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## Effectiveness And Toxicological Properties Of Iodlukman.

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### ABSTRACT

The article contains information on a new iodlukman preparation, obtained on the basis of iodine and a surface active polymer. The drug was developed by Russian and Turkmen scientists using the components produced on the territory of these states. The iodlukman preparation has a pronounced disinfection activity against microorganisms of 1-4 groups in concentrations from 0.5 to 4%. The conducted studies showed that when studying acute inhalation toxicity of iodlukman, LD<sub>50</sub> and LD<sub>100</sub> could not be determined. Experiments to determine the acute toxicity found that the LD<sub>50</sub> of the drug is 2188.6 + 13.7 mg / kg. The study of the antimicrobial effect of the drug against pathogenic and opportunistic pathogens of respiratory diseases showed that iodlukman solutions have a pronounced bactericidal effect on the E. coli pc.1257 and Staphylococcus aureus pc.209P.

**Keywords:** iodine, toxicity, efficacy, opportunistic microorganisms.

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## INTRODUCTION

Disinfection is the main method that can break the epizootic chain when infectious diseases occur and spread by affecting its most important link - the factor of transmission of the pathogen from the source of infection to the susceptible organism. Currently, various preparations are used for disinfection with active substances in which there may be aldehydes, dialdehydes, guanidine compounds, quaternary ammonium, chlorine and many other chemical compounds. One such compound is iodine. [1]

Currently, iodine-containing preparations such as iodine monochloride, iodotriethylene glycol, iodopyrrolidone, iodogan, iodisine, iodipra-5, iodipra-20, saniodide (Spain), iozan CCT, iozansupidine (Switzerland), disan (Japan), iodide, iodididone, iodopyrone (Russia), etc. [2]

Iodophores based on surfactants are sufficiently described in the scientific literature. In particular, copolymers of ethylene oxide and propylene oxide of irregular structure [5], block copolymers of ethylene oxide and propylene oxide (BSP) were used as iodine carriers [9, 10], including symmetrical BSP, oxyalkylatedalkylphenols [6, 7] and higher alcohols [8]. It should be noted that the known iodophores as mandatory stabilizing additives contain organic and inorganic acids or salts of the latter [11].

One of the newly created preparations based on iodine and a surface active polymer is iodlukman. The iodlukman preparation has a pronounced disinfection activity against microorganisms of 1-4 groups and in concentrations from 0.5 to 4%.

The purpose of our work was to study the possibility of using this drug for sanitation of the upper respiratory tract of animals and poultry and to study the toxicological properties of the drug.

## MATERIAL AND METHODS

The study of acute inhalation toxicity of iodlukman was carried out under laboratory conditions. Tests were carried out on laboratory white mice, white rats, chickens, and rabbits in an aerosol chamber with a volume of 8 m<sup>3</sup> according to the generally accepted procedure.

The initial iodine concentration was 1.5%, recommended for disinfection, the flow rate of the working solution of the preparation was 30 ml / m<sup>3</sup>, the exposure was 4 h and 24 h. In subsequent experiments, the concentration of the drug was increased. The temperature of the air in the chamber during the experiment was 18-200 °C.

The action of iodlukman on the mucous membranes of the eyes and the skin of laboratory animals had to be checked because of the possibility of accidental ingress of iodlukman working solutions onto the mucous membranes of the eyes and the skin of persons conducting disinfection work in rabbit experiments to study their resorptive toxic effects.

The effect of iodlukman solutions on the skin of rabbits was studied as follows. The day before the experiments, rabbits in the back area from both sides carefully cut out the hair (5×8 cm). The next day, 1.5%, 4.5% and concentrate of the iodlukman preparation were applied to the shaved area of the skin on the left side with a cotton swab, and on the right side - water (control). After this, the rabbit was injected intravenously with a sterile 1% solution of trypan blue in physiological saline at the rate of 1 ml/kg of animal weight. If there is an irritating effect, a strong blue staining of the skin should appear on the application site.

Experiments to determine the acute toxicity of iodlukman were carried out on white mice clinically healthy, normally developed, with a body weight of 18-20 g.

A study of the antimicrobial effect of iodlukman on pathogenic and opportunistic pathogens of respiratory diseases was carried out in an aerosol chamber with a total volume of 9 m<sup>3</sup>, into which a pre-titrated corresponding infected liquid was sprayed in an amount of 1 ml / m<sup>3</sup>. The air was removed from the chamber, neutralized and sown on nutrient media after 16, 20 and 30 minutes [3].

Similarly, controls were put in place, where instead of the "Yodlukman" solution spraying of sterile distilled water was used.

The effect of iodlukman on the mucosa of the trachea was studied by spotting the preparation at a concentration of 5% on the mucosa from the prepared trachea of newly killed chickens. It was noted: drops of iodlukman for 20-30 minutes, absorbed into the mucous membrane, evenly distributed in its layer, staining it in a bluish-greenish color.

Experiments on the study of the bactericidal activity of iodlukman under laboratory conditions were carried out on Petri dishes with meat-peptone agar (MPA) [4].

**RESULTS AND DISCUSSION**

The study of acute inhalation toxicity of iodlukman was carried out under laboratory conditions.

After the end of the preset exposure, the experimental animals from the chamber were removed and transferred to clean cells, observed for 14 days, noting the general state during the experiment.

The results of the experiments are presented in Table1.

**Table 1: Inhalation toxicity results of iodlukman**

Animal species	Concentration of the drug,%	Drug consumption ml/ m <sup>3</sup>	Consumption of iodine, mg/ m <sup>3</sup>	Multiplicity of over estimation	Results of the experiment exposition, h			
					4		24	
					alive	dead	alive	dead
White mice	1,5	30	45	1	10	-	10	-
	4,5	30	135	3	10	-	10	-
	7,5	30	225	5	10	-	10	-
	15	30	450	10	10	-	10	-
Rats white	1,5	30	45	1	10	-	10	-
	4,5	30	135	3	10	-	10	-
	7,5	30	225	5	10	-	10	-
	15	30	450	10	10	-	10	-
Chickens	1,5	30	45	1	3	-	3	-
	4,5	30	135	3	3	-	3	-
	7,5	30	225	5	3	-	3	1
	15	30	450	10	3	-	1	2
Rabbit	1,5	30	45	1	1	-	1	-

From the data in Table 1, it can be seen that the use of iodlukman working solutions in the recommended concentration and consumption during disinfection did not cause the death of laboratory animals and poultry.

As a result of the conducted tests to determine the inhalation toxicity, iodlukmanLD<sub>50</sub> and LD<sub>100</sub> were not possible to determine.

The results of the conducted studies showed that the working solution of iodlukman at a concentration of 1.5% did not cause any inflammatory phenomena of the mucous membrane of the eye for 3 days after application, 4.5% iodlukman solution caused a slight reddening of the conjunctiva of the eye, which took place on 2-3 day of observation, and by the end of 3-4 days the mucosa came back to normal and took the original form.

In our experiments, it was established that when applying the drug to the skin of rabbits (even iodlukman concentrate), no blue staining of the skin appeared. With additional observation of rabbits for 3 days from the application of the iodlukman concentrate, an insignificant thickening of the skin fold was

revealed, followed by epithelial peeling. Edema, scratching, painful reaction during palpation was not observed.

Thus, it has been established that the working solutions of the preparation in the recommended concentrations do not adversely affect the skin of rabbits, and only when applying iodlukman concentrate on the skin is a weakly boring effect.

Based on the data obtained, it was found that the LD<sub>50</sub> of iodlukman was 2188.6 + 13.7 mg/kg.

The carried out researches have shown that the preparation has a pronounced disinfection effect to pathogens that cause respiratory diseases of animals and birds.

In the process of spent workings of modes of air disinfection of industrial premises, equipment, walls, floor, etc. We selected the following aerosol treatment regimes as the most effective: 1.5% aqueous solution of the preparation at a flow rate of 30 ml/m<sup>3</sup> and 4.5% aqueous solution at a flow rate of 10 ml/m<sup>3</sup>.

For disinfection of air and sanitation of respiratory tracts of animals and poultry, we recommend the use of iodlukman at a concentration of 4.5% solution flow rate of 10 ml / m<sup>3</sup> - in two divided doses (initially sprayed with 5 ml / m<sup>3</sup> and 15 minutes later with the rest of the solution), total exposure to aerosol exposure is at this 30 min, disinfectant and sanitizing effect is achieved at 45 mg / m<sup>3</sup> iodine.

Experiments on the effect of the drug on the mucosa of the trachea showed that when the application of iodlukman at a concentration of 5% was applied to the mucosa from the prepared trachea of newly killed chickens: a drop of the drug for 20-30 minutes, absorbed into the mucous membrane, evenly distributed in its layer, paint it in a bluish-greenish color. These data indicate that the drug does not cause the destruction of the mucous membrane of the respiratory tract and with a uniform and rapid impregnation of mucous (purulent) clusters has a better bactericidal effect. These properties are inherent in him and in the treatment of various purulent, complicated wound infections.

Experiments to study the bactericidal activity of the preparation of Petri dishes with meat-peptone agar (MPA) showed that iodlukman has a pronounced bactericidal effect on *Escherichia coli* pc.1257 and *Staphylococcus aureus* pc.209P.

Zones of growth retardation of the tested test cultures for the *E. coli* pc.1257 - 27-29 mm, for the *staphylococcus aureus* pc.209P - 25-28 mm from the edge of the socket outwards.

The study of the pharmacodynamics of iodine in the blood (using the method of determining the iodine blood mirror) showed that after 15 treatments during the month at recommended regimens and a maximum dose of 10 ml / m<sup>3</sup> after 3 hours, the iodine in the blood was in the range 0.39-0.43 µg / ml, and in control untreated poultry, 0.38-0.42 µg / ml. Thus, in the case of the laughter of poultry or other animals immediately after their inhalation with aerosols of the drug, the meat products obtained from them are not dangerous to humans for the above reasons and can be used for food without restrictions.

## CONCLUSION

The conducted studies showed that the use of iodlukman working solutions in the recommended concentration during aerosol disinfection did not cause the death of laboratory animals and poultry, LD<sub>50</sub> and LD<sub>100</sub> could not be determined. LD<sub>50</sub>iodlukman with oral administration was 2188.6 + 13.7 mg / kg.

Working solutions of the drug in the recommended concentrations do not adversely affect the skin of rabbits. Working solution of iodlukman at a concentration of 1.5% does not cause inflammation of the mucous membrane of the eye.

The following aerosol treatment regimes proved to be effective: 1.5% aqueous solution of the preparation at a flow rate of 30 ml / m<sup>3</sup> and 4.5% aqueous solution at a flow rate of 10 ml / m<sup>3</sup>.

For disinfection of air and sanitation of respiratory tracts of animals and poultry, it is recommended to apply the preparation at a concentration of 4.5% at a solution flow rate of 10 ml / m<sup>3</sup> - in two divided doses, the total aerosol exposure is 30 min, the disinfecting and sanitizing effect is achieved at 45 mg / m<sup>3</sup> of iodine.

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