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ANALYSIS OF ANTIMICROBIAL ACTIVITY OF HUMIC PREPARATIONS IN VITRO

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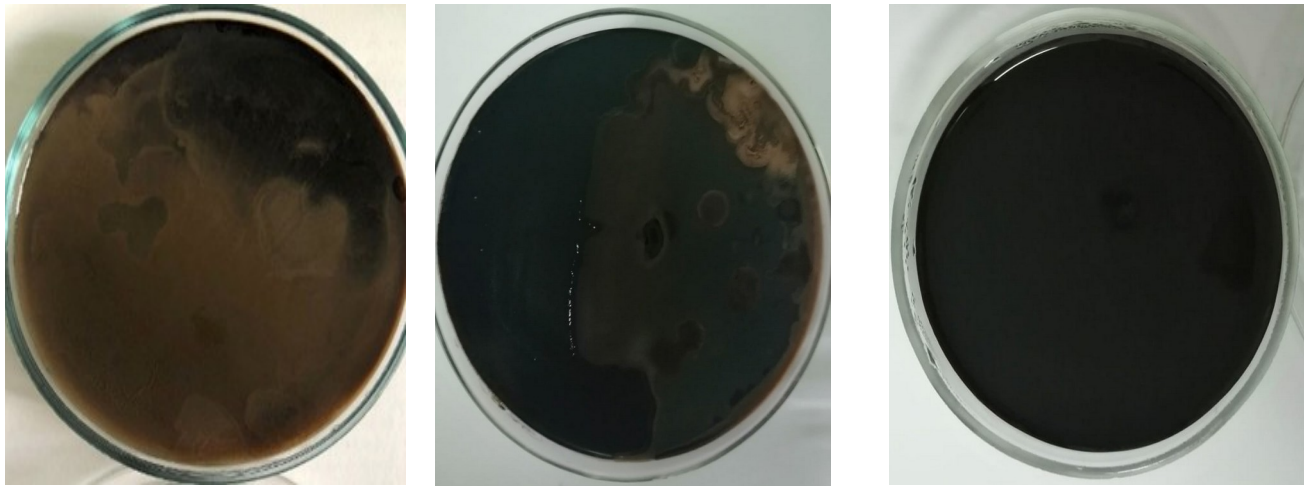
The proposed means and methods of treating people with purulent-septic infections caused by *Staphylococcus aureus* or other representatives of the purulent microflora differ in the presence of antibiotics or other chemicals or disinfectants. Often they provoke allergies, contribute to the formation of antibiotic-resistant strains[1].

The same problem exists in veterinary medicine, where drugs for the treatment of animals with purulent-necrotic diseases of the distal extremities of animals are currently insufficiently effective. It should also be noted that there is an insufficient market for domestic pharmaceuticals.

Consequently, the development and introduction of new domestic drugs and methods of treatment of sick people with purulent-septic infections and animals with purulent-necrotic lesions is very relevant and has great practical significance for human and veterinary medicine in Kazakhstan[2].

The theoretical and practical significance of the work lies in the development of a new drug for the treatment of sick people with purulent-septic infections and for the treatment of animals with purulent-necrotic diseases of the extremities, such as necrobacteriosis, hoof rot, Mortellaro disease, purulent pyodermatitis, purulent and purulent-necrotic pododermatitis, laminitis, Rustergolts ulcers and other pathologies of various etiologies[3]. The experience of using the drug on volunteers has shown a high therapeutic effect in the treatment of furunculosis, nail injuries, acne. In animals, the affected hooves, lacerations in the joints, wetness in horses, and dermatitis were healed in a fast time with a high effect. The innovative formulation of the drug made it possible to obtain a rapid recovery effect without the use of antibiotics, disinfectants, cauterizing substances[4].

The main advantages of the proposed veterinary drug "Liniment "Humik-Salve" are the absence of antibiotics and hormonal drugs, an increased content of biologically active substances, including humic and fulvic acids, micro- and macroelements that are part of the veterinary drug in an accessible chelated form;



abc

Figure 1–Suppression of the growth of microorganisms in the presence of humic substances on the concentration gradient of potassium humate: a) 10%; b) 50%; c) 100%

As can be seen from Figure 3, microorganisms grow well in the presence of low concentrations of potassium humate. It was noted that almost all bacteria cannot withstand concentrations from 5% and above (Figure 1a). However, at a concentration of potassium humate in nutrient media from 3 to 50%, there was a noticeable delay in the growth of microorganisms (Figure 1b). At a concentration of potassium humate from 10 to 100%, the growth of microorganisms is practically absent (Figure 1c).

We found that concentrations of humic substances 1-2% stimulate the growth of various saprophytic organisms, causing rapid growth on the surface of Petri dishes. The same concentrations practically did not suppress the growth of pathogenic and conditionally pathogenic microflora. Starting from a 3% concentration of potassium humate, the growth of microorganisms began to slow down, 10-100% concentration of potassium humate completely suppressed the growth of any microflora (Figure 2).

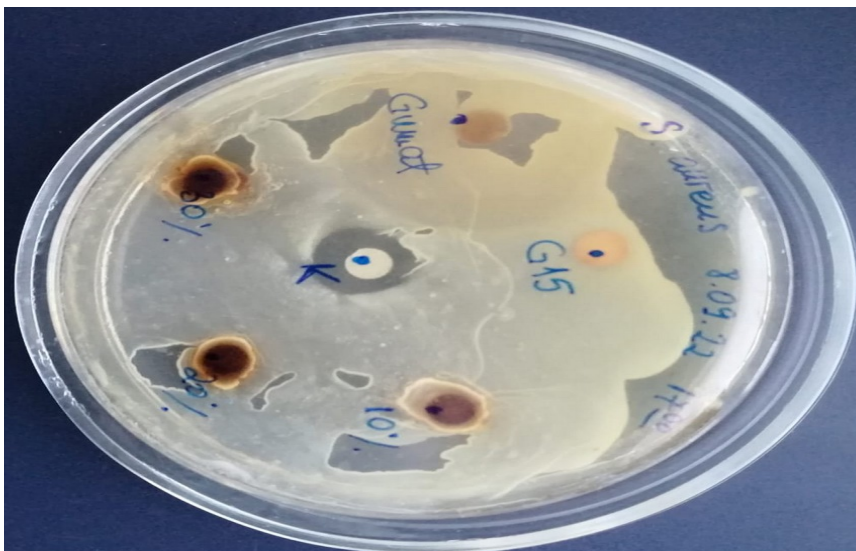


Figure 2 – Suppression of *Staphylococcus aureus* growth: the drug after 24 hours

Conclusion

As can be seen from Figure 1, the control has a bactericidal effect, the diameter of the growth delay was 1.3×1.4 cm. The drug with a 10% concentration has a bacteriostatic effect, the diameter of growth retardation was 1.2×1.2 cm. The drug with a 20% concentration has a bacteriostatic effect, the diameter of growth retardation was 3.7×3.7 cm. The drug with a 30% concentration has a bacteriostatic effect, the diameter of growth retardation was 3.8×3.8 cm. The drug "Gumaz" has a pronounced bacteriostatic effect, the diameter of growth retardation was 4.0×4.0 cm.

Thus, it was revealed that the veterinary drug "Liniment "Humik-Salve" has a pronounced antimicrobial effect on pathogens of purulent processes.

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