

MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION

**Federal state budgetary institution**  
**"National Research Center for Epidemiology and Microbiology named after Honorary**  
**Academician N.F. Gamaleya"**

(FSBU "N. F. Gamaleya Research Center for Epidemiology and Epidemiology" of the Russian Ministry of Health)

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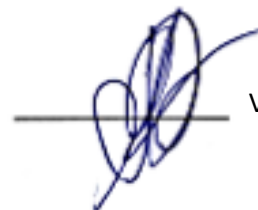
I APPROVED  
Director of the Federal State Budgetary Institution  
"NRCEM named after N.N. N. F. Gamaleya" of the  
Ministry of Health of Russia, Academician of the  
Russian Academy of Sciences, Dr. Biol. Science Professor  
A.L. Gunzburg  
"08" October 2021

**REPORT**

**ABOUT THE RESEARCH WORK "STUDYING THE BACTERICIDAL EFFECT OF IN VITRO SAMPLES  
OF CONCENTRATES OF BIOCIDAL NANOPARTICLES ZnO AND ZnO - Ag IN RELATION TO GRAM  
NEGATIVE AND GRAM POSITIVE BACTERIA"**

(Final)

Head of research work, senior researcher, head.  
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Moscow 2021

## CONCLUSION

In the process of carrying out research, the bactericidal effect of two preparations containing ZnO and ZnO - Ag nanoparticles, obtained by electric explosion and additional ultrasound treatment, was studied, and their effective doses (ED) were selected, at which the death of 99.9%, 95% and 90% of bacterial strains was achieved species *E. Coli*, *H. Influenza*, *K. Pneumoniae*, *P. aeruginosa*, *S.aureus*, *A. baumannii*, *S. typhimurium* at the concentration range specified in the experimental plan. Both drugs were active against the studied strains. The most effective drug was ZnO - Ag, capable of eliminating 100% of bacteria in lower concentration ranges (ED<sub>90</sub> 0.0625 - 0.3%), compared with ZnO ultrasound (ED<sub>90</sub> 0.6 - 2.4%). At the maximum studied concentration of nanoparticles (2.5%), the activity of the ZnO - Ag ultrasound preparation was 100% against all studied strains; ZnO preparation US – 100% in relation to *E. Coli*, *H. Influenza*, *K. Pneumoniae*, *P. aeruginosa*, *S. Typhimurium*, 88.97% - against *A. Baumannii*, and 97.73% for *S. Aureus*.

Thus, within the framework of the implementation of Agreement No. 8062 dated October 20, 2021, for the implementation of research work on the project "Study of the bactericidal effect in vitro of samples of concentrates of biocidal nanoparticles ZnO and ZnO - Ag, subjected to modification under intense ultrasonic influence against gram-negative and gram-positive bacteria", in accordance with the requirements of the Technical Specifications, all assigned tasks were fully completed.