The Use of Isohemagglutinating Serums and Phytagglutinins in Forensic Medical Examination

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ABSTRACT

The authors consider a comparative study of α and β sera and phytagglutinins under the influence of high temperature.The intensity of agglutination of the alpha and β serum was the same both when exposed to temperature for 30 minutes and at 8 hours of exposure at 30 and 200C, their titer was 1:64.Under conditions of 370 and 480C, the agglutination ability of alpha and β serum increases, their titer is 1:128.The activity of extracts from Phaseolus vulgaris Savi seeds increases with a temperature change from 30 to 480C and their titer is 1:256. The activity of extracts from Nimrang grape seeds does not increase with a temperature change from 30 to 480C and their titer is 1:64.

Keywords: phytagglutinins, agglutinogens, agglutinins, gonorrhea, antitran titers

Introduction. Blood testing occupies a special place among the physical evidence. Currently, a large number of group-specific factors are being established in blood traces to establish the fact, but the main and constantly decisive issue is the determination of the blood group of the AB0 system. The group affiliation of this system is determined by agglutinins and agglutinogens. Recently, the use of phytagglutinins (lectins) has been increasingly promoted in the practice of forensic medical examination of physical evidence to determine the group of the AB0 system. The introduction of new methods of analysis and the expansion of the volume of diagnostic reagents used increases the effectiveness of forensic medical examination of physical evidence. It is known that in addition to human blood serum, the agglutinating ability of erythrocytes can be caused by other substances, in particular, extracts of plant origin (phytagglutinins). Agglutinins (lectins) as well as human and animal serum antibodies, it belongs to the globulin fraction of proteins. Differentiating human blood agglutinins from agglutinin-like substances of plant and animal origin (from lectins and protectins) is of great forensic importance.

The purpose of the study: to verify a comparative study of isohemagglutinating serums and phytagglutinins (lectins) under the influence of high temperature.

Research materials and methods. Various series of alpha and beta isohemagglutinating serums with a titer of 1:32 and 1:64, taken from the forensic biological department of the Tashkent city branch of the RNPTSME of the Ministry of Health of the Republic of Uzbekistan, were studied. As well as extracts of the Rhaseolus vulgaris Savi bean and Nimrang grape seeds prepared according to the method proposed by Prof. M.I. Potapov were studied. To do this, the seeds are crushed in a mortar, turning them into a homogenate,

and poured with an isotonic solution of sodium chloride in a ratio of 1:10. After careful mixing of the ingredients, the resulting extract is kept in a thermostat at a temperature of + 37^0 for 3 hours, and then stored in the refrigerator at + 4-6^0C for 16-18 hours. After such extraction, the centrifugation is carried out, and the filler part is filtered through a decontaminated paper filter.

Thus, the prepared extract is stored at +4-6^0C in a closed flask without the addition of antibacterial substances. The study is performed in the reaction of hemagglutination to human erythrocytes of the AB0 system. The extracts are studied in vitro during one and a half hour contact with 2% suspension of erythrocytes (3 drops of liquid + 1 drop of suspension), followed by centrifugation for one minute at 1000-1500 rpm. The results of the reaction are recorded with the naked eye and with the help of a microscope. In the presence of phytagglutinins, their titer is determined. Titration of phytagglutinins is carried out by standard erythrocytes of the same microdonors. The agglutination ability of each isohemagglutinating serum α, β and phytagglutinins was tested with samples of erythrocytes A and B by titration. Isohemagglutinating serums were diluted with saline solution 2, 4, 8.16 times, etc. so that 3 drops of liquid remained in each tube. After adding a drop of 2% suspension of standard erythrocytes A and B to all test tubes, the mixture was left for 1.5 hours at different temperature conditions: 3^0, 20^0, 37^0 and 48^0C, centrifuged for 1 minute at 1000-1500 rpm and shaken in a tripod. The results of the reaction were observed with the naked eye under a microscope (on slides under the cover).

The results of the discussion study. The results of the study showed that isohemagglutinating serum α agglutination occurred with erythrocytes of group A, and with erythrocytes of group B agglutination did not occur, as well as isohemagglutinating serum β agglutination occurred with erythrocytes of group B, and with erythrocytes of group A agglutination did not occur.At 3^0 and 20^0C undiluted serum, the intensity of agglutination "+++" is a sandy agglutination visible to the naked eye, At 37^0 and 48^0C undiluted serum, the intensity of agglutination "++++" is a large-petalled agglutination. (see Table 1).

Table №1

The effect of temperature on agglutination capacity α and β serums

Intelligence α / β	Red blood cells of the groups								Red blood cells of the groups							
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	3^0		20^0		37^0		48^0		3^0		20^0		37^0		48^0	
нер	-	+++	-	+++	-	++++	-	++++	+++	-	+++	-	++++	-	++++	-
2	-	+++	-	+++	-	++++	-	++++	+++	-	+++	-	+++	-	+++	-
4	-	++	-	++	-	+++	-	++++	++	-	++	-	+++	-	+++	-
8	-	++	-	++	-	++	-	+++	++	-	++	-	++	-	++	-
16	-	+	-	+	-	++	-	+++	+	-	+	-	++	-	++	-
32	-	±	-	+	-	+	-	++	+	-	+	-	+	-	+	-
64	-		-	±	-	+	-	+	±	-	±	-	+	-	+	-
128	-	-	-	-	-		-	±	-	-	-	-		-	±	-

Note:

"++++" - large-petal agglutination;

"+++" - sand-like agglutination visible to the naked eye;

"++" is an agglutination visible to the eye in the form of conglomerates of various sizes;

"+" denotes the gluing of all red blood cells into conglomerates of various sizes;

"+" corresponds to small conglomerates against the background of a large number of non-glued red blood cells;

"" corresponds to small agglutinates of 3-5 glued erythrocytes against the background of most non-glued;

"–" denote the complete absence of agglutination.

As can be seen from the table, the agglutination ability of alpha and beta serum was detected in all cases of the study. The intensity of agglutination of the alpha and β serum was the same both when exposed to temperature for 30 minutes and at 8 hours of exposure at 30 and 200C, their titer was 1:64.Under conditions of 370 and 480C, the agglutination ability of alpha and β serum is increased, their titer is 1:128.Heating the serum at a higher temperature, the agglutinins are destroyed.

Table №2

The effect of temperature on the agglutination ability of phytagglutinins

	bean extract Phaseolus vulgaris Savi								grape seed extract "Nimrang"							
Razex	Red blood cells of the groups								Red blood cells of the groups							
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	3^0		20^0		37^0		48^0		3^0		20^0		37^0		48^0	
нер	+++	-	+++	-	++++	-	++++	-	+++	-	+++	-	+++	-	+++	-
2	+++	-	+++	-	+++	-	+++	-	+++	-	+++	-	+++	-	++	-
4	++	-	++	-	+++	-	+++	-	++	-	++	-	++	-	++	-
8	++	-	++	-	++	-	++	-	++	-	++	-	++	-	+	-
16	+	-	+	-	++	-	++	-	+	-	+	-	+	-	+	-
32	±	-	+	-	+	-	++	-	±	-	±	-	+±	-	±	-
64		-	±	-	+	-	+	-	-+	-	-+	-	±	-	-+	-
128	-	-	-	-	±	-	+	-	-	-	-	-	-	-	-	-
256	-	-	-	-	-+	-	±	-	-	-	-	-	-	-	-	-

The activity of extracts from Phaseolus vulgaris Savi seeds increases with a temperature change from 30 to 480C and their titer is 1:256. The activity of extracts from Nimrang grape seeds does not increase with a temperature change from 30 to 480C and their titer is 1:64. It must be said that the use of extracts from the seeds of the legume family (Phaseolus vulgaris Savi) and The use of Nimrang grape seeds as hemagglutinating drugs is more economical than the use of expensive immune serums.

Conclusions: Thus, phytoagglutinins have the property of agglutinating erythrocytes of the AB0 system and can be used to determine the blood type in traces, and increase the effectiveness of forensic medical examination of physical evidence.

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