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ОЦЕНКА ЭФФЕКТИВНОСТИ БАКТЕРИЦИДНЫХ ЛАМП В ПОМЕЩЕНИЯХ ОБЩЕГО ПОЛЬЗОВАНИЯ

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ASSESSMENT OF EFFECTIVENESS OF GERMICIDAL LAMPS IN AREAS OF COMMON USE

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Resume. In this work the assessment of effectiveness of different types of germicidal lamps in areas of common use is carried out and discussed. For the assessment Petri dishes with general purpose agar were placed in classrooms of the microbiology, virology and immunology department of Belarussian State Medical University for 20 minutes and incubated. After incubation the colonies were analyzed based on their cultural characteristics and tallied.

Keywords: germicidal lamps, effectiveness assessment, common spaces, microbiology, medicine.

Резюме. В данной работе проведена оценка эффективности различных типов ультрафиолетовых ламп в общественных местах. Для оценки в классах кафедры микробиологии, вирусологии и иммунологии Белорусского государственного медицинского университета были размещены чашки Петри с общим агаром на 20 минут и инкубированы. После инкубации колонии были проанализированы на основе их культурных характеристик и подсчитаны.

Ключевые слова: бактерицидные лампы, оценка эффективности, помещения общего пользования, микробиология, медицина.

Relevance. The microbiological status of air in common areas is an important factor in controlling infectious diseases and a concern for public health [1,2]. The significance of microbiological air contamination in places with prolonged human presence plays an even more critical role [4]. To control the degree of contamination, different methods are used, one of which is the use of germicidal lamps of open and closed (recirculator) type. Recirculators have a significant advantage of being usable in the presence of people [3,5].

Objective: to assess the effectiveness of germicidal lamps of open and closed (recirculator) types using microbiological, cultural and statistical methods.

Materials and methods. To evaluate the effectiveness of germicidal lamps, we used two classrooms with similar volumes and frequencies of classes of the Microbiology, Virology and Immunology Department of Belarussian State Medical University. In one classroom, a recirculator operated for 15 minutes every hour from 8 AM till 7 PM. In the second classroom a wall-mounted UV lamp functioned for one hour between 6 PM and 7 PM. For assessing microbiological activity, we placed five Petri dishes with a diameter of 10 cm filled with general purpose solid nutrient media. One petri dish was placed in the middle of the room, and one in each corner.

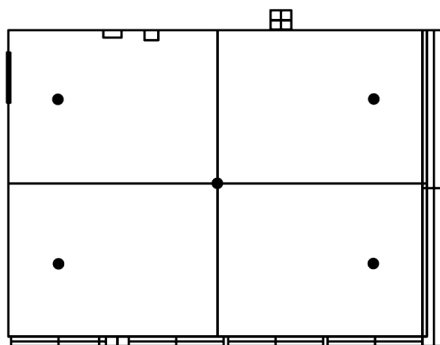


Fig. 1 – Placement of Petri dishes in practicum 2

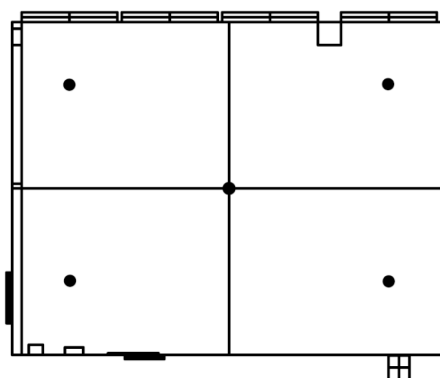


Fig. 2 – Placement of Petri dishes in practicum 4

The lids of all the Petri dishes were opened for 20 minutes to allow microorganisms to settle onto the nutrient media. After this time, all dishes were collected and placed in a thermostat for 24 hours at 38 °C. After the incubation period, the Petri dishes were examined under a microscope, tallying the colonies and description of their colonial characteristics. From culturally different colonies, some material was taken for differential staining using the Gram method, and these were also studied under a microscope, describing their bacterial characteristics.

Results and their discussion. In the air, we identified Gram-positive and Gram-negative bacilli, as well as *Staphylococcus aureus* and some unidentified fungi. Based on observations conducted at different times of the day, we can conclude that the germicidal lamp effectively decreases the level of microbial contamination or maintains it at a relatively constant level compared to conditions without disinfection measures until late in the day. Thus, the main advantage of using recirculators, compared to simple UV lamps, is their ability to be used in the presence of people, allowing for air disinfection during class time. However, it should be noted that using recirculators for 15 minutes every hour may not be sufficient, considering the size of the room and the number of people present. Therefore, we are in the process of testing longer durations to find the optimal time while considering noise levels during class.

Conclusion. According to preliminary results, we conclude that the use of closed-type UV lamps (recirculators) has a positive effect on the level of microbiological contamination in classroom air. Further research is needed to determine the minimal effective working intervals to achieve the highest efficiency while minimizing noise pollution. Additionally, we recommend integrating the use of open-type UV lamps before

and after class hours into the air disinfection procedures, alongside the use of recirculators.

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