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TOXICOLOGICAL EVALUATION OF THE DRY EXTRACT OBTAINED FROM THE LEAVES OF *PERSICA VULGARIS MILL*

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ABSTRACT

In this research, the results of the analysis on the acute toxicity of the dry extract obtained from the leaves of Persica vulgaris Mill. are presented. Based on the toxicological research findings, it was established that the dry extract belongs to Hazard Class 4 (low-toxic substances) according to acute toxicity parameters, does not possess cumulative effects, does not irritate the mucous membranes, and does not exhibit sensitizing properties. Furthermore, it does not cause dystrophic, necrotic, or inflammatory changes in the structure of the internal organs of experimental animals.

PERSICA VULGARIS MILL. БАРГЛАРИДАН ОЛИНГАН ҚУРУҚ ЭКСТАКТИНИ ТОКСИКОЛОГИК ТАНЛИЛИ

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ABSTRACT

Мазкур тадқиқот ишида Persica vulgaris Mill. ўсимлик баргларидан олинган қуруқ экстрактининг ўткир заҳарлилигини ўрганиш бўйича таҳлил натижалари келтирилган. Токсикологик тадқиқот натижалари асосида аниқланиб, қуруқ экстрактининг ўткир заҳарлилик кўрсаткичлари бўйича 4 хавфлилик синфига киради (кам заҳарли модда), кумулятив таъсирга эга эмас, шиллиқ қаватларни таъсирлантирмайди хамда сенсибилизацияловчи самара кўрсатмайди, шунингдек тажриба ҳайвонларининг ички органлари тузилмасида дистрофик, некротик ва яллиғланиш ўзгаришларини чақирмайди.

INTRODUCTION. The need to expand the range of medicinal plant raw attention of scientists to the study of new types of medicinal plants, including those traditionally considered food. Common peach *Persica vulgaris Mill*. is one of such plant species with a wide range of pharmacological effects. In particular, the leaves of common peach – *Persicae vulgaris folia* - are of particular interest as a promising type of medicinal plant raw material.

RESEARCH PURPOSE. The aim of the research is to evaluate the toxicological parameters of the dry extract obtained from the leaves of *Persica vulgaris Mill.*

MATERIALS AND METHODS. The object of the study was the dry extract obtained from the leaves of *Persica vulgaris Mill*. Experimental research was conducted on small laboratory animals (white rats, mice, and guinea pigs) in accordance with the current regulatory and methodological standards. In experimental conditions, the acute toxicity was assessed by a single intragastric administration of the extract at a dose of 5000 mg/kg relative to the animals' body weight [4]. The cumulative properties of the dry extract of *Persica vulgaris Mill*. leaves were evaluated in subacute experiments using the Lim et al. method on white rats weighing 110–120 g. The experimental animals received the tested supplement in its native form with food for 28 days. The initial dose was recalculated according to the animals' body weight and subsequently increased 1.5-fold every 4 days, reaching 1/10 of the maximum tolerated dose determined in the acute experiment. The control animals received purified water in an equivalent volume. The dose was administered in the form of an aqueous solution of the dry extract. The sensitizing effect of the dry leaf extract of *Persica vulgaris Mill*. was evaluated in guinea pigs using the provocative skin test, after intradermal injection of a 50% solution of the tested supplement. The criterion for sensitization was the skin reaction assessed 24 hours after application at the injection site according to the Magnusson–Kligman grading scale. Observations were carried out as follows: during the acclimatization period, daily monitoring was performed, and from the first day of the experiment until its completion, body weight was measured before administration of the extract. Mortality or paralysis was assessed every 7 days until the end of the study. Clinical observations were conducted daily throughout the entire study period-during acclimatization, four times on the first day after dosing (at 1, 2, 3, and 4 hours), and thereafter once daily depending on the appearance of clinical signs of toxicity. When extrapolating toxicological data obtained from laboratory animals to humans, interspecies differences in toxic effects, the hazard and toxicity level of the supplement, the specific conditions of the experiment (routes and methods of administration, seasonal and circadian rhythms, etc.), as well as uncertainty factors were taken into account. For the assessment of sensitizing effects and irritation of the eye mucosa and skin, the experimental results were directly translated to human evaluation models. All experimental procedures were carried out in compliance with the rules adopted by the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (ETS No. 123, Strasbourg, 18 March 1986).

The biochemical analysis of blood was performed according to standard methods (AST, ALT, total protein, using the Cypress Diagnostics (Belgium) reagent kits) on automated CYANSmart biochemical analyzers equipped with appropriate software. The

hematocrit level was assessed using a hematocrit centrifuge (Cypress Diagnostics, Belgium), and an extended peripheral blood analysis was carried out using the Goryaev chamber.

The obtained data were statistically processed using standard software with an evaluation of significant indicators (M ± m) and comparison of differences according to Student's t-test. Differences between the groups were considered statistically significant at the 95% confidence level ($p < 0.05$).

During the study, the animals' body weight, clinical signs of intoxication, hematological and biochemical parameters, and mortality/paralysis rates were entered into the computer database of the Preventive Toxicology and Hygiene Laboratory of the Sanitary and Epidemiological Control Department under the Main Medical Directorate of the Administration of the President of the Republic of Uzbekistan.

RESULTS AND DISCUSSION

Assessment of Acute Toxicity. During the experiments, no cases of mortality were observed among the test animals. In subsequent observations, the animals maintained normal responses to external stimuli, and the general condition and behavior of the animals in the experimental group remained satisfactory. All animals were active and consumed food with good appetite; the visible mucous membranes and fur coat showed no abnormalities. No deaths were recorded throughout the entire observation period. The median lethal dose (LD_{50}) for the tested dry extract of *Persica vulgaris Mill*. leaves was not reached in the experimental animals. No sex- or species-dependent differences in sensitivity to the extract were identified between mice and rats.

Thus, the observation data obtained during the post-exposure period and the toxicometric results indicate that the dry extract of *Persica vulgaris Mill*. leaves intended for food use can be classified as a practically non-toxic and low-hazard substance (Hazard Class IV according to GOST 12.1.007).

Evaluation of the Cumulative Effect. Throughout the entire observation period, no behavioral deviations were recorded in the experimental animals. Similar to the control group, they remained active, clean, consumed food well, and responded adequately to external stimuli. The body weight of the animals was measured every 7 days, and no statistically significant differences were found between the control and experimental groups [5].

When examining the peripheral blood hematological parameters of the animals that received the dry extract of *Persica vulgaris Mill*. leaves, no significant differences were detected in any of the indicators (number of erythrocytes, $-10^{12}/_{л}$; hemoglobin concentration (g/L), leukocyte count ,$-10^{9}/_{л}$).

Table1

Average hematological parameters of rat blood after administration of the dry leaf extract of *Persica vulgaris Mill.*

Groups	Observation period	Hematological Indicators		
		Hemoglobin concentration, g/l	Leukocytes, $-10^9/_л$	Erythrocytes, $-10^{12}/_л$;
Control (purified water)	Before administration	133,2±14,2	14,7±3,53	6,76±3,13
	After the experiment	122,4±12,4	14,6±4,59	6,18±2,30
Persica vulgaris Mill. dry leaf extract	Before administration	131,8±12,3	14,5±2,39	6,08±1,21
	After the experiment	133,6±15,3	14,8± 5,60	6,76±2,51

The total counts of erythrocytes, leukocytes, and hemoglobin levels in all experimental animals did not differ significantly from those of the control group (Table 1) [6].

No noticeable differences were observed in the parameters obtained from the control group. The biochemical indicators of the blood serum of animals in both the experimental and control groups—including total protein levels, transaminase enzymes (AST, ALT), and alkaline phosphatase (ALP)—showed no significant variations. The levels of transaminases (TP) in the experimental animals were likewise statistically indistinguishable between the experimental and control groups (Table 2).

Table 2

Biochemical blood parameters of white rats after exposure to the dry leaf extract of *Persica vulgaris Mill.*

Groups	Statistical Indicators	Observation period	Biochemical indicators			
			AST, U/L	ALT, U/L	ALP, Б/л	TP, g/l
Control (purified water)	M± m	Before administration	54,2±2,5	116,0±5,26	36,2±7,5	66,2±1,7
		After the experiment	56,1±3,1	114,8±5,4	33,4±4,9	66,1±1,3
Persica vulgaris Mill. leaf extract	M± m	Before administration	50,2±3,7	112,4±5,17	32,6±5,6	62,0±01,5
		After the experiment	54,2±2,5	116,0±5,26	36,2±7,5	66,2±1,7

Pathomorphological examinations were carried out on the animals of the experimental and control groups after the final administration of the preparation. According to the results of the macroscopic assessment of the examined organs, no differences were detected between the control and experimental groups.

The conducted studies showed that daily intragastric administration of the dry leaf extract of *Persica vulgaris Mill*. to rats for 28 days in gradually increasing doses does not lead to changes in physiological parameters, does not cause dystrophic or destructive

alterations in parenchymal organs, and is not accompanied by irritation of mucous membranes.

Thus, the results of the 28-day experiment demonstrate that the dry leaf extract of *Persica vulgaris Mill.* does not possess cumulative properties.

Sensitizing Effect. The assessment of the sensitizing activity of the dry leaf extract of *Persica vulgaris Mill*. as a biologically active supplement, conducted through repeated administration followed by a provocative skin test and intradermal injections, showed the following: after the provocative epidermal test at the site of application, no reaction was observed in the animals (according to the evaluation scale: "– / 0"). The mean group sensitization index (IS) was equal to 0 points.

Thus, according to the indicators of acute and subacute sensitizing effects on the morphological composition of the blood and the mucous membrane of the eye, the dry leaf extract of *Persica vulgaris Mill*. can be classified as a low-toxic and practically non-toxic substance (Hazard Class IV according to GOST 12.1.007 and Hazard Class V according to the hygienic classification) [4; 6; 7; 8; 9; 10].

CONCLUSION

According to the results of toxicological studies, the dry leaf extract of *Persica vulgaris Mill.* belongs to Hazard Class IV (low-toxic substances) based on indicators of acute toxicity. The extract does not exhibit cumulative effects, does not cause irritation of mucous membranes, does not possess sensitizing properties, and does not induce dystrophic, necrotic, or inflammatory changes in the internal organs of experimental animals.

The obtained results allow us to conclude that the dry leaf extract of *Persica vulgaris Mill*. does not exert any general toxicological effects on the organism and meets safety requirements according to toxicological criteria.

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