



STUDY OF THE BIOLOGICAL ACTIVITY OF WOAD INFUSION (ISATIS TINCTORIA L.)

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ABSTRACT

Research was conducted to study pharmacological, preclinical studies to determine the biological and therapeutic hypoglycemic activity of Woad (*Isatis tinctoria*) preparations L., isolated from aqueous infusion. The effect of doses and concentrations on therapeutic hypoglycemic efficacy was also studied, for which drugs were prepared in doses of 25 mg/kg, 50 mg/kg and 75 mg/kg. The results showed that when used for 14 days, *Isatis tinctoria* extract L. _ for the treatment of animals with diabetes mellitus at different doses, only 75 mg/kg reduced the amount of glucose in the urine and blood. It should also be noted that the administered dose of *isatis tinctoria* L. - 75 mg/kg increased the activity of leukocytes, erythrocytes and platelets responsible for the immune system in the blood.

KEYWORDS: Blood serum, hypoglycemic activity, alloxan, inulin, leukocytes, erythrocytes, immune system, glucose, platelets.

INTRODUCTION

Woad (*Isatis tinctoria* L.) has a wide spectrum of action and has long been used in the treatment of various diseases in folk and traditional medicine in many countries.^[1,2,3,4] An extract from the roots is used to treat various respiratory diseases, including influenza. The influence of drugs isolated from Woad has been studied and it has been proven that it has direct anticoagulant activity and affects the hematopoietic system of hemostasis.^[5]

Thanks to the natural insulin-like components contained in some plants, with the regulatory use of herbs it is possible to reduce the dose of glucose-lowering drugs, and sometimes even partially replace them. Preventing the consequences of diabetes such as damage to the eyes, liver, kidneys, and blood vessels. Herbs for type 2 diabetes mellitus have the ability to reduce blood glucose levels, saturate the body with vitamins, strengthen overall health, increase and restore immunity.

Woad grows in the climate of Uzbekistan; it will be very relevant to study the influence of hypoglycemic activity. Also relevant is the use of local resources in the conditions of modern domestic medicine and their implementation from an economic point of view.

The present studies were carried out to study the determination of the biological and therapeutic hypoglycemic activity of Woad preparations isolated from an aqueous infusion of the herb Woad. Also the influence of doses and concentrations on therapeutic hypoglycemic efficacy.

Purpose of research. Study of pharmacological, preclinical studies by determining the biological and therapeutic hypoglycemic activity of an aqueous infusion of the Woad plant. Also the effect of doses and concentrations on therapeutic hypoglycemic efficacy in animals with diabetes mellitus at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg.

Materials and methods of research. To accomplish the research objective, medicinal drugs were used substances isolated from the plant *Isatis tinctoria* L. The effect of doses on hypoglycemic activity was studied, for which preparations were prepared in doses of 25 mg/kg, 50 mg/kg and 75 mg/kg.^[6,7,8] As a reference drug, we used the dietary supplement inulin (dietary supplement, Now Foods (USA), Inulin Certified Organic).

Serum glucose was checked using a diagnostic kit - KIT test produced by Cypress Diagnostics, Belgium. on the FEC device. Blood parameters responsible for the immune system were determined using an automatic

hematology analyzer Dymind DH36, manufactured by Shenzhen Dymind Biotechnology Co., Ltd, China.

RESULTS AND DISCUSSION

Experimental animals (25 rats) were divided into 5 groups, 5 animals were allocated to each group. During the study, 25 rats of both sexes were intraperitoneally injected with alloxan at a dose of 140 mg/kg. As a comparison drug, we used a dietary supplement - inulin (Inulin Certified Organic). To support the intestines, pure probiotic powder (Net WT. 1LB -454g) was used. On the 7th and 14th days, serum glucose was checked using KIT tests on a photoelectrocolorimetric (PEC) device at a

wavelength of 540 nm. At the next stage of the study, leukocytes, erythrocytes were determined, and platelet levels that respond to the immune system in the blood were measured using an automatic hematology analyzer.

RESULTS

For 14 days, animals in each experimental group were administered a substance isolated from the *Isatis tinctoria* plant in doses of 25 mg/kg, 50 mg/kg and 75 mg/kg. On the 7th day, blood serum glucose was checked. Glucose was also checked on the 14th day, the results are presented in Table 1.

Table 1: Determination of glucose in blood serum for 7-14 days at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg of the *Isatis tinctoria* plant (M±m, n=5).

Groups	Days for determining the amount of glucose	
	The amount of glucose on the 7th day.	Amount of glucose on day 14.
Healthy	6.13 ± 0.50	3.1 ± 0.20
Control	16.22 ± 0.12#	8.40 ± 0.35#
Inulin , 75 mg/kg	14.95 ± 1.15#	3.14±0.20*
<i>Isatis tinctoria</i> , 25 mg/kg	13.0 ± 1.96#	4.37 ± 0.23*#
<i>Isatis tinctoria</i> , 50 mg/kg	15.41 ± 1.15#	4.03 ± 0.12*#
<i>Isatis tinctoria</i> , 75 mg/kg	11.96 ± 1.22*	3.11 ± 0.18*

Based on the study results, 7-day urine and blood glucose tests were different from healthy animals, and 14-day studies showed that a dose of 75 mg/kg of the substance isolated from the plant *Isatis tinctoria* L. was found to be biologically active and highly effective.

At the next stage of the study, blood parameters responsible for the immune system were studied at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg - leukocytes, erythrocytes and platelets. The results obtained on the 7th day are presented in Table 2, and on Day 14 in Table 3.

Table 2: Cellular immune systems with an indicator in the blood of *Isatis tinctoria* L. at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg on day 7, (M ± m, n = 5).

	Healthy	Control	Inulin, 75 mg/kg	<i>Isatis tinctoria</i> , 25mg/kg	<i>Isatis tinctoria</i> , 50mg/kg	<i>Isatis tinctoria</i> , 75mg/kg
WBC, 10 ⁹ /l	13.2±0.8	23.9±1.6#	13.1±2.7*	16.6±0.6*#	13.5±2.7*	13.1±0.1*
Lym%, %	0.7±0.1	0.8±0.04	0.7 ±0.1	0.8±0.02	0.7±0.06	0.6±0.03*
Gran%, %	0.2±0.1	0.2±0.05	0.4 ±0.1	0.1±0.02	0.2±0.05	0.2±0.02
Mid%, %	0.1±0.02	0.1±0.002	0.1 ±0.02	0.1±0.002	0.1±0.01	0.2±0.04*
Lym, 10 ⁹ /l	9.8±1.4	18.2±0.4#	8.7 ±2*	12.6±0.7*	9.5±1.1*	7.3± 0.9*
Gran, 10 ⁹ /l	2.0±0.6	2.5±0.2	3.3 ±1.5	2.3±0.2	2.3±1.1	2.0±0.7
Mid, 10 ⁹ /l	1.3±0.1	2.2±0.1#	1.1 ±0.1*	1.7±0.1*#	1.7±0.5	1.0±0.4*
RBC, 10 ¹² /l	7.7±0.1	7.8±0.3	8.8 ±0.7	7.8±0.3	7.8±0.2	8.8±1.4
HGB, g/l	149.3±4.6	140.5±1.5	173.7±4.7*#	156.0±2.0*	151.0±1.2*	132.0±1.7*#
PLT, 10 ⁹ /l	456.7±92.4	196.5±30.5#	371.7±48.9*	175.5±20.5#	278±75	3 9 8.0±57.0*

{p <0.05} comment (*p>0.05 compared to control) (#p>0.05 compared to healthy animal).

Table 3: of *Isatis tinctoria* L. at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg on the 14th day (M±m, n=5).

	Healthy	Control	Inulin, 75 mg/kg	<i>Isatis tinctoria</i> , 25mg/kg	<i>Isatis tinctoria</i> , 50mg/kg	<i>Isatis tinctoria</i> , 75mg/kg
WBC, 10 ⁹ /l	13.5 ± 0.71	7.2 ± 1.7#	13±0.8*	1 0.42 ± 1.6 _	7.55 ± 5.5	13.0 ± 0.262*
Lym%, %	0.7 ± 0.07	0.72±0.1	0.70±0.02	0.52 ± 0.2	0.49 ± 0.1	0.6 ± 0.13
Gran%, %	0.2 ± 0.05	0.145 ± 0.04	0.16±0.01	0.29 ± 0.13	0.28 ± 0.04*	0.2 ± 0.1
Mid%, %	0.1 ± 0.02	0.13 ± 0.04	0.14±0.01	0.19 ± 0.1	0.24 ± 0.04#	0.2 ± 0.05
Lym#, 10 ⁹ /l	9.8 ± 1.40	9.1 ± 0.9	9.11±0.9	16.0 ± 4.1	11.2 ± 0.8	13.3 ± 1.4*
Gran#, 10 ⁹ /l	2.0 ± 0.63	1.23 ± 1.1	2.1±0.02	2.64 ± 0.1	1.70 ± 0.1	1.7 ± 0.46
Mid#, 10 ⁹ /l	1.3 ± 0.09	1.1±1	1.79±0.02#	1.68 ± 0.03#	1.14 ± 0.1	1.5 ± 0.26
RBC, 10 ¹² /l	9.3 ± 0.21	7.4 ± 0.04#	8.62±1.82	7.99 ± 0.36#	7.27 ± 0.14#	9.0 ± 0.27 *
HGB, g/l	173.0 ± 0.58	138 ± 1.0#	165.5±3.4*	160.5 ± 4.5*#	146 ± 2.0*#	133.3 ± 1.1*#
PLT, 10 ⁹ /l	366.3 ± 11.9 _	170 ± 23.0#	160±19#	136 ± 20#	186.5 ± 17.5#	321.3 ± 14.5* #

{p < 0.05} comment (*p > 0.05 compared to control) (#p > 0.05 compared to healthy animal)

Based on the study results, the 7-day urinary and blood glucose tests were different from healthy animals, and the 14-day validation studies showed that a dose of 75 mg/kg of a substance isolated from the plant *Isatis tinctoria* L., is recognized as biologically active and highly effective. At the next stage of the study, indicators of leukocytes, erythrocytes and platelets, responsible for the immune system in the blood, were identified.

CONCLUSION

The results of the study on the study of pharmacological, preclinical tests were obtained to determine the biological and therapeutic hypoglycemic activity of an aqueous infusion of the Woad plant and the effect of doses and concentrations on therapeutic hypoglycemic efficacy, in diabetic animals at doses of 25 mg/kg, 50 mg/kg and 75 mg/kg.

The research results showed that during 14-day treatment of animals with diabetes mellitus with the introduction of *Isatis tinctoria* extract L. _ in different doses, only when administered a dose of 75 mg/kg reduced the amount of glucose in the urine and blood. It should also be noted that the dose 75 mg/kg *isatis tinctoria* L increased the activity of leukocytes, erythrocytes and platelets responsible for the immune system in the blood.

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