heliotrin.

The combined administration of heliotrin with trichodesmin and pink bitterness showed that their destructive effect on the body as a whole, and on the liver tissue in particular, is very pronounced. In this case, a rapid deterioration in the condition of the experimental animals occurs. Even after a short period (one week) of the introduction of these toxic substances, the animals refused to feed, there was a sharp drop in weight, lethargy appeared and the percentage of death of animals increased.

When slaughtered, animals show plethora of all internal organs, small foci of hemorrhage along the entire course of the gastrointestinal tract. The liver is flabby with a smooth surface, light brown in color with areas of hemorrhage. The liver capsule is edematous, thickened, the interlobular connective tissue is swollen. The characteristic trabecular structure is disturbed in the lobules. There are areas of hemorrhage, infiltration, foci of necrosis and necrobiosis of hepatocytes. Most hepatocytes are in a state of granular and fatty degeneration with the accumulation of lipids in their cytoplasm, the complete disappearance of glycogen and a sharp decrease in the RNA content.

In total, the pathomorphological picture of the liver indicated more pronounced structural disorders than with the introduction of the products of each weed separately.

Along with pronounced morphological changes, a number of liver functions were impaired.

On the part of metabolic processes, with the introduction of relatively small doses of pink mustard seeds (50 and 250 mg / 100 g), there is a noticeable increase in the blood sugar content (up to 140 with a control of 80 mg%), and with the introduction of large doses (500 and 1000 mg / 100 g), on the contrary, the blood sugar content decreases sharply (up to 58 mg%). The content of glycogen in the liver decreases in all cases, especially with the introduction of large doses, 3-4 times. At the same time, there is a significant decrease in the content of β-lipoproteins (the main transport forms of lipids) both in the liver (up to 0.55 with control, 1.62 mg%) and in serum (up to 40 with control 54.7 mg%), respectively, which was observed and the accumulation of fat in the liver tissue (up to 22 at a rate of 16 mg%).

On the part of the indicators of protein metabolism, a pronounced decrease in the protein content in the liver tissue (up to 11.4 with the control of 17.3 g%) and in the blood serum (up to 6.93 with the control of 7.63 g%) was found. This is obviously due to the suppression of synthetic and increased proteolytic processes in the liver tissue, as evidenced by a decrease in the content of protein nitrogen, as well as an increase in the proteolysis coefficient (up to 14.8 with a control of 6.5). According to these changes in the liver, hypoproteinemia, hypoalbuminenia and an increase in globulin fractions in the blood serum are noted. The violation of protenosynthetic processes is also evidenced by markedly positive colloidal reactions, indicating an increase in globulin fractions in the serum, which is, presumably, the result of diffuse liver damage in this case.

When animals are poisoned with heliotrin, as well as with trichodesmin, the resulting complex of biochemical shifts is similar to the data of other authors (N. Kh. Abdullaev; T. M. Mukhamedov; N. I. Rasulev; V. F. Smirnov and R. K. Azimov),

With the combined action of pink mustard, heliotrin and trichodesmin, an increase in blood sugar, a decrease in the content of glycogen and β-lipoproteins in the liver and an accumulation of fat in it were noted. The most noticeable was the decrease in protein in the liver, which is due not only to inhibition of synthesis, but also to an increase in its breakdown. With combined injections of pink mustard, heliotrin, trichodesmin, the decrease in the protein content in the liver was much more pronounced than with the introduction of pink mustard alone.

Thus, poisoning of animals with seeds of pink mustard separately and especially in combination with the toxic principles of other weeds growing together with pink mustard - heliotrope pubescent and gray trichodesma, causes pronounced pathomorphological shifts and a sharp suppression of the functional activity of the liver tissue.

At the same time, it is characteristic of a violation of the functional abilities of the liver: inhibition of the protein-synthetic function of the liver with a simultaneous increase in the breakdown of proteins in it, a decrease in the content of glycogen, a violation of the formation of β-lipoproteins and a tendency to accumulate fat in the liver.

Comparison of the results of determining the indicated metabolic parameters with the results of histochemical studies of the liver shows a direct correlation between the nature of changes in the chemical components of the liver tissue and a violation of its functional activity. This is evidenced by the above data showing a decrease in the content of glycogen, total protein and an increase in liver lipids, which are also determined by histochemical methods of research.

On the basis of these studies, it can be said that ingestion of pink mustard and especially at the same time, in combination with the toxic principles of pubescent heliotrope and gray-haired trichodesma, causes pronounced pathomorphological changes in the liver with sharp disturbances in its metabolic functions.

Based on the morphofunctional studies carried out, it can be said that pink bitterness growing on the territory of the Republic of Uzbekistan is a rather poisonous weed plant, poses a danger to animal husbandry, as well as to agricultural crops. The toxicity of pink mustard is especially pronounced during the period of flowering and ripening.

Under the action of pink bitterness, almost all internal organs are damaged (a picture of the type of toxic nephrosis, myocarditis), but the liver is most affected. The detected changes fit into the picture of hepatodystrophy (mainly protein and fat). These pathomorphological changes are accompanied by a pronounced violation of the main — antitoxic, protein-synthetic, glycogenosynthetic and other functions of the liver.

The study of the reversibility of pathological changes after the cessation of poisoning of animals with pink bitterness during the period of reparation (over the next 3-6 months) revealed only a certain tendency towards normalization of certain liver functions, but without noticeable signs of restoration of its structural features.

It should be noted that with the combined action of pink mustard with heliotrin and trichodesmin, liver damage and dysfunctions are significantly pronounced in comparison with the pathomorphological picture and its dysfunctions when one of these weeds is affected by the toxic principle.

The data obtained give us the basis to consider the weed plant pink bitterness separately, and when combined with the action of the products of other weed plants, in particular, as one of the dangerous poisonous weeds that can cause liver damage in animals when eaten in cereals. In this case, the defeat of the liver proceeds according to the type of toxic dystrophy, which subsequently often causes the development of chronic hepatitis and cirrhosis of the liver.

Consequently, from the above studies, it follows that there is an urgent need to strengthen quarantine supervision over this plant, conduct a systematic struggle to destroy it and study a number of issues related to the chemical composition, the mechanism of its action and the development of therapy methods.

CONCLUSIONS:

1. Pink sorchak Asgorthilonpicris S. A. M., growing on the territory of RU, is a poisonous weed that infests the sown area of almost all regions of the republic. Its toxicity depends on the conditions of the growing area. All constituent parts of the weed are poisonous - stems, leaves, flowers and seeds. The toxicity is especially high during flowering and ripening. Long-term storage of both the stems and the seeds of pink mustard (within five years) does not decrease the degree of its toxicity.

2. In case of poisoning with pink mustard with medium and high doses, discirculatory changes are observed in all organs and tissues in combination with intracellular dysproteinosis and fatty degeneration.

3. Comparative morphohistochemical study of various organs revealed a higher affinity of pink mustard for the liver tissue.

4.Changes develop both in the parenchyma and in the interstitial tissue. Parenchymal changes are expressed in protein and fatty degeneration, interstitial - in lymphoid-histiocytic infiltration of the liver stroma.

5.Histochemically developing hepatodystrophy is characterized by a decrease in the content of RNA, glycogen, the activity of redox enzymes and the accumulation of neutral fat in hepatocytes.

6. At the submicroscopic level, the main changes in hepatocytes with the introduction of pink mustard (250 mg / 100 g) are reduced to a sharp swelling of mitochondria, a decrease in the electron density of their matrix, and destruction of cristae. From the side of the granular endoplasmic reticulum, there is an expansion of its cisterns, a decrease in free and attached ribosomes.

7. The combined introduction of pink mustard with the active principles of known poisonous weeds (heliotrope pubescent and gray trichodesma) aggravates pathological processes in the liver, leading to the development of necrotic processes in its parenchyma.

8. The results of studying the morphology of the liver within 6 months after the cessation of the introduction of pink mustard indicate the absence of signs of reversibility of the arising dystrophic processes within the established study periods.

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