BIOLOGICAL EFFECT OF INFLUENCE OF PLANT AND SYNTHETIC PREPARATIONS ON EXPERIMENTAL ANIMALS ORGANISM AT CHRONIC INFLUENCE OF PHYSICAL AND CHEMICAL FACTORS

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Abstract

Background: Experimental studies have confirmed the probability of changes in some carbohydrate and protein metabolism indicators during dichloromethane intoxication under the conditions of noise and vibration. It is necessary to use Phytotea' Gepalyuks' with potassium for prevention and treatment by correcting metabolic processes to avoid the adverse effects of physical and chemical factors on the body.

Objective: Experimental study of the effectiveness of phytotea "Gepalyuks" and potassium on carbohydrate energy metabolism of the liver and blood under the influence of chemical and physical factors.

Methods: The experiments were conducted on 98 purebred white rats - males weighing 160-180 years, contained in vivarium's usual diet. Animals were divided into control and experimental groups. Control animals received an equivalent volume of drinking water, food and were kept in vivarium conditions. Animals of the experimental group were divided into two groups: The first group was intragastrically injected 10% of oiled dichloromethane solution in the dose of 1/20 LD50 (255 mg/kg) in conditions of noise (tape recording) at the level of 95-105 dBA and vibration of 5-16 dBA during 90 days. The second group, together

with intragastric administration of 10% oily solution of dichloromethane in a dose of 1/20 LD50 (255 mg/kg), was administered a decoction of phytotea "Gepalyuks"(1 ml of phytotea per 100 g of animal body weight) in conditions of noise exposure (tape recording) at the level of 95-105 dBA and vibration of 5-16 dBA during 90 days. Phytotea "Gepalyuks" consists of immortelle sand flower, yarrow herb, licorice root, peppermint leaves, corn snouts, and rosehip fruit. Animals were slaughtered on 15, 30, 60 and 90 days from the beginning of the experience. We took the liver, blood and determined biochemical indicators of carbohydrate, protein, and pigment metabolism for research.

We studied some carbohydrate energy metabolism indicators to study the effectiveness of phytotea"Gepalyuks" and potassium orotate under chronic exposure to dichloromethane, noise and vibration.

Findings: When administered within 90 days, biologically active vegetable and synthetic preparations in the form of decoction lead to an increase in the activity of GDG, SDH and MDH and a decrease in the level of pyruvic and lactic acids in serum and liver.

As a result of experimental studies, it was found that when administered phytotea "Hepallux" in combination with potassium orotate for 90 days (15, 30, 60 and 90 days) under chronic exposure to dichloroethane, noise and vibration in biochemical indicators - protein and lipid metabolism and activity of enzymes of aliphatic amino acids remineralization (AST, ALT) and the content of cholesterol, total and direct bilirubin in the liver and blood revealed a positive effect.

Conclusions: Application of phytotea "Hepallux" in complex

Potassium orotate causes a pronounced pharmacotherapeutic effect under the toxic effects of chemical and physical factors - dichloroethane, noise and vibration. Normalizes or approximates indices of carbohydrate energy (pyruvic, lactic acids, the activity of GDG, SDG, MDG) metabolism and alkaline phosphatase to those of the control group in blood and liver. The content of total

protein, total and free bilirubins, the activity of AST, ALT in serum and liver is approaching the norm.

Keywords: dichloromethane, noise, vibration, phytotea “Gepalyuks” potassium orotate, carbohydrate energy exchange, protein exchange, correction, prevention.

Introduction

At present, the treatment of patients with acute and chronic liver diseases, despite the progress of modern hepatology associated with the introduction of new methods of laboratory and instrumental diagnostics, the study of ecology and pathogenesis of liver diseases at the cellular and molecular level, is still extremely difficult and in some cases, far from a satisfactory solution to the problem [1, p. 221; 2, p. 32; 4, p. 246; 6, p. 50].

In this regard, it is relevant to the search for means capable of increasing the resistance of the liver to the damaging effects of toxic substances and of activating the processes of detoxification in the body [3, p. 50; 5, p. 544; 7, p. 14]. Promising the development of pharmacological correction methods of liver diseases are preparations of natural origin, differing, as a rule, by wide therapeutic action, low toxicity, and the associated possibility of long-term use without risk of toxic [9, p. 49; 13, p. 206].

The therapeutic effect of biologically active substance - phytotea “Gepalyuks”in combination with potassium orotate is because the drug has a stimulating effect on protein synthesis, normalizes the carbohydrate and energy process in case of dichloromethane poisoning, in conditions of noise and vibration [10, p. 10; 12, p. 205].

The work is aimed at the development of prophylaxis and early diagnostics of chronic hepatitis as well as new methods of restoration of hepatocyte functional state disorders based on scientifically grounded data on the study of the mechanism of hepatotoxic action of chemical (dichloromethane) and physical

factors (noise and vibration) at the subcellular level of the liver, on biochemical processes of metabolites of carbohydrate and energy exchange in the liver and blood [8, p. 50; 14, p. 38; 16, p. 157].

The researches were conducted within the framework of grant project ADBC - 15.17.3.

Purpose of the study. Experimental study of the effectiveness of phytotea “Gepalyuks” in combination with potassium orotate for carbohydrate and energy metabolism under the influence of chemical and physical factors.

Materials and methods of research. The research was carried out following the European Convention for the Protection of Vertebrate Animals used for Experimental or Other Scientific Purposes (Strasbourg, March 18, 1986) ETS N 123. All the animals were housed in the vivarium and the medical and biological hygiene studies laboratory of the SSPPZ Research Institute of the RUz Ministry of Health.

The experiments were conducted on 60 white male rats weighing 160-180 years kept in the usual vivarium diet. The animals were divided into control and experimental groups. Control animals received an equivalent volume of drinking water, food and were kept in the vivarium. Animals of the experimental group were divided into two groups: The first group was intragastrically injected 10% of oiled dichloromethane solution in the dose of 1/20 LD50 (255 mg/kg) in conditions of noise (tape recording) at the level of 95-105 dBA and vibration of 5-16 dBA during 90 days. The second group, together with intragastric administration of 10% oily solution of dichloromethane in a dose of 1/20 LD50 (255 mg/kg) was administered a decoction of phytotea “Gepalyuks” with potassium orotate (1 ml of phytotea per 100 g of animal body weight) in conditions of noise exposure (tape recording) at the level of 95-105 dBA and vibration 5-16 dBA for 90 daysImmortelle sand vine, yarrow herb, licorice root, peppermint leaves, corn snouts, rose fruit are the “Gepalyuks” phytotea. The liver and blood were taken for research.

To assess the state of carbohydrate and energy metabolism was determined in liver tissue and blood content of pyruvic and lactic acids and glycogen levels. At the same time, the activity of respiratory enzymes of the mitochondria of the liver was determined in groups of animals using spectrophotometer SF-48: glutamate dehydrogenase (GDG), succinate-dehydrogenase (SDG) and malatdehydrogenase (MDG), alkaline phosphatase (ALP). Mitochondria were isolated from the liver by differential centrifugation in a 0.25 m saccharide solution containing 1 mm of EDTA at PH-7.4 with double washing. The activity of enzymes was expressed in micro molecules per 1 gr. of tissue for 1 hour (μmol/g, h). The liver and blood content of total protein, the activity of enzymes alanine transferees (ALT) and aspartate transferees (AST), the amount of total and direct bilirubin were determined [10, p. 10; 11, p. 15].

The obtained data have been statistically processed on a personal computer using the Microsoft Office Excel - 2010 software package with built-in static processing functions. The indicators “M”, “m”, “t” have been calculated. The statistical significance of the differences in the compared indicators was assessed by the Student’s criterion ($P < 0.05$).

Results. To clarify the mechanism of hepatotropic action of chemical (dichloromethane) and physical factors (noise and vibrations) on carbohydrate metabolism, studies of glycogen, pyruvic and lactic acids content and activity of enzymes of tricarboxylic acid dehydrogenases cycle were conducted, alkaline phosphatase (alkaline phosphatase), ALT, AST, bilirubin and its fractions, the level of total protein in the blood and liver, to correct metabolic processes were injected into the stomach of white rats decoction phytotea“Gepalyuks” and potassium orotate.

In the intragastric application of decoction from a complex of the plant (“Gepalyuks”) and synthetic drugs (potassium orotate) under repeated exposure to dichloromethane, noise and vibration observed changes in metabolites of carbohydrate and energy metabolism in the blood of laboratory animals. With the

introduction of decoction from a complex of plant preparations consisting of immortelle sand flower, yarrow herb, licorice root, peppermint leaves, corn snout, rosehip fruit and potassium orotate within 90 days, there is a decrease in lactic acid content in the blood on 15, 30, 60 and 90 days with the blood of animals that have not received treatment by 90.3; 41.0; 32.3; 131.6%.

After applying "Gepalyuks" decoction in combination with potassium orotate, pyruvic acid rates in the experimental group of animals were close to those of the control group animals that were not treated the 15 - 90 days they decreased and recovered, amounting to 19.3 - 31.6%. And so, the use of drugs in animals poisoned with dichloromethane, under the conditions of noise and vibration, we can observe the approaching of lactic and pyruvic acid parameters to control group animals' parameters. Content of glycogen in blood during application of therapeutic decoction increases by 8.8 - 13.8% and made 80.5 - 86.1% in comparison with the control group (Table 1)

At chronic influence within 90 days of dichloromethane, noise and vibration (DNV) inhibition of activity enzymes of the tricarboxylic acid cycle - dehydrogenase in blood serum of laboratory animals is observed.

When administered within 90 days, biologically active plant and synthetic preparations in the form of decoction lead to increased activity of GDG, SDG and MDG in serum. The activity of GDG increased by 21.7 - 43.8%, the activity of GDG by 26.6 - 21.0% and the activity of MDG by 22.7 - 16.0%. The alkaline phosphatase activity decreased by 46.9% on day 15, 38.4% on day 30 and 18% on day 60 after the use of the therapeutic decoction

Thus, under chronic exposure to dichloromethane, noise and vibration (DNV), there was an increase in under-oxidized glycolysis products and inhibition of tricarboxylic activity acid cycle enzymes - dehydrogenase - GDG, SDH, MDG and an increase in serum alkaline phosphatase.

Table1
Influence of plant complex and synthetic preparations on indicators metabolites of carbohydrate and energy metabolites in blood when exposed to dichloromethane, noise and vibrations

№	Indicators	Standard indicators	Control	15 days		30 days		60 days		90 days	
				Without treat	With treat	Without treat	With treat	Without treat	With treat	Without treat	With treat
1.	Lactic acid (moth/l)	Mcp±m % %	0,99±0,08	2,52±1,64 254,5%	1,62±0,14*** 163,6% 64,3%	2,44±0,17*** 246%	2,03±0,13*** 205% 83,2%	2,75±0,17** 277,7%	1,59±0,14** 160,6% 57,8%	2,35±0,15*** 237,4%	1,2±0,07 121,2% 78,0%
2.	Porovinogradic acid (µmol/l.h.)	Mcp±m % %	109±6,72	155,0 ±9,90** 142,2%	128,0 ±8,05 117,4% 82,6%	166,0 ±11*** 152,2%	145,0 ±5,02*** 133% 87,3%	143,5±8,37** 131,6%	106,6±8,40 100,5% 31,6%	155,2±6,72*** 142,3%	121,1±5,9 111% 31,3%
3.	Glycogen (mg/l)	Mcp±m % %	13,0 ±0,74	10,3±0,56* 79,2%	11,8±0,62 80,5% 101,6%	10,46±0,53* 80,5%	11,44±0,51 88% 109,4%	9,45±0,47*** 72,7%	11,2±0,63 86,1% 118,5%	10,2±0,56** 78,5%	12,0±0,54 92,3% 117,6%
4.	GDG (µmol/l.h.)	Mcp±m % %	11,0 ±0,95	6,04±0,60*** 54,9%	8,43±0,82* 76,6% 21,7%	5,13±0,59*** 46,6%	6,61±0,69** 60,1% 13,5%	5,92±0,49*** 53,8%	9,91±0,77 90% 36,2%	4,38±0,46*** 39,8%	9,2±0,75 83,6% 43,8%
5.	SDG. (µmol/l.h.)	Mcp±m % %	24,0 ±2,64	17,3±2,02* 72,1%	23,7±1,93 98,7% 26,6%	14,17±1,39** 59%	18,3±1,92 76% 17,0%	14,0 ±1,37** 58,3%	19,0 ±2,26 79,2% 20,9%		
6.	MDG (µmol/l.h.)	Mcp±m % %	15,0 ±1,00	10,49±1,19** 69,9%	13,9±1,25*** 92,6% 22,7%	8,03±0,64*** 53,5%	10,42±0,81** 69,5% 16,0%	10,3±1,31*** 68,6%	11,0±1,07* 73,3% 4,7%		
7.	alkaline phosphatase (µmol/l.h.)	Mcp±m % %	0,79±0,05	1,60±0,13*** 202,5%	1,23±0,07*** 155,6% 46,9%	1,91±0,14*** 241,2%	1,65±0,14*** 208,8% 32,4%	1,74±0,15 220,2	1,6±0,07*** 202,5% 17,7%		

*Note: Reliability: * - P<0,05; ** - P<0,01; *** - P<0,001 DNV in relation to control; % treatment effect in relation to treatment without DNV treatment*

The introduction of decoction consisting of vegetable (Gepalyuks) and synthetic substances (potassium orotate) stabilizes the carbohydrate energy process with a decrease in the metabolites of anaerobic glycolysis as a result of the activation of redox enzymes and reducing the concentration of lactic, pyruvic acids in the blood.

The study of the effect of decoction of phytotea“Gepalyuks”, which consists of a complex of plant preparations - licorice root, rosehip fruit, corn snout, yarrow grass, immortelle of sand and mint leaves, as well as synthetic preparations of potassium orotate on the carbohydrate energy metabolism of the liver in chronic poisoning with dichloromethane under the influence of noise and vibration was conducted on 15, 30, 60 and 90 days of the study. Simultaneously, the lactic acid concentration was reduced towards normalization by 25.3 to 95.3% over the entire period. The level of pyruvic acid during treatment was restored by 30.3 - 53.7% and the concentration of glycogen in the liver with the group of untreated patients was increased by 3.4 - 13.5%.

Therefore, with the use of phytotea “Gepalyuks” and potassium orotate, there is a decrease in under-oxidized products of glycolysis - lactic and pyruvic acids and an approach to the norm and an increase in the splitting of glycogen in the liver under chronic exposure to DNV (Table 2).

The activity of tricarboxylic acid - dehydrogenase enzymes in the application of medicinal decoction and potassium orotate increases. Simultaneously, the activity of GDG in the liver increased during the whole period of the study with untreated patients by 26.4 - 42.4%. The activity of GDH increased by 10.9; 20.5; 11.5 and 32%. MDH and alkaline phosphatase activity under the influence of medications increased towards normalization up to 77.9 - 58.5%, alkaline phosphatase - up to 62-87% with the control group.

And so, the complex of plant and synthetic preparations have a pronounced pharmacotherapeutic efficiency at toxic liver damage by dichloromethane, noise and vibration. It stimulates excerptor-absorbing and positively affects carbohydrate and energy metabolism in the liver and blood of laboratory animals.

Table 2.

Influence of plant and synthetic preparations on indices of metabolites of carbohydrate and energy exchange in the liver under the influence of dichloromethane, noise and vibration

№	Indicators	Standard indicators	Control	15 days		30 days		60 days		90 days	
				Without treat	With treat	Without treat	With treat	Without treat	With treat	Without treat	With treat
1.	Lactic acid (moth/l)	Mcp±m % %	1,93±0,077	3,19±0,11*** 165,3%	2,71±0,2** 140% 25,3%	2,88±0,14*** 149%	2,19±0,14 113,5% 35,5%	2,83±0,16*** 146%	1,79±0,12 92,7% 53,3%	3,92±0,14*** 203%	2,08±0,11 107,7% 95,3%
2.	Porovinogradic acid (µmol/l.h.)	Mcp±m % %	122,0 ±4,18	176,0 ±8,84*** 144,3%	176,0 ±6,75*** 144% 0,3%	188,0 ±11,14*** 154%	147,0 ±7,25** 120,5% 33,5%	191,4±10,4*** 156,5%	125,4±5,62*** 102,8% 53,7%	159,7±8,73** 130,9%	122,8±5,78 100,6% 30,3%
3.	Glycogen (mg/l)	Mcp±m % %	20,0 ±0,68	15,1±0,69*** 75,5%	15,7±0,70*** 78,5% 3,6	14,18±0,94*** 70,9%	16,27±0,75** 81,3% 10,2%	14,3±0,53*** 71,5%	17,2±0,81* 85% 13.5%	14,4±0,48*** 72%	16,87±0,57** 84,3% 13,06%
4.	GDG (µmol/l.h.)	Mcp±m % %	11,0 ±0,89	6,95±0,75** 63,2%	9,86±0,53 89,6% 26,4%	7,64±0,711** 69,4%	8,03±0,99* 73% 3,6%	6,61±0,76** 60,1%	9,51±0,75 86,4% 26,3%	4,84±0,59*** 44%	9,5±0,59 86,4% 42.4%
5.	SDG. (µmol/l.h.)	Mcp±m % %	35,0 ±2,70	29,1±2,93 83,1%	32,9±2,36 94% 11.9%	20,83±1,79*** 59,5%	28,0 ±2,03* 80% 20.5%	21,2±2,70** 63,1%	26,1±2,28* 74,6% 11.5%	18,8±2,73*** 53,7%	30,0 ±1,73 85,7% 32.01%
6.	MDG (µmol/l.h.)	Mcp±m % %	24,0 ±2,18	16,05±1,1** 66,9%	18,7±1,58 77,9% 11.6%	11,9±1,23*** 49,6%	15,87±0,96** 66,1% 16.5%	12,6±1,17*** 52,5%	14,9±0,96** 62,1% 9.61%	9,60±1,39*** 40%	12,8±1,24*** 53,3% 13.3%
7.	alkaline phosphatase (µmol/l.h.)	Mcp±m % %	51,0 ±3,18	39,90±3,89* 78,2%	43,6±2,88 85,5% 7.3%	31,62±2,68*** 62%	35,3±1,97*** 68% 6.0%	34,1±2,25*** 66,8%	44,4±1,93 87% 20.2%		

*Note: Reliability: * - P<0,05; ** - P<0,01; *** - P<0,001 DNV in relation to control; % treatment effect in relation to treatment without DNV treatment*

A study of the effectiveness of “Gepalyuks” in combination with potassium orotate on the biochemical processes in the blood and liver of laboratory animals in chronic exposure to DNV during 90 days (15, 30, 60 and 90 days) on the metabolites of protein and lipid metabolism and the activity of enzymes demineralization of aliphatic amino acids (AST, ALT) and the content of cholesterol, total and direct bilirubin in the liver and blood revealed a positive effect (Table 1). 3, 4).

When using “Gepalyuks” and potassium orotate under the action of DNV, the content of cholesterol, total and free bilirubin decreased and came close to the control group’s indicators. At the same time, serum cholesterol level decreased by 15 - 90 days by 34.9 - 58.9%, the content of total and direct bilirubin decreased by 34.0 - 69.0%. and by 16.2 - 39.4%. The total protein content during treatment increased during the whole study period (by 9.3 - 17.8%) with the control group animals that were not treated.

Under the influence of hepatotropic chemical and physical factors, ALT and AST activity in serum increased dramatically.

With the introduction of experimental animals, decoction of phytotea “Gepalyuks” and potassium orotate activity of AST decreased by 52.7 - 47.3% and ALT activity decreased by 52.8 - 57.2%.

The influence of a complex of chemical and physical factors has a negative effect on the liver’s functional state and leads to the disruption of biochemical processes in all study periods.

When using a decoction of phytotea“Gepalyuks” and potassium orotate, the content of total protein in all the terms of the experiment increases by 3.6 - 9.0%, and the cholesterol content decreased by 21.9, 28.0, 25.2 and 27.9%, respectively, to 15, 30, 60 and 90 days of experience (Table 4).

Table3.

Influence of vegetable preparation Gepalyuks and potassium orotate on some

Biochemical indicators of blood under exposure to DNV

№ п/п	Indicators	Standard indicators	Control	15 days		30 days		60 days		90 days	
				Without treat	With treat	Without treat	With treat	Without treat	With treat	Without treat	With treat
1.	Total Protein (mg/l)	Mcp±m %	72,7±3,13	55,9±3,67** 76,9%	62,7±3,57* 86,2% 9,3%	52,07±3,34*** 71,6%	60,37±2,74* 83% 11,4%	53,6±2,88*** 73,7%	57,4±3,02** 78,9% 5,2%	54,9±3,69** 75,5%	67,9±1,84 93,3% 17,8%
2.	Cholesterol (moth/l)	Mcp±m %	6,14±0,28	9,02±0,46*** 146,9%	7,00±0,31 112% 34,9%	11,43±1,06*** 186,6%	9,61±0,70** 156,5% 30,1%	9,67±0,55*** 156,6%	6,67±0,24 108,6% 48,0%	10,7±0,65*** 174,2%	7,08±0,27* 115,3% 58,9%
3.	AST (µmol/l.h.)	Mcp±m %	0,36±0,05	0,82±0,05** 227,7%	0,62±0,04 172,2% 55,5%	1,51±0,13*** 419,4%	1,32±0,20*** 366,6% 52,8%	0,82±0,03*** 227,7%	0,72±0,03*** 200% 27,7%	0,91±0,05*** 252,7%	0,56±0,03* 155,5% 97,2%
4.	ALT (µmol/l.h.)	Mcp±m %	0,53±0,62	1,00±0,07 188,6%	0,72±0,05 135,4% 35,9%	1,27±0,12 239,6%	1,13±0,10 213% 26,6%	1,12±0,08 211,3%	0,68±0,95 128,3% 33,0%	1,02±0,05 192,4%	0,77±0,02 145,3% 47,1%
5.	Total bilirubin (moth/l)	Mcp±m %	5,31±0,22	7,31±0,29*** 137,6%	5,5±0,26 103,5% 34,0%	10,92±0,96** 205,6%	9,37±0,44** 176,4% 29,2%	7,5±0,24*** 141%	4,88±0,25 91,9% 49,1%	10,35±0,60*** 194,9%	6,69±0,35* 125,9% 69,0%
6.	Straight bilirubin (moth/l)	Mcp±m %	2,48±0,17	3,4±0,24*** 137%	2,91±0,82 120,5% 16,2%	3,74±0,28*** 150,8%	2,79±0,12 112,5% 38,3%	2,61±0,21 105,2%	1,62±0,11*** 65,3% 39,4%		

*Note: Reliability: * - P < 0,05; ** - P < 0,01; *** - P < 0,001 in relation to the control; therapeutic effect - without treatment.*

Table4.

Influence of dichloromethane complex, noise and vibrations on some biochemical parameters in liver tissue and treatment with Gepalyuks and potassium orotate preparations

№ п/п	Indicators	Standard indicators	Control	15 days		30 days		60 days		90 days	
				Without treat	With treat	Without treat	With treat	Without treat	With treat	Without treat	With treat
1.	Total Protein (mg/l)	Mcp±m %	85,9±2,51	64,6±2,19*** 75,2%	75,4±2,57** 78,8% 3,6%	60,09±2,81*** 69,9%	67,8±2,62*** 78,9% 9,0%	67,6±3,24*** 78,7%	70,0±2,36*** 81,5% 2,8%	70,3±3,40** 81,8%	74,7±2,28** 86,9% 5,1%
2.	Cholesterol (moth/l)	Mcp±m %	26,5±1,95	36,4±1,62** 137,3%	30,6±1,22 115,4% 21,9%	39,36±1,90*** 148,5%	31,94±1,83* 120,5% 28,0%	42,47±2,22*** 160,3%	35,8±2,0** 135,1% 25,2%	38,1±2,54** 143,7%	30,7±1,77 115,8% 27,9%
3.	AST (µmol/l.h.)	Mcp±m %	55,9±3,17	45,5±2,69* 81,4%	41,6±2,51** 74,4% 7,0%	36,2±2,16*** 64,7%	31,0±1,57*** 55,4% 9,3%	43,3±2,59** 77,4%	35,5±3,44*** 63,5% 13,9%	52,2±2,85 93,4%	45,9±2,77** 82,1% 11,3%
4.	ALT (µmol/l.h.)	Mcp±m %	38,1±1,76	32,1±1,55* 84,2%	30,9±2,23* 81,1% 3,1%	33,07±1,57* 86,8%	27,6±2,10** 72,4% 14,4%	36,6±2,59 96,0%	27±1,48*** 70,8% 25,3%	63,5±3,21*** 166,6%	42,6±2,29 111,8% 54,3%

*Note: Reliability: * - P<0,05; ** - P<0,01; *** - P<0,001. Relative to control; therapeutic effect - without treatment.*

The activity of AST and ALT enzymes during the treatment increases and is approaching a normal figure. At the same time, the activity of AST increased by 7.0 - 13.9%. Gepalyuks' decoction has a particularly large effect on ALT activity and the activity decrease was 25.3 - 54.8%. So the pharmacotherapeutic efficiency of the complex of the plant (Gepalyuks) and synthetic (potassium orotate) drugs is due to its membrane stabilizing effect, as well as the ability to increase the activity of antioxidant protection systems, stimulate the processes of carbohydrate, protein, lipid metabolism.

Conclusions:

1. The use of phytotea "Gepalyuks" and potassium orotate causes a pronounced pharmacotherapeutic effect at the toxic influence of chemical and physical factors - dichloromethane, noise and vibration. Normalizes or approximates indices of carbohydrate-energetic (pyruvic, lactic acids, GDG, SDG, MDG and alkaline phosphatase) metabolism process to indices of the control group in blood and liver. The content of total protein, total and free bilirubin, the activity of AST, ALT in serum and liver is approaching the norm.
2. The results obtained allow us to conclude that the administration of the complex preparations, consisting of vegetable substances and potassium orotate, has a beneficial effect on the dynamics of biochemical processes in persons working in the oil and gas industry. This is expressed in the normalization of the intensity of aerobic oxidation processes. The received data testify to the expediency of applying a complex of biologically active substances for pathogenetic prophylaxis and therapy of toxic hepatitis.

References:

1. Azizkhodjaev A.A. General and neurological morbidity of workers engaged in the extraction and transportation of oil and oil products//Actual. problems of hygiene, sanitation and ecology. -T., 2004. -P. 220-221.
2. Azizkhodjaev A.R., Iskandarova G.T. Labor conditions and health condition of workers engaged in the extraction and transportation of multi-sulfur oil and petroleum products // Bul. associated doctors of Uzbekistan. - 2003.-№3.-P. 32-36.
3. I. A. Study of activity of the monooxygenase system of cytochrome R-450 and antioxidant protection in oil workers // Vestn.dermatol. and venerol. - 2003.-№2.-P.49-50.
4. Bakhmet A.A. Lymfoid structures of rat spleen under exposure to Stress-protective peptides // Mother, Interdepartmental conf., devoted to the 75th anniversary of the birth of Prof. B.A. Nikityuk: The problems of modern human morphology. - M.: MGAFK, 2008. –pp. 246-247.
5. Boyko V.I., Dotsenko Y.I., Akhmineeva A.H., Boiko O.V. Hygiene of labor and health condition of workers engaged in processing natural gas. (in Russian) // Hygiene and sanitation. - Moscow, 2017. Volume 96. - №6. - P. 541-548.
6. Valeeva E. T., Karimova L. K., Bakirov A. B., Gimranova G. Gainullina, M.K., Timasheva G.V., Masyagutova L.M., Zotova T.M. and others. Risk Factors and Peculiarities of Formation of Occupational Illness in the Petrochemical Industry: Manual for Doctors. - Ufa, 2008. - 60 p.
7. Kamilov R. F., Shakirova E. D., Kudryavtsev V. P., Shakirov D. F. Acid and Osmotic Resistance of Rubber, Rubber-Technical Products in the Petrochemical Industry. // Labor medicine and industrial ecology. - 2008. - №8. - pp. 11-16.
8. Karimova L.K., Gimranova G.G., Muldasheva N.A., Zotova T.M. Combined influence of chemicals and noise in the conditions of modern

petrochemical productions (in Russian) / Bulletin of East-Siberian Scientific Center of Siberian Branch of Russian Academy of Medical Sciences. - 2006. - №3(49). - pp.48-50.

9. Parpiev A.M. “Sumition Influence on Some Metabolite Indexes Carbohydrate metabolism in the liver, blood under acute and chronic poisoning” // Hygienic aspects of environmental protection, health and welfare of the population - the priority area of public health of Uzbekistan - Tashkent, 2014 pp. 55-57.
10. Khamrakulova M.A., Sadikov A.U., Sabirova G.A. Features of the flow of biochemical processes in the body under the influence of chemical and physical factors and methods of early detection of pathological processes // Methodical recommendations. Tashkent, 2015. 10 p.
11. Khamrakulova M.A., Sadikov A.U., Ubaidullaeva N.F. Features of exposure to chemical and physical factors and prevention methods by introducing biologically active substances // Methodical recommendations. Tashkent, 2016, p15.
12. Khamrakulova M.A., Ergasheva N.O. Change of carbohydrate and energy metabolism in the brain under single exposure to dichloromethane, noise and vibration // Journal of Infection Immunity and pharmacology. - Tashkent, 2019. - №1. - pp. 204-209.
13. Khamrakulova M.A., Ergasheva N.O. Changes in carbohydrate energy metabolism in the brain under single exposure to dichloromethane, noise and vibration (in Russian) // - Tashkent, 2019. - №1. - pp. 204-209 (14.00.00; №15).
14. Faustov, A.S.; Popov, S.V. Estimation of the digestive organs condition of the chemical enterprise workers (in Russian) // Hygiene and sanitation. - 2004.-№4.-pp.37-39.

15. Shakirov A.F., Ferkhutdinova R.R. Energy exchange of free radical oxidation in the organism of workers in oil refining industry // Medicine labor and industrial ecology. - 2000.-№2.-pp.11-13.
16. Ergasheva Nargiza. Features of effects of pesticide on breathing and oxidative phosphorylation in mitochondria of small intestine mucosa // Journal European science review. – Austria-Vienna, 2018. - №1-2. – pp.157-158.