Жұмыс аясында иксод кенелерінің пайда болу индексі (тал, %), молшылық индексі (ИИ, дана), сондай-ақ ірі қара малдың маусымдық және жасына байланысты жұқтыру динамикасы талданды. Қан паразиттік инфекциялардың диагностикасы ДНҚ-ны анықтауға арналған арнайы праймерлерді қолдана отырып, ПТР әдісімен жүргізілді *Theileria annulata, Theileria sergenti, Theileria orientalis* және *Babesia bovis.*

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ANTISEPTICS OF NATURAL, NON-CHEMICAL ORIGIN, THEIR TOXICOLOGICAL AND ALLERGIC EFFECTS ON THE BODY OF LABORATORY ANIMALS

ANNOTATION

In modern practical disinfectology, It is argued that ideal chemical agents, high disinfecting activity, and some other properties should be characterized by ecological safety, minimum toxicity and environmental safety. Environmental protection minimizes toxic effects on humans and animals, ease of utilization of spent solution. Antiseptics of natural, non-chemical origin are of great importance to solve this. Origin Spilled neutral concentrated anolyte (ANK), Ozone (O3), Shungite carbon and Propolis. These antiseptics of natural origin are environmentally friendly and have bactericidal and fungicidal action. They can be used for disinfection and disinfection of objects in medical and veterinary facilities. Our research aimed to determine the toxicological and allergic properties of anolyte, ozone, shungite, propolis, and their complexes shungite+ozone+anolite. "Shozan", propolis+ozone+anolite "Prozan", and shungite+propolis+ozone+anolite "Shuprozan" on laboratory animals. 1. According to the research results, antiseptics of natural origin and their complexes at single intraperitoneal injection at a dose of 1 ml do not have a toxic effect on laboratory mice. Laboratory mice Do not have an allergic effect on the cornea and conjunctival mucosa of the eye. Skin-resorptive reactions do not have an allergic effect on the skin. Essential antiseptics ethanol in a solution of 20% and hydrogen peroxide in a solution concentration of 1% have a toxic effect at a single intraperitoneal injection at a dose of 1 ml on laboratory mice and cause their death. It has an allergic effect on the cornea and mucosa conjunctiva of the eye, determining the skin-resorptive reaction has an allergic effect on the skin of rabbits.

Keywords: ANK anolyte, ozone (O_3), shungite carbon, propolis, ethanol, hydrogen peroxide toxicological and allergic properties.

Introduction. In the modern era of rapid industrial and agricultural development, one of the most pressing technical, ecological-biological, eco-toxicological, and social issues is environmental pollution. This includes contamination of soil, air, natural water bodies, rivers, seas, and oceans with chemicals, heavy metals, toxic gases, and pathogenic microorganisms resulting from the activities of large state-owned agricultural enterprises.

Modern disinfection science asserts that ideal chemical agents should not only possess high disinfecting activity and certain other properties but also ensure environmental safety, minimal toxicity to humans and animals, and ease of disposal of spent solutions.

To address this issue, antiseptics of natural, non-chemical origin play a crucial role.

In 1987, V.M. Bakhir discovered electrochemically activated (ECA) liquids, including water, which present an alternative to widely used disinfectants of both domestic and foreign production. The production of electrochemically activated solutions at various concentrations in STEL units is based on the electrochemical activation of a low-concentration aqueous solution of table salt. This process occurs in flow-through electrochemical modules under the influence of a high-voltage electric field for a specific duration. The synthesized ECA solutions—anolyte and catholyte—exhibit pronounced oxidative and reductive properties. Additionally, a neutral anolyte (ANK) is produced, a novel solution with unique biocidal properties, combining cleaning, disinfecting, and sterilizing effects [1].

Solutions obtained from STEL units effectively eliminate bacterial and fungal pathogens such as *Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli*, hepatitis B and poliovirus, HIV, adenoviruses, tuberculosis, salmonellosis, and dermatomycosis, among others. Studies have demonstrated that ECA solutions significantly outperform well-known disinfectants like chloramine and sodium hypochlorite in terms of effectiveness [2-4].

A key advantage of electrochemically activated solutions as highly effective disinfectants is their environmental safety. These solutions spontaneously degrade without forming toxic chemical compounds, making them harmless to the environment [3-5]. STEL units, with varying production capacities (from 20 to 100 L/h), produce three types of solutions: alkaline catholyte (a cleaning agent), acidic anolyte (a disinfectant), and neutral anolyte ANK (a combined cleaning-disinfecting agent). Research indicates that anolytes with specific physicochemical properties exhibit bactericidal, sporicidal, and virucidal effects. For example, ANK anolyte with a pH of 8 and an active chlorine concentration of 0.03–0.095% inactivates *E. coli, Staphylococcus aureus, P. aeruginosa*, and others in bacterial suspensions (in vitro) within 5–10 minutes and on surfaces (wood, metal, glass) within 1.5–2.5 hours.

When selecting disinfection methods for industrial premises, livestock, and poultry, social effects are equally important. ANK neutral anolyte is entirely safe for personnel, animals, and the environment. It spontaneously decomposes after disinfection without forming toxic compounds and does not require neutralization. The effectiveness of electrochemically activated solutions in medical and veterinary disinfection has been confirmed in numerous scientific studies [6-8].

Ozone (O_3), which readily releases an oxygen atom, is a powerful oxidant. Many oxidation reactions that require high temperatures with oxygen proceed at normal temperatures with ozone. The formation of ozone from oxygen is an endothermic reaction, requiring 33,000 kcal per molecule, making high energy costs a limiting factor for widespread ozone application. At 15°C and atmospheric pressure, ozone's solubility in water is 50% by volume. Ozonated water, like gaseous ozone (O_3), serves as a potent oxidant used for disinfecting and preserving food products and raw materials, preventing spoilage and extending shelf life [9].

Ozone (O_3), an allotropic triatomic modification of oxygen, functions as a gaseous chemical agent capable of oxidizing various organic and inorganic compounds. Due to constant molecular rearrangement, ozone naturally decomposes into oxygen, preventing accumulation unless continuously generated [10]. Since ozone reverts to oxygen without leaving harmful residues, it is increasingly considered for sterilization purposes [11]. Ozone's properties allow it to be used alongside conventional disinfectants to minimize side effects. Gaseous ozone is moderately soluble in water, with its stability depending on factors such as partial pressure, temperature, purity, pH, and hydrodynamic conditions [12]. In water, ozone is even less stable and quickly decomposes into oxygen. While the half-life of gaseous ozone at 20°C is approximately three days, in distilled water at the same temperature, it decomposes by 50% within 20 minutes. During practical applications, it is crucial to maintain ozone concentrations at the lowest effective levels to minimize health risks to personnel and reduce corrosion [13].

Shungite consists of 30% carbon, 45% quartz, and about 20% silicate mica. Shungite carbon is a fossilized fullerene-containing substance derived from organic sedimentary deposits with a high degree of carbonization. Fullerene content varies from 0.0001% to 0.001%. The unique molecular structure of shungite explains its diverse medicinal properties and widespread use in folk medicine. Shungite's beneficial properties stem from the unusual structure of its carbon molecules. Before the discovery of fullerenes in shungite, only three crystalline carbon modifications were known—diamond, carbyne, and graphite. However, research revealed a fourth form—fullerene, a hollow, spherical molecular compound composed of 60–70 carbon atoms. The presence of fullerenes and the unique structure of the carbon matrix distinguish shungite and contribute to its remarkable physical, chemical, and medicinal properties [14].

Shungite, with its rich mineral composition and pronounced sorption, bactericidal, and catalytic properties, has long been used in drinking water purification and activation systems. Shungite-infused water, a molecular-colloidal solution of hydrated fullerenes, has demonstrated anti-inflammatory, bactericidal, antiseptic, analgesic, anti-allergenic, and immunostimulating effects on the human body [15].

Shungite is a natural composite with an amorphous microporous quartz framework filled with highly dispersed (approximately 1 μm) aluminosilicate minerals. Its average composition includes 70% carbon and 30% ash, with 40–50% silicon oxide, 12–25% aluminum oxide, and other trace elements. Shungite's density is 2.1–2.4 g/cm³, with a porosity of up to 5%, compressive strength of 100–120 MPa, electrical conductivity of 1500 S/m, and thermal conductivity of 3.8 W/mK. Its unique properties, including chemical resistance, high density, strength, heat capacity, electrical conductivity, and ability to shield high-frequency electromagnetic radiation, make it a valuable material [16].

The effect of shungite on immune status, hematological, and biochemical parameters in animals was studied in 30 calves and 40 piglets over 60 days using shungite from the Zazhoginsky deposit. Its effectiveness was evaluated based on clinical, hematological, and biochemical indicators, considering overall body mass. By the end of the study, experimental calves showed a 23.2% increase in red blood cells, a 20.45% increase in hemoglobin, and a 35.5% decrease in white blood cells compared to the control group. Total protein levels were 2.18% higher, phagocytic activity increased by 22.6%, phagocytic index by 30%, phagocytic number by 8.7%, and lysozyme activity by 28.9%. Bactericidal activity decreased by 14.5% in the control group but increased by 10.1% in the experimental group [17].

Propolis, derived from the Greek words pro (before) and polis (city), is used by bees to seal hive surfaces, cracks, and as a nutritional reserve. It is a resinous substance collected from plant surfaces and enriched with nectar, pollen, and bee enzymes. Its color varies from dark green to brown depending on local flora.

Propolis exhibits antibacterial and immunomodulatory properties, utilized in both medicine and veterinary science for disease prevention in poultry [21].

Our study developed and tested an anolyte-ozone complex, "Ozan," with antiseptic properties [22]. However, assessing potential side effects of these substances and their combinations on living organisms remains essential.

The aim of our research was to determine the toxicological and allergenic properties of anolyte, ozone, shungite, propolis, and their complexes (shungite + ozone + anolyte, propolis + ozone + anolyte, and shungite + propolis + ozone + anolyte) in laboratory animals.

Materials and Methods. This study was conducted as part of the grant-funded scientific research project AP19679451 (2023-2025) titled "Development of an Environmentally Safe Antiseptic Preparation Based on Natural Substances and Compounds for Use in Veterinary Medicine and Human Medicine."

Neutral Anolyte (ANK). Neutral anolyte ANK was produced using the STEL-10N-120-01 mod.120 IIP device through electrochemical treatment of a sodium chloride solution with a concentration of 0.9 g/L in distilled water. The resulting liquid was a colorless, transparent solution with a chlorine odor, containing highly active chlorine-oxygen compounds. The primary active substances in this metastable solution were chlorinated oxygen and hydroperoxide oxidants. The total dissolved substances in ANK anolyte, at an oxidant concentration of 500 mg/L, did not exceed 5.0 g/L. The ANK anolyte was stored at room temperature in a tightly sealed glass bottle, protected from direct sunlight. It was used without prior preparation or dilution.

Aqueous Ozone. Aqueous ozone was produced using a DICHO apparatus (model TQ-Z08) by placing the device's nozzle in a container with distilled water for 10–20 minutes. This process resulted in an ozonated solution with a saturation concentration of 1.5 mg/L.

Shungite Infusion. For the preparation of shungite infusion, a 0.5 kg sample was washed multiple times with tap water. The shungite was then placed in a sterile five-liter glass bottle and filled with distilled water. The bottle was tightly sealed with a plastic cap and left to infuse at room temperature for three days. The resulting infusion was stored in the laboratory at room temperature in a tightly sealed glass bottle, protected from direct sunlight, and used without prior preparation or dilution.

Propolis Infusion. A 50 g sample of propolis was frozen in a household freezer and then grated. The grated propolis was added to 500 mL of distilled water and infused in a water bath for one hour, yielding a 10% propolis infusion. The infusion was cooled to room temperature, filtered through sterile gauze, and stored in a tightly sealed glass bottle in a refrigerator at +4°C. It was used without prior preparation or dilution.

Preparation of Complex Solutions

- Shosan (Shungite + Ozone + Anolyte): Equal volumes of shungite infusion and ozonated anolyte were mixed.
- Prozan (Propolis + Ozone + Anolyte): Equal volumes of propolis infusion and ozonated anolyte were mixed.
- Shuprozan (Shungite + Propolis + Ozone + Anolyte): Equal volumes of shungite infusion, propolis infusion, and ozonated anolyte were mixed.

Toxicological Study. The toxicological properties of the natural-origin antiseptics and their complexes were evaluated in a laboratory setting at the veterinary clinic of Zhangir Khan West Kazakhstan Agrarian and Technical University. A total of 100 mature, non-pedigreed white mice weighing 20–27 g were used and divided into 10 groups of 10 animals each. The animals were housed in a vivarium under standard sanitary conditions and fed a standard diet in accordance with established norms.

- Group 1: Aqueous ozone
- Group 2: Anolyte
- Group 3: Shungite infusion
- Group 4: Propolis infusion
- Group 5: Shosan

- Group 6: Prozan
- Group 7: Shuprozan
- Group 8: 20% ethanol solution
- Group 9: 1% hydrogen peroxide solution
- Group 10: Distilled water (control, 1.0 mL)

All substances were administered intraperitoneally at a dose of 1.0 mL, following aseptic and antiseptic procedures. Clinical observations were conducted over three days, monitoring the animals' general condition, activity level, coordination, pain response, presence of tremors, seizures, paresis, paralysis, secretions (eyes, nose, urinary tract), skin color changes, weight changes, and appetite. Mice from each group were housed in separate cages. At the end of the study, the animals were euthanized, followed by a pathological examination.

Allergic Reaction Study. To study the allergic properties of the natural-origin antiseptics and their complexes, Chinchilla rabbits were used. The animals were housed under standard vivarium conditions and fed a standard diet. Allergic properties were assessed through conjunctival application and dermal absorption tests.

For the conjunctival reaction assessment, 100 rabbits were divided into 10 groups of 10 animals each. The right eye of each rabbit received one drop of the test substance, while the left eye received one drop of distilled water as a control.

- Group 1: Aqueous ozone (right eye) / Distilled water (left eye)
- Group 2: Anolyte (right eye) / Distilled water (left eye)
- Group 3: Shungite infusion (right eye) / Distilled water (left eye)
- Group 4: Propolis infusion (right eye) / Distilled water (left eye)
- Group 5: Shosan (right eye) / Distilled water (left eye)
- Group 6: Prozan (right eye) / Distilled water (left eye)
- Group 7: Shuprozan (right eye) / Distilled water (left eye)
- Group 8: 20% ethanol solution (right eye) / Distilled water (left eye)
- Group 9: 1% hydrogen peroxide solution (right eye) / Distilled water (left eye)
- Group 10: Distilled water in both eyes (control)

Reactions of the conjunctiva and cornea, along with clinical changes, were recorded at 5 minutes, 15 minutes, 1 hour, and 3 hours post-application.

For the dermal absorption reaction assessment, 100 rabbits were divided into 10 groups of 10 animals each. The fur on both sides of the shoulder area (5 × 5 cm) was shaved, dried with sterile gauze, and the test substances were applied to the right side, while distilled water was applied to the left as a control.

- Group 1: Aqueous ozone (right) / Distilled water (left)
- Group 2: Anolyte (right) / Distilled water (left)
- Group 3: Shungite infusion (right) / Distilled water (left)
- Group 4: Propolis infusion (right) / Distilled water (left)
- Group 5: Shosan (right) / Distilled water (left)
- Group 6: Prozan (right) / Distilled water (left)
- Group 7: Shuprozan (right) / Distilled water (left)
- Group 8: 70% ethanol solution (right) / Distilled water (left)
- Group 9: 3% hydrogen peroxide solution (right) / Distilled water (left)
- Group 10: Distilled water (both sides, control)

Skin reactions and clinical changes were recorded at 30 minutes, 1 hour, 3 hours, and 4 hours post-application.

The handling and housing of the experimental animals complied with generally accepted ethical standards and regulations.

Results and Discussion. The study on the toxicological properties of natural-origin antiseptics and their complexes revealed that in groups 1–7 of white mice, which received aqueous ozone, anolyte, shungite infusion, propolis infusion, "Shozan," "Prozan," and "Shuprozan," no clinical abnormalities were observed over three days.

In groups 8 and 9, which received a 20% ethanol solution and a 1% hydrogen peroxide solution, clinical abnormalities were recorded. On the first day, immediately after administration, mice exhibited agitation followed by depression, impaired coordination, unsteady gait, and loss of appetite. Their response to pain stimuli was reduced. On the second day, tremors, seizures, paresis, and paralysis of the limbs were observed, along with cyanosis of the mucous membranes and bluish discoloration of the skin. On the third day, ocular and nasal discharge, involuntary urination, and defecation were recorded. All mice in these groups died due to respiratory muscle paralysis and cardiac arrest.

The results of the postmortem examination showed no pathological changes in the organs and tissues of white mice in groups 1–7 and 10, nor any abnormalities in their anatomical structure.

In groups 8 and 9, necropsy revealed intestinal and gastric bloating, deformation of the abdominal cavity, cyanosis of the mucous membranes, hemorrhages in the liver, gallbladder, and lungs, an overfilled bladder, and jaundice of the serous membranes. These pathological findings indicate poisoning in the affected mice, confirming the toxic properties of the 20% ethanol solution and the 1% hydrogen peroxide solution (Figure 1).

Thus, natural-origin antiseptics and their complexes, when administered intraperitoneally in a single 1 ml dose, do not exhibit toxic effects in laboratory mice.

Allergic Reaction Study. An investigation into allergic reactions of the conjunctival mucosa and cornea revealed that in groups 1–7, where rabbits received aqueous ozone, anolyte, shungite infusion, propolis infusion, "Shozan," "Prozan," and "Shuprozan" in the right conjunctival sac, no clinical abnormalities in the conjunctival and corneal reactions or overall condition of the animals were observed at 5 minutes, 15 minutes, 1 hour, and 3 hours after administration. No abnormalities were noted in the left eye, where distilled water was applied.

In groups 8 and 9, where a 20% ethanol solution and a 1% hydrogen peroxide solution were instilled into the right conjunctival sac, clinical abnormalities were observed.

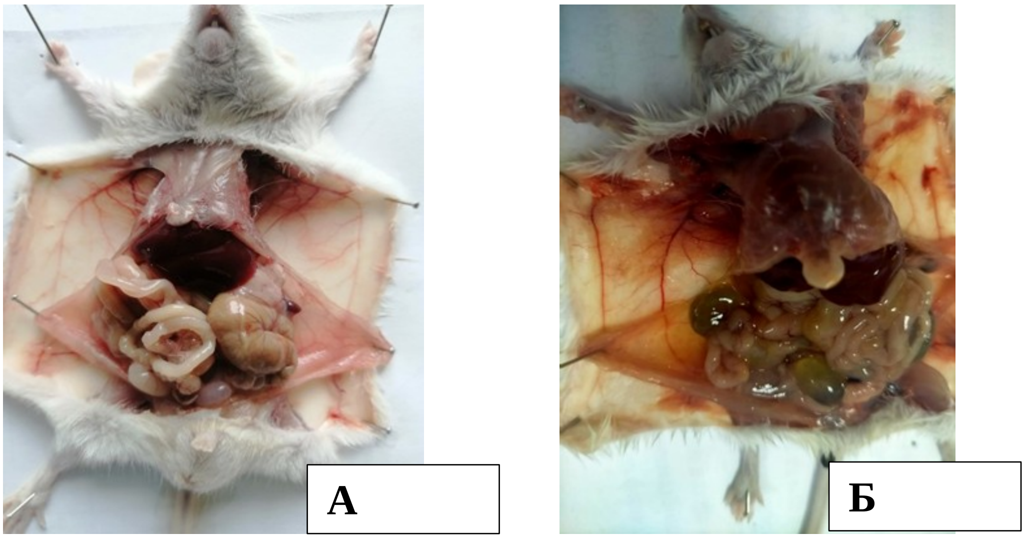

Figure 1 – Results of the pathological examination of mice:
(A) Groups 1–7 and 10, (B) Groups 8 and 9.

In rabbits, within the first minute after administration, restlessness, increased respiration, and rapid heartbeat were observed. Profuse tearing and frequent eyelid blinking were noted. After 5 minutes, conjunctival hyperemia and an intensified corneal reflex were recorded. After one hour, redness and conjunctival irritation persisted, while after two hours, the irritation gradually subsided and completely disappeared after three hours.

No clinical abnormalities were observed in the left eye, where distilled water was administered.

In the control group, where animals received distilled water in both the right and left conjunctival sacs, no clinical abnormalities were observed (Figure 2).

Thus, natural-origin antiseptics and their complexes do not induce allergic reactions in the cornea or conjunctival mucosa.

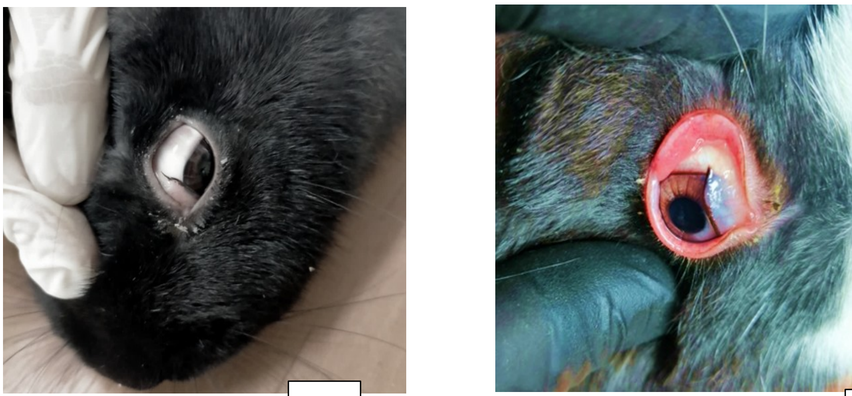

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Figure 2 – Results of clinical changes in the cornea and conjunctival mucosa.
(A) Groups 1–7 and 10, (B) Groups 8 and 9.

When studying the dermal-resorptive reaction, it was determined that in groups 1–7, where rabbits had aqueous ozone, anolyte, shungite infusion, propolis infusion, "Shozan," "Prozan," and "Shuprozan" rubbed into the skin in the right scapular area, no clinical abnormalities in skin reaction or overall condition were observed at 30 minutes, one hour, three hours, and four hours after application. No clinical deviations were noted in the left scapular area, where distilled water was applied.

In groups 8 and 9, where 70% ethanol solution and 3% hydrogen peroxide solution were applied to the right scapular area, respectively, clinical deviations were observed. Within the first 30 minutes after application, rabbits exhibited skin irritation, hyperemia, and increased tactile sensitivity. Their general condition was agitated and restless. After one hour, skin irritation and hyperemia began to subside, and by the third to fourth hour, they had completely disappeared, with the animals calming down. No clinical deviations were noted in the left scapular area, where distilled water was applied.

In group 10 (control), where distilled water was applied to both sides, no clinical abnormalities were observed (Figure 3).

Thus, when assessing dermal-resorptive reactions, natural antiseptics and their complexes do not exhibit allergic effects on the skin.

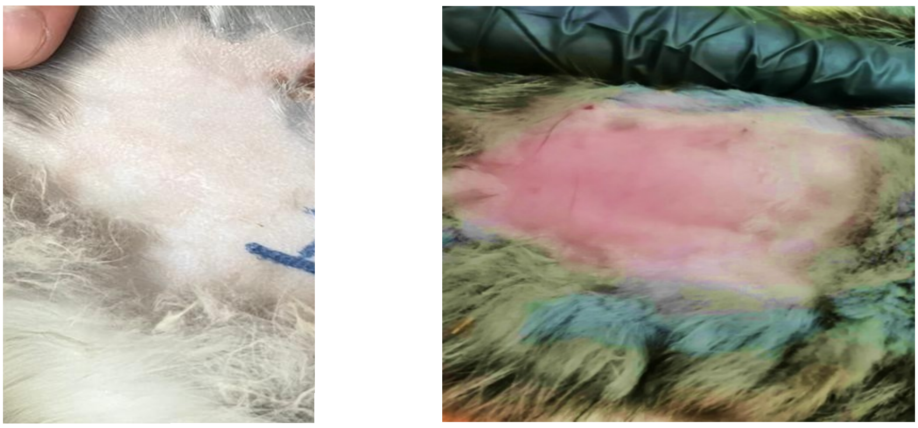

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Figure 3 – Results of clinical skin changes in groups 1–7 and 10 (A), in groups 8 and 9 (B).

Conclusions

1. Based on the research results, natural-origin antiseptics and their complexes do not exhibit toxic effects on laboratory mice when administered intraperitoneally in a single dose of 1 ml.

2. Natural-origin antiseptics and their complexes do not cause allergic reactions on the cornea and conjunctival mucosa of the eye.

3. Natural-origin antiseptics and their complexes do not cause allergic reactions on the skin when assessing dermal-resorptive reactions.

4. The basic antiseptics, ethanol at a 20% solution concentration and hydrogen peroxide at a 1% solution concentration, exhibit toxic effects on laboratory mice when administered intraperitoneally in a single dose of 1 ml, leading to their death.

5. The basic antiseptics, ethanol at a 20% solution concentration and hydrogen peroxide at a 1% solution concentration, cause allergic reactions on the cornea and conjunctival mucosa of rabbits' eyes.

6. The basic antiseptics, ethanol at a 70% solution concentration and hydrogen peroxide at a 3% solution concentration, cause allergic reactions on the skin of rabbits when assessing dermal-resorptive reactions.

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ТҮЙІН

Заманауи практикалық дезинфекцияда идеалды химиялық агенттер, жоғары дезинфекциялық белсенділік және басқа да кейбір қасиеттер экологиялық қауіпсіздікпен, минималды уыттылықпен және экологиялық қауіпсіздікпен сипатталуы керек деген пікір бар. Қоршаған ортаны қорғау адам мен жануарларға уытты әсерді азайтады, жұмсалған ерітіндіні пайдаланудың қарапайымдылығын азайтады. Бұл мәселені шешу үшін табиғи, химиялық емес шыққан антисептиктердің маңызы зор. Origin Төгілген бейтарап концентрацияланған анолит (ANK), Озон (O_3), Шунгит көміртегі және Прополис. Бұл табиғи антисептиктер экологиялық таза және бактерицидтік және фунгицидтік әсерге ие. Оларды медициналық және ветеринарлық мекемелердегі объектілерді дезинфекциялау және дезинфекциялау үшін пайдалануға болады.

Біздің зерттеуіміз анолиттің, озонның, шунгиттің, прополистің және олардың шунгит+озон+анолит кешендерінің токсикологиялық және аллергиялық қасиеттерін анықтауға бағытталған. "Шозан", прополис+озон+анолит "Прозан" және шунгит+прополис+озон+анолит "Шупрозан" зертханалық жануарларда. Зерттеу нәтижелері бойынша табиғи шыққан антисептиктер және олардың кешендері 1 мл дозада бір реттік интраперитонеальді инъекция кезінде зертханалық тышқандарға уытты әсер етпейді. Зертханалық тышқандар көздің қабығына және конъюнктивалық шырышты қабығына аллергиялық әсер етпейді. Тері-резорбциялық реакциялар теріге аллергиялық әсер етпейді. Маңызды антисептиктер 20% ерітіндідегі этанол және 1% ерітіндідегі сутегі асқын тотығы зертханалық тышқандарға 1 мл дозада бір реттік интраперитонеальді

инъекция кезінде уытты әсер етеді және олардың өліміне әкеледі. Көздің қабығы мен шырышты қабығының конъюнктивасына аллергиялық әсер етеді, терінің резорбциялық реакциясын анықтау қояндардың терісіне аллергиялық әсер етеді.

РЕЗЮМЕ

В современной практической дезинфектологии утверждается, что идеальные химические средства, обладающие высокой дезинфицирующей активностью и некоторыми другими свойствами, должны характеризоваться экологической безопасностью, минимальной токсичностью и сохранностью для окружающей среды. Защита окружающей среды сводит к минимуму токсическое воздействие на человека и животных, простота утилизации отработанного раствора. Для решения этой проблемы большое значение имеют антисептики натурального, нехимического происхождения. В состав средства входят нейтральный концентрированный анолит (ANK), озон (O_3), шунгитовый уголь и прополис. Эти антисептики природного происхождения безвредны для окружающей среды и обладают бактерицидным и фунгицидным действием. Их можно использовать для дезинфекции и обеззараживания предметов в медицинских и ветеринарных учреждениях. Целью нашего исследования было определение токсикологических и аллергических свойств анолита, озона, шунгита, прополиса и их комплексов шунгит+озон+анолит. "Шозан", прополис+озон+анолит "Прозан" и шунгит+прополис+озон+анолит "Шупрозан" на лабораторных животных.

Согласно результатам исследований, антисептики природного происхождения и их комплексы при однократном внутрибрюшинном введении в дозе 1 мл не оказывают токсического действия на лабораторных мышей. Лабораторные мыши не оказывают аллергического воздействия на роговицу и слизистую оболочку конъюнктивы глаза. Кожно-резорбтивные реакции не оказывают аллергического воздействия на кожу. Эфирные антисептики этанол в концентрации 20% и перекись водорода в концентрации 1% оказывают токсическое действие при однократном внутрибрюшинном введении в дозе 1 мл на лабораторных мышей и вызывают их гибель. Оказывает аллергическое действие на роговицу и слизистую оболочку конъюнктивы глаза, определяя кожно-резорбтивную реакцию, оказывает аллергическое действие на кожу кроликов.

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