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TABLE OF CONTENTS

AGRICULTURAL SCIENCES

- 1 Bidolakh D. I., Kuzjovych V. S., Pidkhovna S. M. Tree and shrub inventory with using of modern technologies 12
- 2 Ivanyv M. O., Mychalenko I. V., Lavrynenko I. O. Productivity and adaptive abilities of corn hybrids under different irrigation modes and moisture supply in the Arid Steppe of Ukraine 16
- 3 Вдовиченко В. М. Аналіз пірогенних процесів в лісах Дніпропетровського обласного управління лісового та мисливського господарства 19
- 4 Любич В. В., Железна В. В., Стратуца Я. С. Урожайність та якість зерна тритикале і пшениці залежно від сорту 23
- 5 Мамрузиев А. А., Ахмеджанов А. Н., Каримов Э. Ё. Внедрение перспективного сорта хлопчатника Зафар в систему хлопково - текстильного кластера 28
- 6 Сидякіна О. В., Іванів М. О. Формування врожайності та якості зерна кукурудзи за дії мінеральних добрив та регулятора росту зеастимулін 31
- 7 Ткач О. В. Біологічні процеси на безвисадкових посівах цикорію коренеплідного 36

BIOLOGICAL SCIENCES

- 8 Балабак А. В., Шевченко Н. А. Эколого-биологические особенности размножения и выращивания чайно-гибридных роз 41
- 9 Решетник К. С., Левицька Д. Р., Юськов Д. С., Сенік Н. Ф., Мельник О. М. Деякі ксилотрофні гриби Староміського лісу м. Вінниця 45
- 10 Троїцька О. О., Беренда Н. В., Ткаліч І. О., Мілько Д. О. Екологічна оцінка якості поверхневих вод р. Дніпро в районі скиду стічних вод з центральної очисної станції – 1 (м. Запоріжжя) за окремими показниками блоку специфічних речовин токсичної дії 49

MEDICAL SCIENCES

- 11 Chovpan G., Pikalov D. The role of X-ray computed tomography in cancer diagnosis 54
- 12 Chovpan G., Smolin I. Diagnosis of cardiovascular diseases by functional computer monitor 56
- 13 Davydenko V. B., Mishyna M. M., Roy N. V., Romanova N. V. Daily biorhythms of biofilm formation by pathogens of inflammatory diseases in children and influence on them by ultrasonic and ozone 58
- 14 Hayevska M. Y., Boyko V. V., Smialko O. V., Foloshnia T. P. Syphilis infection in Chernivtsi region 60
- 15 Kovalenko V., Kovalenko E. Y. Some aspects of the formation of rehabilitology as a system in the modern conditions of reforming a medical service in Ukraine 63

DAILY BIORHYTHMS OF BIOFILM FORMATION BY PATHOGENS OF INFLAMMATORY DISEASES IN CHILDREN AND INFLUENCE ON THEM BY ULTRASONIC AND OZONE

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Introductions. Treatment of severe purulent diseases in children is associated with high resistance of microbes.

One of the most significant antibiotic resistance factors is the ability of pathogenic microbes to form biofilms. In a state of biofilm, microbes increase their resistance by 500 to 10,000 times. During this period, they are practically not affected by antimicrobial agents. In this regard, methods for the destructive effect on biofilms are important for successful treatment.

Aim: the development of effective methods of treatment of purulent-inflammatory diseases in children.

Materials and methods. In in vitro experiments, daily biofilm formation biorhythms were studied using *St. aureus* and *E. coli*. The optical density of the biofilms was measured using a "Multiskan EX" microplate reader. Evaluation of the results was carried out using the "VAST-program". The effect of low-intensity ultrasonic radiation with intensity parameters from 2 to 3 W/cm², an operating frequency of 26.5 kHz and an oscillation amplitude of 50 – 80 μm on the formed biofilms was studied in an in vitro experiment.

The study of the combined effects of ultrasound and an ozonated NaCl solution was carried out in vitro on *St. cultures. aureus* and *E. coli*.

Information on the destruction of biofilms was obtained by comparing the optical density of biofilms.

Results and discussion. In the experiment, we found different biofilm thickness throughout the day. There are periods of increased and decreased film formation. We took this feature into account when assigning the time of exposure to low-intensity ultrasound on biofilms, with the help of which the destruction of biofilms was carried out, and antimicrobial agents (ozonized solutions) opened up to the plankton fraction of microbes. It was found that, in addition to destruction, ultrasound prevents the formation of secondary biofilms, which positively affects the results of treatment.

The treatment of foci of inflammation with ultrasound and ozone were performed to treat patients with pleural empyema and lung abscesses in children.

Conclusions. The introduction of ultrasound exposure and ozonation of foci of inflammation in the complex treatment of children with severe purulent-inflammatory diseases contributed to a more rapid subsidence of inflammatory manifestations, reduced intoxication, and a speedy recovery.