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Review Article

PILOT RATIONALE FOR THE USE OF LOCAL FOOD AND MEDICINAL PLANTS TO REGULATE LIVER FUNCTION IN CASES OF PESTICIDE POISONING

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Abstract
Background: Almost all pesticides have hepatotoxic effects even at low doses, making liver protection from pesticide toxic effects one of the urgent regional medical and social problems
Objective: The purpose of this work was to assess the functional state of the liver of animals poisoned with the pesticide Bagira, using in their diet dishes made from local food and additional introduction of a complex of local herbal medicines into the diet.
Methods: The experiments were carried out on 147 white male rats weighing 170-190 g. Bagira" pesticide in dose 1/20 Lethal dose 50 (LD50)-44.3 mg/kg (LD50=886 mg/kg) was injected daily intragastricly.
Results (Findings): The results of experimental studies are presented, which show that the use in the experiment of feed prepared from local products together with decoction of medicinal plants, allows to achieve a sharp improvement in biochemical indicators of the functional state of the liver of rats with chronic liver damage by the pesticide "Bagira", compared with indicators of animals on the diet of vivarium. The data on increase of liver function and positive influence of new diets on liver excretion function of animals have been received.
Conclusions: 1. The results of the experiments show that the use in the experiment of feed prepared from local products together with decoction of medicinal plants, allows to achieve a sharp improvement in biochemical indicators of the functional state of the liver compared with the indicators of animals on the diet of vivarium.
2. An increase in the amount of protein in liver tissue, a decrease in the activity of Alanine Transferase (ALT) and Aspartate Transferase (AST) with the use of local products indicates an increase in liver function, and a decrease in bilirubin content indicates their positive impact on liver excretion function.

Keywords: local, food, medicinal plants, pesticide

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INTRODUCTION

Uzbekistan is one of the territories where, for objective reasons, a wide range of pesticides are used in agriculture in significant quantities. As a result, not only those who directly use pesticides are exposed to these biologically active substances, but also a significant part of the population in small doses. Practically all pesticides have hepatotoxic effect even in small doses, which makes the problem of liver protection from toxic action of pesticides one of the urgent regional medical and social problems [1, p. 35]. The most important way of maintenance of normal functioning of the liver is considered to be a rational diet [4, p. 45; 5, p. 26], but nowadays one of its most important principles is not fully taken into account in the organization of dietary nutrition - the account of dietary habits of the population [2, p. 83; 6. p. 42].
The main part of the population of our republic is adapted to the dishes of national cuisine, prepared from local products [3, p. 25; 7, p. 26]. When eating European dietary dishes, people need time to adjust the activity of digestive system enzymes and to adapt to new foods [8, p. 17].

PURPOSE OF WORK

The purpose of this work was to assess the functional state of the liver of animals poisoned with the pesticide "Bagira", using in their diet dishes made from local food, and the additional introduction of a complex of local herbal medicines in the diet.

Methods. The experiments were conducted on 147 white male rats weighing 170-190. The studies were conducted in accordance with the European Convention for the Protection of Vertebrate Animals used for Experimental or Other Scientific Purposes (Strasbourg, 18 March 1986) ETS N 123. All animals were kept in the vivarium and the laboratory for medical and biological studies in hygiene at the Research Institute of the SSPPZ MH RU.

2 series of experiments were conducted: 1 series - control, 2 series - main groups.

In the first series the animals were divided into 2 groups: 1 control group - animals received feed close to dishes of national cuisine and cooked from local products (mash, peas (nukhat), rice, pumpkin, meat of local animals); 2 control group - animals received usual vivarium feed using buckwheat, perlovka, oatmeal and imported types of meat.

In order to create a model of chronic intoxication of animals of the 2nd series, Bagira pesticide was administered daily intragastric dose of 1/20 LD50 - 44.3 mg/kg (LD50=886 mg/kg) for two months. "Bagira" is an insecticide used against pests and diseases of agricultural plants. The affected animals were divided into 5 groups (from 3 to 7 groups), 21 animals in each group. The affected animals of the third group received the usual feed from the vivarium. Animals of the 4th group, poisoned with pesticide, received food prepared from mash (mashchuria, mashhurd) and vegetable decoction. The 5th group of animals poisoned with pesticide received food from national dishes with peas (shurak nohat, mohora) in combination with decoction from plant preparations. The 6th group of poisoned animals received national dishes consisting of rice products (pilaf shawl, mastava) and vegetable decoction. Group 7 pesticide poisoned animals received food from pumpkin and meat (pumpkin and meat manty) and vegetable decoction.

As a decoction intragastric complex of medicinal plants (rosehip fruit, licorice root, mint, yarrow) in a dose of 1 ml/100 g of animal body weight was introduced. Preparation of decoction: 5 g of each plant in crushed form for 400 ml of boiling water was left for 2 hours in a thermos [10, p. 4].

After 15, 30, 60 days of experiments, 7 rats in each group were decapitated, liver extracted and blood was taken into centrifuge tube. The total protein content, activity of AST and ALT enzymes, the amount of total and direct bilirubin in blood serum were determined in liver tissue [10, p. 4].

RESULTS

Indicators of the functional state of the liver of the investigated animals, studied on the 15th, 30th and 60th days of the experiment, are presented in the table.

In control groups different feed was used for feeding healthy animals and although the studied functional indices have some differences, in no case these differences were reliable.

At inoculation of animals with pesticide "Bagira" and use in feeding of animals of usual products (Op1) on 15th day of experiment significant changes of investigated parameters in comparison with K1 and K2 were marked: the amount of total protein in liver tissue decreased by 12.5%, AST activity increased by 28.2%, ALT - by 83.6%, the content of total bilirubin in blood serum increased by 44.3%, direct bilirubin - by 33.3%; in all cases, these differences were statistically reliable: $P<0.05$ - $P<0.01$. On the 30th and 60th days of the experiment the studied parameters of the liver functional state also differed significantly from those of healthy animals: the amount of protein was 29.2% lower, ALT activity - 77.1-68.0%, AST - 31.1-31.0% higher, the content of total bilirubin - 66.9 - 76.8%, and the content of direct bilirubin - 43.0 - 86.0% more than in K1 and K2 ($P<0.05$-0.001). These changes indicate a sharp decline in liver function.

Inclusion of local foodstuffs (groups Op2, Op3, Op4, Op5) in the feed for animals already by the 15th day allowed improving the investigated indicators; the amount of protein as compared to Op1 increased with the introduction of dishes from mash and peas by 7.5%, from rice and pumpkin - by 2.6%, the activity of AST decreased by 19.2 - 24.3%, ALT - by 38.7-45.2%, the content of total bilirubin - 25.8 - 33.0%, and direct bilirubin - by 17.6 - 19.1%. However, these changes were not statistically reliable in all cases; in particular, a reliable increase in protein in liver tissue was noted only when included in the diet of rats, marshes and peas (Op2, Op3,).

On the 30th day of the experiment, the influence of national dishes on the functional state of the liver was more pronounced: the amount of protein increased in comparison with Op1 in all dishes, but it was particularly noticeable - with the use of peas and pumpkin with meat - by 31.15 and 35.0% respectively ($P < 0.001$), the activity of AST decreased by 24.2-27.0%, ALT - by 38.7-45.2%, the content of total bilirubin - by 25.2-33.0%, and direct bilirubin - by 14.3-27.8% (P in most cases < 0.01).

On the 60th day of the experiment most of the studied parameters in liver tissue of Op2, Op3, Op4, Op5 - groups of animals turned out to be at the level of healthy control animals.

CONCLUSIONS:

1. 1.The results of the conducted experiments show that the use in the experiment of feed prepared from local products together with decoction of medicinal plants allows to achieve a sharp improvement of biochemical indicators of the functional state of the liver in comparison with indicators of animals on the vivarium diet.
2. 2.An increase in the amount of protein in liver tissue, decrease in ALT and AST activity when using local products indicates an increase in liver function, and a decrease in bilirubin content indicates their positive impact on liver excretion function.
3. Conflict of interest. All authors state that there is no potential conflict of interest requiring disclosure in this article.

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