Estimation of Efficiency of Use of Dairy Products Enriched with Enter Sorbent Dietary Fibers on Immunophysiological Indicators of the Rat Organism

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Abstract: At all times, the problem of healthy and wholesome food has been one of the most important problems facing human society. This problem cannot be solved by simply increasing the amount of food consumed. Plant-based antioxidants are widely used for the prevention and treatment of diseases with the aim of eliminating free radicals from the body and restoring the body's antioxidant defense system. The article shows biochemical indicators that reflect the nature of changes in the early stages of the formation of response of the animal organism during toxic poisoning and the use of sour-milk products using enter sorbent dietary fiber from rice husk. With an increase in the dosage and frequency of CCl4 administration, the effect of deep poisoning and impaired lymph dynamics was obtained. Along with a decrease in the content of total protein and urea in lymph and blood plasma, an increase in ALT and AST levels in blood plasma by 2.5–3 times, as well as an increase in thymol test, were noted. Antioxidant defense mechanisms are universal in order to increase the body's vitality.

Keywords: Enterosorbent, Tetrachloromethane, Rats, Protein, Glucose, Cholesterol, Liver, Blood, Alt, AST.

INTRODUCTION

Currently, research on the development of cooking technologies based on local raw materials for new, environmentally friendly products with medicinal properties, a specific aroma, and increased stability during storage, which is competitive in the world market, is relevant. A new direction, called functional nutrition along with the traditional approach to the role of food in the health of the population, has been developed in recent years. In contrast to rational nutrition, functional nutrition means the use of products of natural origin, which, when used systematically, have a certain regulatory effect on the body as a whole or on its specific systems and organs [1-10].

The results of this research estimation of efficiency of use of dairy products enriched with enter sorbent dietary fibers on immune physiological indicators of the rat organism indicate that when toxic compounds and extreme environmental factors act on the body, adaptive reactions of the body are carried out with the participation of the lymphatic system. This participation is manifested in the form of changes in the internal organs of rats, lymph flow, motility of the lymph nodes, and lymph composition, which is aimed at reducing the negative impact of extreme and foreign factors on the body.

Dietary fiber is a poorly soluble structural substance with certain physical properties. Lack of dietary fiber leads to the appearance of diseases of the intestine, heart, blood vessels, obesity, dysbiosis and other diseases [11-15]. Also, with a lack of dietary fiber in the diet, metabolic disorders are observed. Insoluble dietary fiber acts on the human body in two ways: sorption and mechanical. In the gastrointestinal tract, fibers sorb on their surface and remove heavy metals, free radicals, microbial toxins and decay products from the body.

In addition, they bind in the stomach with the excess of gastric juice and hydrochloric acid, and in the intestine - bile acids, bilirubin, cholesterol, thereby reducing the aggressiveness of gastric juice and bile. In the small intestine, dietary fiber mechanically cleans mucous membrane, which leads to an improvement in

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parietal digestion and intestinal absorption function. The intestinal microflora, using dietary fiber, synthesizes B vitamins, as well as vitamin PP (nizatidine) and vitamin K. The addition of natural biologically active substances of plant origin allows us to create a new generation of products that are balanced in nutritional and biological value, helping to meet the physiological needs of the body [16-21]. BAS biologically active substances increase many times due to the fact that the substances present in it form biological complexes with a mutually reinforcing effect.

MATERIALS AND METHODS OF RESEARCH

Description of an Experiment

To solve estimation of efficiency of use of dairy products enriched with enter sorbent dietary fibers on immune physiological indicators of the rat organism, experiments were performed on 150 adult white laboratory rats, males weighing 200-220 g. Anesthesia on animals was performed by giving ether anesthesia. In the next part of the work, acute poisoning of rats with carbon tetrachloride (CCl4) was performed. Rats received an intraperitoneal injection of CCl4 oil solution with a single injection of 0.1 mg / kg and a three-time injection of the same concentration every other day. Rats were taken after 2-3 days. Blood was taken intravitally for biochemical and hematological studies before and after intoxication with 4 carbon chloride and after correction with enterosorbent. To correct violations of physiological parameters in acute CCl4 poisoning, fermented milk products enriched with enter sorbent dietary fiber BAS were used (carbonized crushed rice husk CCRH) to assess their effectiveness in toxic seeding with carbon tetrachloride and study the effect of dairy products on the basis of e composition enterosorbiruyuschee components on the physiological parameters of animals. The fermented milk products enriched with enter sorbent dietary fiber BAS was continuously given to animals throughout the entire period of the experiment. Blood samples were taken intravitally for biochemical studies. Blood biochemical parameters were determined on a BioChemSA biochemical analyzer (Germany). The content of urea and creatinine in blood plasma was determined using a Bio-Lachema-Test kit (Czech Republic). Urea was determined by the unified method by the color reaction with diacetyl monooxime, creatinine - by the color reaction of Jaffe with picric acid, followed by reading on CPHC-2(color meter photoelectric concentration).

A general analysis of peripheral blood was performed on a Celly 70 Biocode Hycel automated hematology analyzer for veterinary research. When studying behavioral reactions in toxic poisoning, it consists of studying the motor component of the orientational reaction and the emotional reactivity of animals along with studying the behavior of rodents in new conditions.. This test allows us to assess the severity and dynamics of elementary behavioral acts in rodents under stressful conditions that occur in response to the placement of a laboratory animal in a facility that has a larger area and light intensity than its everyday maintenance box. The test allows to evaluate: the severity and dynamics of individual behavioral elements, the level of emotional-behavioral reactivity of the animal ("sedation-agitation"), addiction, symptoms of neurological deficit, locomotor stereotype, motor activity, research activity and emotional state. An “open field” is mainly used as a screening test. In toxicological studies, the method was used to identify: minimal deviations in the animal organism caused by toxic agents; hypothalamic pacemakers of biological motivation underlying the formation of alcoholic attraction; disturbances of conditioned reflex activity in rats during experimental cerebral ischemia against the background of prolonged exposure to ethanol. The study of animal behavioral reactions was used at the initial stages of the safety testing of fermented milk products enriched with enter sorbent dietary fiber EPI (rice husk RH and carbonized crunched rice husk CCRH).

Multiple series of experiments on the comparative study of animal behavioral activity in various variations of the Open Field test setup, conducted in an experimental laboratory at the Department of Biophysics and Biomedicine of the Faculty of Biology and Biotechnology at Al-Farabi Kazakh National University, confirm this point of view. Calculations and statistical processing of the results of the study were performed using the Microsoft Excel 7.0 software package for Windows 2010. The arithmetic mean values were determined in groups, and arithmetic mean errors were determined. The results were analyzed using one-way analysis of variance, the differences between the groups were considered significant at $p < 0.01$, $p < 0.05$. General condition was assessed by daily inspection of animals. Weighing, measuring rectal temperature, water and feed intake was performed once a week and after administration. Physiological studies were carried out before the start of the experiment and 7.15, 30 days after the start of the study according to generally accepted methods. Hematological, biochemical studies, urine tests, macroscopic and histological studies of internal organs were carried out parallel posthumously after the end of the experiment on days 7, 15 and 30. All obtained experimental data were subjected to statistical processing using Student t-test.

Research Results

When evaluating the use of EPI on a model of toxic poisoning and on vital signs in rats during the experiment, these was noted: the general condition of the animals, the dynamics of body weight, and rectal temperature. General condition was assessed by daily inspection of animals. Weighing, measuring rectal temperature, water and feed intake was performed once a week.

All procedures on animals were carried out strictly in accordance with the requirements set forth in the "Rules for the work using experimental animals". When studying the effect on survival and body weight, it should be noted that during the experiment, the death of 10% of experimental animals was observed with a 3-time injection of iv carbon tetrachloride (CCl4). And with the correlation of fermented milk products, the death of experimental animals was not observed, which indicates the absorption action of enterosorbents added to fermented milk products and the tendency to addiction. The total dose received by rats for 30 days is 900 mg / kg. Cumulation coefficient, equal to the ratio of the expected, but not achieved accuracy, the weights used before the start of the study. The weighing results of white rats are presented in Table **1**.

Analysis of the data in Table **1** shows that the weight of the animals increase uniformly throughout the study period, both in the control and in all experimental groups. There were no differences in dosage.

Rectal temperature measurements of rats were performed using a TPEM-1 electric medical thermometer (permissible basic error of the measured temperature range ± 1%) 1 hour after drug administration. The data obtained are presented in Table **2**.

Analysis of the data presented in Table **2** shows that in all experimental groups during the entire observation period, statistically significant deviations in the values of rectal temperature from the background and control values are not detected. Table **3** presents

Table 1: Effect on Body Weight of White Rats CCL4 and Fermented Milk Products with the Addition of Enter Sorbent, g (M ± m)

Period of research	Experimental groups					
	In tactical	control	CCL_4	Sour milk + enterosorbents	Yogurt + enterosorbents	Cottage cheese + enterosorbents
Males						
background	181.6±2.2	182.8±1.3	184.1±1.8	181.5±1.8	185.0±2.6	187.0±2.3
7 days	191.3±1.7	191.5±2.8	191.1±2.1	189.1±2.5	193.4±2.2	192.4±2.1
14 days	199.2±2.6	203.0±1.7	198.2±1.2	196.9±2.0	203.7±2.5	200.7±2.3
21 days	211.0±2.4	211.6±1.9	209.0±2.5	205.1±1.6	210.2±2.4	208.2±2.4
30 days	220.6±2.1	218.3±2.7	218.9±2.3	217.4±2.0	215.4±2.4	216.2±2.4

Table 2: Effect of CCL4 Injection and Fermented Milk Products Supplemented with Enterosorbents on the Rectal Temperature of White Rats, °C (M ± m)

Period of research	Experimental groups and sex					
	intactical	control	CCL_4	Sour milk + enterosorbents	Yogurt + enterosorbents	Cottage cheese + enterosorbents
Males						
background	37.2±0.1	37.1±0.1	37.1±0.1	37.2±0.1	37.3±0.1	37.1±0.1
7 days	37.3±0.2	37.0±0.2	37.2±0.1	37.8±0.2	37.0±0.2	37.0±0.2
14 days	37.1±0.1	37.1±0.1	37.1±0.2	37.5±0.1	37.6±0.1	37.1±0.1
21 days	37.6±0.1	37.3±0.2	37.5±0.1	37.4±0.1	37.5±0.1	37.3±0.2
30 days	37.3±0.1	37.2±0.1	37.4±0.1	37.7±0.2	37.8±0.1	37.2±0.1

Table 3: Effect of CCL4 Injection and Fermented Milk Products Supplemented with Enterosorbents on the Structure of Behavior of White Rats (M ± m)

indicator	Experimental groups and sex					
	intactical	**control**	**CCL4**	**Sour milk + enterosorbents**	**Yogurt + enterosorbents**	**Cottage cheese + enterosorbents**
Background, males						
Latent period from	1.2±0.1	1.1±0.1	1.2±0.2	1.1±0.1	1.2±0.1	1.4±0.1
Horizontal activity	16.2±0.2	13.7±1.0	14.0±1.2	15.8±0.9	14.5±1.0	15.8±0.9
Vertical activity	1.6±0.1	2.0±0.3	1.7±0.5	1.4±0.3	1.4±0.2	1.3±0.3
Peeping	2.6±0.2	2.5±0.1	4.0±0.3	2.9±0.1	3.6±0.1	2.9±0.1
Grooming	1.0±0.1	0	0.8±0.1	0	0.9±0.1	0
Boluses	1.2±0.2	1.6±0.2	2.2±0.2	1.4±0.3	1.3±0.3	1.4±0.3
30 days, males						
Latent period from	7.8±1.0	9.4±0.5	8.6±0.4	9.8±0.6	9.3±0.4	9.4±0.5
Horizontal activity	7.5±0.1	7.8±0.1	7.4±0.2	9.2±0.8	9.4±0.4	7.8±0.1
Vertical activity	1.1±0.3	0.8±0.2	0.9±0.2	0.8±0.2	0.9±0.1	0.8±0.2
Peeping	1.2±0.1	0.9±0.1	1.0±0.1	1.3±0.1	1.5±0.1	0.9±0.1
Grooming	0.1±0.1	0	0.1±0.1	0.1±0.1	0	0
Boluses	2.6±0.1	2.0±0.3	1.0±0.1	1.5±0.3	1.2±0.1	2.0±0.3

data on the effect of CCL4 injection and fermented milk products with the addition of enterosorbents on the spontaneous motor activity of rats (SDA). Rats were placed one at a time in the “open field”, where for every 3 minutes they registered the number of movements.

As it can be seen from the data presented, during toxic poisoning, animals became more aggressive, and the groups receiving fermented milk products with the addition of enterosorbents did not show any significant changes in the structure of behavior of animals from all experimental groups. A change in the behavioral pattern due to lengthening the latent period and a decrease in activity in the experimental groups, which is estimated by the number of vertical struts, intersections, and peeps in comparison with the background data, is characteristic of animals that are secondarily placed in an “open field” situation.

To correct violations of morphophysiological parameters in acute CCl4 poisoning, dairy products of natural origin were used, including the addition of EPI from rice husk. Next, a biochemical blood test was performed by laboratory diagnostic method, which allows us to evaluate the work of internal organs (liver, kidneys, pancreas, gall bladder, etc.), obtain information on metabolism (metabolism of lipids, proteins, carbohydrates), and find out the need for trace elements (Tables **4-6**).

Thus, we have established indicators of the total protein for intact groups of animals, which is 66.2 ± 0.19. Total protein - an indicator that reflects the total amount of proteins in the blood. Its decrease is observed in some diseases of the liver and kidneys, accompanied by increased excretion of protein in the urine. The analysis showed that it speaks of the normal state of metabolism in the body of the animal. Blood glucose is the main test in the diagnosis of diabetes. This analysis is very important in selecting therapy and evaluating the effectiveness of diabetes treatment. As can be seen from Table **1**, glucose indicator 5.1 ± varies with published data. Urea content - a substance that is the final product of protein metabolism in the body. Urea is excreted by the kidneys, therefore, the determination of its concentration in the blood gives an idea of the functional abilities of the kidneys and is most widely used for the diagnosis of renal pathology.

This indicator shows 7.4 ± 0.02 **, which means that the kidneys are functioning well. The content of

Table 4: Biochemical Blood Parameters in Intact Animal Groups

№	Name of indicator	unit/measure	control
1	Common Protein	Г/л	66.2±0.19
2	Albumen	г/л	36.0±0.12
3	Urea	Моль/л	7.4±0.02**
4	Creatinine	Моль/л	70.9±0.23
5	Alanine aminotransferase (AlAT)	МЕ/л	92.9±0.17
6	Aspartate aminotransferase (AsAT)	МЕ/л	170.3±0.14
7	Alkaline phosphatase (alkaline phosphatase)	МЕ/л	87.2±0.12
8	Glucose	Моль/л	5.1±0.04
9	Cholesterol	Моль/л	1.8±0.02**

remarks: p ≤0,001*, p ≤0,002**, p ≤0,005*.

AcAT (AST, aspartate aminotransferase) 170.3 ± 0.14 is one of the main enzymes synthesized in the liver. Normally, the content of this enzyme in the blood serum is small, since most of it is located in hepatocytes (liver cells). Compared to literary sources, this indicator increased by 25.5%, which is the norm. The content of ALAT (ALT, alanine aminotransferase) is an enzyme synthesized in the liver. Most of it is located and works in the liver cells, so normally the concentration of ALT in the blood is low, it varies 92.9 ± 0.17. The value of this indicator decreased by 61%, which indicates the normal functioning of the liver. The creatinine content of 70.9 ± 0.23 is a substance that plays an important role in the energy metabolism of muscle and other tissues. Creatinine is completely excreted by the kidneys, so the determination of its concentration in the blood has the greatest clinical significance for the diagnosis of kidney disease. The amount of this component is consistent with the published data, which makes it possible to conclude about active energy metabolism and good kidney function. The cholesterol content is consistent with the published data 1.8 ± 0.02 **; cholesterol is a fat-like substance of animal origin. It is carried in the blood by lipoproteins - complex proteins (proteins), which include fats (lipids). High density lipoproteins (HDL) carry about 20% of cholesterol. They consist mainly of lecithin, due to which cholesterol can be easily transported through the blood without clogging the arteries. The higher the level of HDL, the better. Low density lipoproteins (LDL) carry 65% of cholesterol and can clog arteries []. The amount of cholesterol in the blood of animals decreased by 9%, which reduces the risk of developing cardiovascular diseases and the formation of "cholesterol plaques" on the walls of blood vessels. The albumin index is 36.0 ± 0.12 that corresponds to the norm, it plays a central role in protecting the body from toxic effects, as it has a unique ability to bind a large number of xenobiotics. The intake of excessive concentrations of such active factors in the body in the event of endogenous intoxication leads to blocking or allosteric changes in the albumin binding sites. Albumin is one of the links in the detoxification system of the body, with its deficiency and a decrease in binding capacity, the toxicity index rises sharply. The toxicity index of this protein reflects the degree of toxic agent accumulation. The results of a general clinical blood test in intact groups of rats showed that there were no deviations in the readings of the studied parameters, which may indicate good functioning of the systems of internal organs and immunity (Table **5**). The data of blood biochemical parameters in intact and experimental groups of animals after intoxication with 4 carbon chloride are presented in Table **5**.

After poisoning with 4-carbon chloride, experimental animals showed lethargic, passive behavior and a high decrease in appetite, which led to the death of experimental rats, that amounted to 10% of the total number exposed to CCl4 poisoning. Blood biochemical parameters in experimental groups of animals with carbon tetrachloride poisoning (CCl4) changed significantly. An increase was observed in almost all biochemical parameters of blood during toxic poisoning of animals compared with the intact group of experimental animals.

As can be seen in Table **5**, the level of total protein in the blood in both groups is slightly different, this indicates a normal metabolic state in the animal's body. The data obtained during the studies indicate a decrease in one of the biochemical parameters of blood - albumin, which is 34.1 ± 0.09. In the intact

Table 5: Biochemical Blood Parameters of Animals with Toxic Poisoning

№	Indicators title	unit/measure	control	experimental
1	Common Protein	Г/л	66.2±0.19	67.8±0.15
2	Albumen	г/л	36.0±0.12	34.1±0.09
3	Urea	Моль/л	7.4±0.02*	12.1±0.08
4	Creatinine	Моль/л	70.9±0.23	288.7±0.43
5	Alanine aminotransferase (AlAT)	МЕ/л	92.9±0.17	173.2±0.23
6	Aspartate aminotransferase (AsAT)	МЕ/л	170.3±0.14	358.0±0.21
7	Alkaline phosphatase (alkaline phosphatase)	МЕ/л	87.2±0.12	568.8±0.35
8	Glucose	Моль/л	5.1±0.04*	8.9±0.07
9	Cholesterol	Моль/л	1.8±0.02*	4.7±0.03*

remark: p ≤0,001*, p ≤0,002**, p ≤0,005*.

group, albumin is equal to 36.0 ± 0.12. The decrease in albumin is due to a sharp increase in the toxicity index. The toxicity index of this protein reflects the degree of toxic agent accumulation. Moreover, the dynamics of this indicator expresses a stable decrease in its values (Table **6**). Creatinine evaluates the functioning of the kidneys, an increase of 4 times in the blood indicates kidney failure or dehydration. The content of other blood biochemical parameters in the toxic group of animals proceeds upward in comparison with the control results.

Tables **4-6** give the results of rat blood biochemical parameters during toxic poisoning with corrections of fermented milk products (cottage cheese, yogurt, kefir), including the addition of sorbent (crushed carbonized husk) and rice husk. In the course of the experiment, it was found that the ALT content in the blood plasma of laboratory rats treated with carbon tetrachloride (CCl4) increased by 150.4% (p <0.001), AST by 110.0% (p <0.001) compared with animals of the control group. Blood glucose levels increased with carbon tetrochloride poisoning by 64.0% (p <0.001) compared with the control. The urea content in the blood of animals taking chronic doses of carbon tetrachloride (CCl4) increased by 27.9% (p <0.001) compared with the control group of experimental animals. An increase in urea concentration was noted. Since urea (residual nitrogen) is formed mainly in the liver, the level of urea in the blood increases with severe injuries. Thus, an increase in ALT, AST, and an increase in plasma, glucose, and urea levels in the blood plasma indicate a violation of the function of the gastrointestinal tract, liver, kidneys, and heart in experimental animals with toxic poisoning with carbon tetrachloride.

Against the background of dairy products (kefir, yogurt, cottage cheese), the concentration of ALT decreased by 14.8% (p <0.001), and AST decreased by 34.3% (p <0.001) in relation to the second group of rats. The concentration of protein in blood plasma decreased by 41.9% (p <0.001), under the action of dairy products (kefir, yogurt, cottage cheese), and the protein in blood plasma decreased by 82.8% (p <0.001) in relation to the experimental group animals. Blood glucose level increased with carbon tetrachloride poisoning by 64.0% (p <0.001) compared with the control, against the background of dairy products (kefir, yogurt, cottage cheese) - decreased by 6.1% in contrast to the experimental group. The urea content in the blood of animals taking toxic poisoning of carbon tetrachor decreased by 17.9% (p <0.001) compared with the control group of experimental animals.

From the foregoing, it should be noted that when the carbon tetrachloride (CCl4) was removed and the fermented milk products of kefir, yogurt, and cottage cheese with EPI from rice husk were removed, the quantitative and qualitative composition of proteins was influenced, which contributed to the growth of the activity of enzymes that activate biologically.

Subsequent studies have confirmed an increase in the activity of lactate dehydrogenase and α-amylase in the blood of animals. The activation of enzymatic catalysis favorably influenced the processes of oxidation of bioorganic substances, which contribute to ensuring chemical equilibrium in the body. Biological catalysts of protein nature are enzymes. They contribute to the regulation of metabolic transformations occurring in the body. Under their influence, redox processes occur that contribute to the synthesis of bioorganic substances, as well as the neutralization of toxic metabolites.

Therefore, fermented milk products kefir, yogurt, cottage cheese with the addition of enterosorbents

Table 6: Biochemical Blood Parameters of Animals during Toxic Poisoning with Corrections of Dairy Products with the Addition of Enterosorbents

№	Indicators title	unit/measure	control	An injection CCL_4	Cottage cheese + + rice. Husk	Curd + + sorbent	Yogurt + rice. Husk	Yogurt + sorbent	Sour milk + rice. Husk	Sour milk+ sorbent
1	Common Protein	г/л	66.2±0.19	67.8±0.15	63.9±0.16	67.6±0.14	56.8±0.11	59.0±0.08	58.1±0.12	67.2±0.14
2	Albumen	г/л	36.0±0.12	34.1±0.09	33.1±0.14	35.4±0.1*	33.4±0.12	33.4±0.15	32.8±0.14	33.5±0.08
3	Urea	Моль/л	7.4±0.02	12.1±0.08	9.5±0.04*	10.0±0.07	7.5±0.03**	10.3±0.1*	16.1±0.09	7.1±0.05*
4	Creatinine	Моль/л	70.9±0.23	288.7±0.43	169.3±0.32	224.2±0.53	86.9±0.41	220.1±0.37	145.3±0.28	186.8±0.15
5	Alanine aminotransferase (AlAT)	МЕ/л	92.9±0.17	173.2±0.23	11.0±0.08*	20.5±0.12	78.3±0.25	22.5±0.11	101.5±0.33	24.0±0.12
6	Aspartate aminotransferase (AsAT)	МЕ/л	170.3±0.14	358.0±0.21	138.0±0.17	182.0±0.21	199.9±0.15	203.0±0.23	169.0±0.18	148.0±0.17
7	Alkaline phosphatase (alkaline phosphatase)	МЕ/л	87.2±0.12	568.8±0.35	484.1±0.28	221.4±0.31	361.2±0.37	94.2±0.21	282.6±0.3	703.0±0.51
8	Glucose	Моль/л	5.1±0.04	8.9±0.07	3.62±0.02	3.86±0.06*	6.3±0.04*	1.02±0.01***	1.21±0.02	6.8±0.07
9	Cholesterol	Моль/л	1.8±0.02	4.7±0.03*	1.2±0.01***	1.8±0.03**	1.3±0.01***	1.6±0.03**	1.3±0.02*	1.8±0.04*

remark: p ≤0,001***, p ≤0,002**, p ≤0,005*.

Table 7: Hematological Blood Parameters of Animals with Toxic Poisoning CCL4 with Corrections of Yogurt and Rice Husk, Chopped Carbonized Husk (Sorbent)

№	Hematology analyzation	norm	control	injection CCL_4	correction					
					yogurt +sorbent	yogurt+rice husk	Sour milk+ sorbent	Sour milk+rice husk	Cottage cheese+sorbent	Cottage cheese+rice husk
Leucocytes										
1	White blood cells (thousand / mm3)	2.1-19.5	6.9±0.414	20.9±0.1*	5.2±0.08	10.3±0.15	6.9±0.39	4.1±0.21	11.5±0.39	10.2±0.38
2	Lymphocytes (thousand / mm3)	2-14.1	2.3±0.22	24.1±0.24	2.6±0.22	8.3±0.38	4.9±0.29	2.2±0.22	6.1±0.36	7.4±0.21
3	Monocytes (thousand / mm3)	0.098	0.065±0.008	0.3±0.14	0.083±0.004*	0.072±0.009*	0.092±0.007*	0.075±0.007*	0.004±0.019	0.003±0.001*
4	Granulocytes (thousand / mm3)	5.4	4.5±0.28	2.5±0.34	5.1±0.38	4.9±0.43	3.8±0.40	4.4±0.29	5±0.51	2.5±0.35
5	Lymphocytes%	55-97	70.2±0.33	59.7±0.71	50.8±0.73	80.4±0.67	70.5±0.26	58.3±0.45	53.3±0.40	72±1.41
6	Monocytes%	1-5	3.2±0.20	4±0.43	4±0.27	2.1±0.13	3.1±0.12	4.8±0.41	3.1±0.16	3.2±0.22
7	Granulocytes%	2-31	26.6±0.39	36.3±0.49	31.4±0.60	17.5±0.48	26.4±0.36	24.9±0.41	43.6±0.36	24.8±0.41
Iridocytes										
1	Red blood cells (million / mm3)	5.3-10	10.63±0.37	8.43±0.27	10.06±0.12	9.37±0.27	9.69±0.22	10±0.19	10.44±0.29	10.22±0.24
2	Hemoglobin (g / dl)	14-18	15±0.79	96±1.07	15±1.35	16±0.98	14±0.30	17±0.46	11±0.71	19±0.53
3	Hematocrit (%)	35-52	45.5±0.57	44.4±0.68	51±1.40	47.9±1.26	43.7±0.52	52±0.62	52.3±0.48	51.9±0.77
4	Platelets (thousand / mm3)	500-1370	581±1.27	403±1.98	776±1.60	667±0.98	596±0.83	553±1.21	637±1.25	606±1.15
5	ESR mm / hour	1.5±0.1	1±0.20	2±0.55	1±0.26	1±0.15	1±0.21	1±0.21	1±0.27	1±0.21

remark: statistically significant in relation to control p<0,05*.

have a partially positive effect due to the stabilization and neutralization of toxic free radicals. Their adsorption properties are due to the fact that, when penetrating into the intercellular space, they bind enzyme proteins that cause the development of an inflammatory reaction. EPO from rice husks had an indirect advantage, absorbing toxic substances in the body, thereby weakening the allergic and inflammatory reactions in the body due to the action of carbon tetrachloride.

To study the effect of various dosages of EPI on the immunophysiological parameters of the rat organism during the manufacture of consumer products, hematological blood parameters of experimental animals were analyzed. The results obtained during the experiment indicate a change in the hematological parameters of rats during CCL4 poisoning with the use of EPI separately and comprehensively. Throughout the experiment, the shape of red blood cells in the blood of experimental rats changed (Figure **1**).

Lymphocytes have a strongly pyknotic nucleus, sometimes significant azurophilic granularity is detected. The bulk of segmented cells has a soft, neutrophilic, not clearly defined granularity in smears. The nuclei of eosinophilic cells are formed from a loose chromatin substance and have an almost round shape. The nuclei of eosinophils and neutrophils are formed in a ring type, therefore, ring-shaped nuclei are often found in rod-shaped forms. Monocytes are very different from lymphocytes. The latter are equal in size to two red blood cells, have a large bean-shaped nucleus and a wide protoplasmic border, which is painted in blue or purple with delicate granulation. Blood plates lie in large heaps. In the toxic group, the forms of red blood cells are enlarged and glued. However, on the third day of the experiment, the qualitative characteristics of red blood cells changed, expressed by an increase in the average volume, content and concentration of hemoglobin in them, which return to normal by the seventh day. From the side of white blood cells, the most pronounced changes were observed on the seventh day of the study, when the number of lymphocytes and medium cells increased This reflects the proliferative phase aimed at phagocytosis of destructively altered liver hepatocytes. The decrease in platelets in peripheral blood on the seventh day after the introduction of CCl4 was apparently associated with a decrease in the functional activity of slightly differentiated hepatocytes. Oral

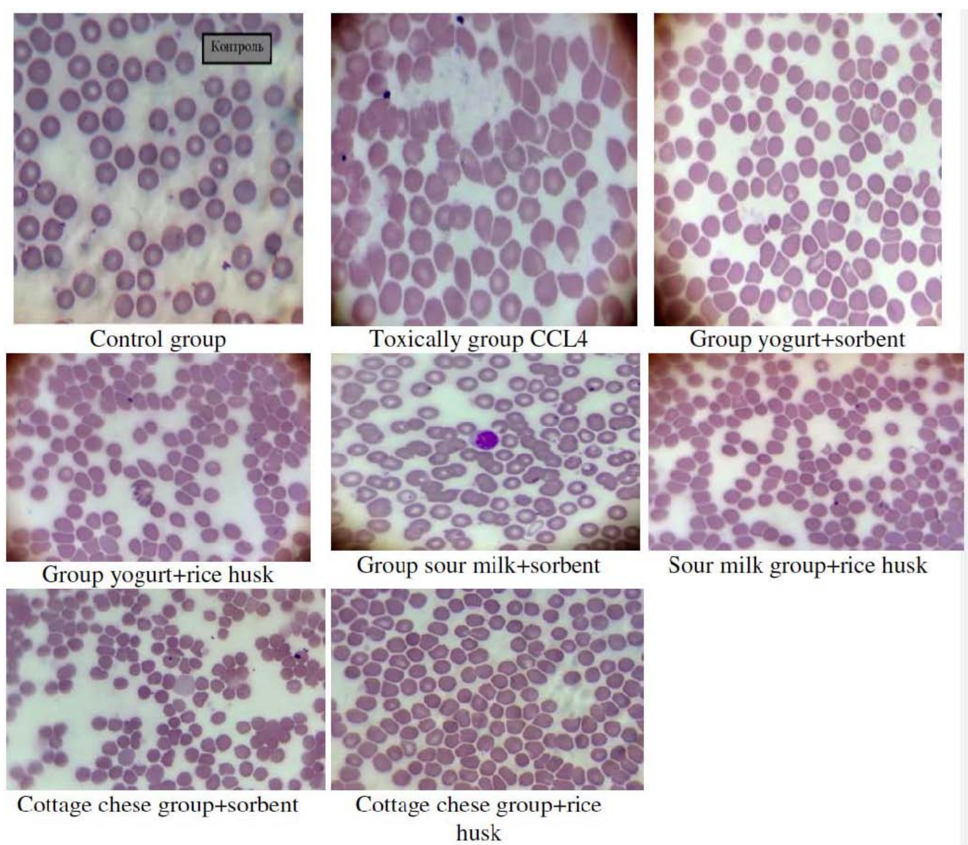

Figure 1: The amount of red blood cells in rat blood during toxic poisoning with corrections of dairy products with the addition of enterosorbents, 1012 / l (n = 60).

administration to rats of fermented milk products (kefir, yogurt, cottage cheese) supplemented with enterosorbents during intoxication of CCl4 rats during the experiment had a positive effect on the immunophysiological parameters of the body. A certain normalization of the hematopoietic function was noted, both spontaneous and caused by the application of vasoactivated substances. A number of blood biochemical parameters were normalized, although the level of total protein remained slightly reduced, and the levels of AST and ALT significantly decreased towards normalization, however, they were still 15-20% higher than the control level. The use of enterosorbents effectively reduced the negative effect of CCl4 on the body's homeostasis. Fermented milk products (kefir, yogurt, cottage cheese) with the addition of enterosorbents due to their sorption properties, contributed to the detoxification of the body and strengthened the body's defenses.

Thus, the results obtained indicate that the use of the investigated EPO (rice husk, carbonized husk, chopped carbonized husk) has a more favorable effect on the rat organism.

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