

Morphological Signs of Exposure to Insecticides and Pesticides Mixtures in an Experiment

¹Yusubjon Nishanovich Nishanov, ²Hamrakulova Mukaddashon Askarovna,
³Sadikov Askar Usmanovich, ⁴Mamasaidov Jamolidin Turginbaevich

ABSTRACT--- *This work is devoted to the question of the effect of pesticides, insecticides and pesticides on the microstructures of internal organs in the experiment. Under experimental conditions, the morphological picture was studied after the use of pesticides and insecticides. The results of morphological studies at different times after seeding with pesticides and insecticides were analyzed. The state of the histostructure of the internal organs was studied.*

Keywords--- *toxicology, microscopy, liver, brain, bronchus, pesticide, insecticide, pesticide*

I. INTRODUCTION

Relevance of the problem

It has long been known that all pesticides have hepatotropic properties even in small doses, so protecting the liver from toxic effects is one of the urgent problems in Central Asia.

If we take into account the fact that international organizations are paying more and more attention to the prevention of harm to human health and the environment by pollution of the air, based on health risk analysis, harmonization of air pollution standards is becoming a necessary task for ecology and medicine.

Moreover, in recent years more and more articles have been published devoted to allergic, pathomorphological changes and morphofunctional indicators of the mucous membrane of the respiratory tract [2].

Therefore, in recent years, the development of horticulture and fruit and vegetable products in the agricultural sector of the Republic of Uzbekistan has been guided by the achievements of the science of plant protection. Which is achieved through the use of modern technologies used by our gardeners and farmers in the production of competitive quality products, along with the use of chemicals and pesticides. However, in this area there are some disadvantages that are expressed in an adverse effect due to non-compliance with hygiene standards and carelessness when using a variety of imported pesticides in horticultural processing. The prevention of complications of various respiratory diseases by studying morphofunctional changes resulting from the effects of these pesticides on the body, especially the respiratory system, is of practical importance for improving and applying pathogenetically substantiated preventive measures.

1
2
3
4

II. GOAL AND TASKS

To analyze the morphological and functional changes in the mucous membrane of the trachea and bronchi arising from the aerosol exposure of insecticides, a mixture of methyl mercaptophos and DDT, to select a method for assessing morphological changes in experimental animals.

1. To study the histostucture of the mucosa of the upper respiratory tract in intact animals.
2. To study changes in the morphostructure in dynamics during aerosol exposure of insecticides to the respiratory system.
3. To identify the degree of response of morphological changes in the trachea and bronchi with aerosol exposure to insecticides.
4. To study the morphological state of the internal organs after the introduction of mercaptophos and DDT.

III. MATERIAL AND RESEARCH METHODS

Experimental studies of aerosol exposure were carried out on 54 male rats weighing 180-220 grams. The studies were carried out in accordance with the European Convention for the Protection of Vertebrate Animals Used for Experiments or Other Scientific Purposes (Strasbourg, March 18, 1986) ETS N 123. The effects of mercaptophos and DDT upon oral administration were studied in organs in 48 white rats, divided into 3 group series after oral administration of pesticides for 4 months. For aerosol use of pesticides studied in the following conditions:

1. The object of the experiment was 10 intact rats that were in the field without the use of pesticides and 44 experimental animals that were during the application of aerosol treatment in vegetable growing and gardening.
2. In experimental animals, the mucous membranes of the upper respiratory tract (trachea and bronchi) were studied by the general histological and histochemical method. The method of choice was hemotoxylin - eosin.

IV. RESEARCH RESULTS

An experimental observation in 10 control rats showed that the mucous and submucous membranes of the trachea and bronchi were lined with multirow epithelium with a thin basal plate. The excretory ducts of the mucous glands were lined with single-row cubic epithelium, around them focal accumulations of lymphoid elements were revealed. In its own plate of the mucous membrane and in the submucosal basis, loose fibrous connective tissue with single diffusely scattered lymphocytes and histiocytes was detected.

In 23 experimental rats, focal epithelial metaplasia was detected. The basal plate is thickened. Foci of fibrosis spreading to the submucosa were observed in the own plate of the mucous membrane, focal lymphoid accumulations and a moderate amount of diffusely dispersed lymphocytes and histiocytes were detected. In the respiratory bronchi of the mucous membranes in some places, pathological changes are mild. In the mucous membranes and the basement membrane of the main and lobar bronchi, focal lymphoid accumulations and a moderate amount of diffusely scattered lymphocytes and histiocytes are noted. In the respiratory department, the

alveolar passages are not uniformly airy, their walls are thin. Perivascular around the branches of the pulmonary veins and pulmonary arteries in their adventitious layer, focal accumulations of lymphocytes are detected.

Whereas, in the control rats, the respiratory section of the bronchi was uniformly airy, the alveoli were thin between the alveolar septa. The epithelium of the main and lobar bronchi is single-row cubic. Around individual pulmonary veins, small accumulations (1-2 rows) of lymphoid elements were revealed. In the walls of the bronchi of 2-3 orders of division and in respiratory bronchioles, single focal lymphoid accumulations and diffusely dispersed lymphoid elements were detected. The results of morphological studies showed that the mucous membrane of the trachea and bronchi in rats after acute exposure to aerosol insecticides, single-row epithelium is edematous and infiltrated.

Studying the results of a microscopic examination of the internal organs after administration of a mixture of methylmercaptophos and DDT in rats of the 1st group (10 mg / kg methylmercaptophos and 10 mg / kg of DDT) was accompanied by more pronounced circulatory-dystrophic and alterative changes in the internal organs than in rats 2 group (3 mg / kg methyl mercaptophos and 10 mg / kg DDT). In animals of the first group, a sharp blood supply to the vessels was observed in the brain. Edema of the soft membranes was noted. Perivascular edema and pericellular edema. Cytoplasm swelling, necrobiosis and necrosis of many ganglion cells. In the lungs, a thickening of the alveolar septa due to their filtration by round cells and histiocytes. Identified signs of pulmonary edema and productive vasculitis, sometimes with partial obliteration of the lumen of the vessel. Focal atelectasis, chronic catarrhal-desquamative bronchitis were also noted. A sharp blood supply to the vessels was revealed in the heart. Swelling and focal vacuolization of muscle fibers and edema of the interstitial tissue were also detected. When studying the microscopic picture, the liver was noted against the background of blood filling in the peripheral sections of the hepatic lobules, hemorrhage areas are visible. Moreover, round-cell infiltration was observed around hemorrhages. The central veins are dilated, their endothelium is swollen. Around the central veins, in the thickness of the lobules, as well as in the interlobular connective tissue, focal lymphoid-histiocytic infiltrates are observed. the microcapillaries between the lobular connective tissue are sharply expanded overflowing with blood, with a swollen wall, due to plasma tissue impregnation. The focus is a sharp expansion of the lymphatic vessels, overflowing with lymph in the form of a uniform pink color of mass. At the same time, the bile ducts are enlarged: there is a change in the epithelial integument in the form of papillary growths that protrudes into the lumen. In places, the cores are arranged in several rows of oval and elongated shapes.

In animals exposed to high temperature (group 3), moderate vascular congestion is observed in the brain, as well as perivascular and pericellular edema with a slight swelling of the cytoplasm in the ganglion cells. Uneven vascular congestion is noted in the heart, there is also granular dystrophy of muscle fibers. Moderate congestion and desquamative catarrh of the bronchi was observed in the lungs. Productive vasculitis was sometimes noted with complete obliteration of their lumen. In the connective tissue of the alveolar septa, small focal lymphoid-histiocytic infiltrates and signs of chronic bronchitis are found.

Microscopic examination in the liver showed moderate plethora of blood vessels, granular dystrophy of the hepatocyte cytoplasm. Along with this, sections of necrobiosis and necrosis of liver cells were observed in the thickness of the lobules. Identified areas with lymphoid-histiocytic infiltrates in the lobular connective tissue, in

places, with cystic expansion of the bile ducts. Also revealed lymphoid-histiocytic infiltrates in the thickness of the hepatic lobules around the central veins.

In animals with the inhalation method, seed in the chamber (4-series of experiments) showed sharp blood vessels, perivascular and pericellular edema, swelling - granular degeneration of ganglion cells leading to necrosis in the brain tissue. This category of experimental animals has the largest foci of catarrhal desquamative pneumonia in the lungs. Granular dystrophy, focal fragmentation of individual muscle fibers and sometimes micro necrosis were noted in the tissues of the heart. At the same time, the liver tissue was moderately full-blooded. The interlobular connective tissue is infiltrated with a small number of round cells and histiocytes. False bile ducts are observed, in places they are cystically dilated. In the thickness of the hepatic lobules, a swelling of the hepatocyte cytoplasm is noted - granular dystrophy with necrobiosis and necrosis of certain groups of liver cells. And also, there is necrosis of the parenchyma in the center of the lobules. Around the foci of hepatocyte necrosis, large infiltrations with a light cytoplasm are noted.

Thus, changes in the mucous membrane of the trachea and bronchi occur in three stages. The first stage is the form of allergic changes when an insecticide affects the mucous membrane of the trachea and bronchi. The second stage is manifested by structural changes on the 7-10th day of the experiment and are focal in nature. In the third stage, cumulation of insecticides occurs on the 15-30th day of the experiment, which settled on the mucous membranes cause deep morphological changes in the mucous membranes, blood vessels, mucous glands of the basement membrane.

The use of mixtures of methyl mercaptophos and DDT orally, lead to dystrophic changes in the internal organs in proportion to the dose of pesticides. At the same time, the high temperature of the environment enhances the toxic effect and lead to more severe changes in the body, especially in the liver. Inhalation of a mixture of pesticides for more than 3 months causes serous-catarrhal pneumonia and an alternative dystrophic nature of the change in the brain and liver.

REFERENCES

1. Oganesyanyan E.A. Ponomarenko M.V. Morphological changes in the trachea, bronchi and lungs in mice with prolonged exposure to chemicals present in the air environment of manned spacecraft. Russian Biomedical Bulletin named after Academician I.P. Pavlova No. 3, 2013.
2. Umbetova L.J. Changes in the mucous membrane in chronic respiratory diseases in children living in conditions of air pollution. Bulletin of KAZN MU, No. 2-2012.
3. Pulmonary fibrosis in response to environmental cues and molecular targets involved in its pathogenesis / Y. Toshinori [et al.] // J. Toxicol. Pathol. – 2011. – Vol. 24, № 1. – P. 9-24. 15
4. Liver disease according to Schiff. Cirrhosis of the liver and its complications. Liver transplantation / Eugene R. Schiff, Michael F. Sorrel, Willis S. Maddrey; trans. from English V.T. Ivashkina. M.: GEOTAR-Media, 2012. -592 p.
5. Levitan, B. N. 50 years of experience in the clinical study of liver cirrhosis / B. N. Levitan, A. V. Dedov // Ros. journal gastroenterology, hepatology, coloproctology. 2002. - No. 1. - P. 76-79.

6. Morphogenesis of chronic hepatitis C and cirrhosis of the liver of infectious-viral origin / G.I. Nepomnyashchikh, S.V. Aydagulova, D.L. Nepomnyashchikh and others // Bull. SB RAMS. 2008. - No. 6 (134). - P. 66-77.
7. European Association For The Study Of The Liver: EASL Clinical Practice Guidelines: Management of chronic hepatitis B virus infection // J. Hepatol. -2012.-Vol. 57.-P. 167-185
8. Population prevalence and symptom associations of autonomic dysfunction in primary biliary cirrhosis / J. L. Newton, M. Hudson, P. Tachtatzis et al. // Hepatology. 2007. - Vol. 45. - P. 1496-505.