



International Science Group

JSG-KONF.COM

|

# INTERNATIONAL SCIENCE CONFERENCE ON MULTIDISCIPLINARY RESEARCH

Berlin, Germany  
January 19 – 21

ISBN 978-1-63684-352-0

DOI 10.46299/ISG.2021.I.I

# **I INTERNATIONAL SCIENCE CONFERENCE ON MULTIDISCIPLINARY RESEARCH**

Abstracts of I International Scientific and Practical Conference

Berlin, Germany  
January 19 – 21, 2021

## Library of Congress Cataloging-in-Publication Data

UDC 01.1

The I International Science Conference on Multidisciplinary Research, January 19 – 21, 2021, Berlin, Germany. 1102 p.

ISBN - 978-1-63684-352-0

DOI - 10.46299/ISG.2021.I.I

### EDITORIAL BOARD

Pluzhnik Elena	Professor of the Department of Criminal Law and Criminology Odessa State University of Internal Affairs Candidate of Law, Associate Professor
Liubchych Anna	Scientific and Research Institute of Providing Legal Framework for the Innovative Development National Academy of Law Sciences of Ukraine, Kharkiv, Ukraine, Scientific secretary of Institute
Liudmyla Polyvana	Department of Accounting and Auditing Kharkiv National Technical University of Agriculture named after Petr Vasilenko, Ukraine
Mushenyk Iryna	Candidate of Economic Sciences, Associate Professor of Mathematical Disciplines , Informatics and Modeling. Podolsk State Agrarian Technical University
Oleksandra Kovalevska	Dnipropetrovsk State University of Internal Affairs Dnipro, Ukraine
Prudka Liudmyla	Odessa State University of Internal Affairs, Associate Professor of Criminology and Psychology Department
Slabkyi Hennadii	Doctor of Medical Sciences, Head of the Department of Health Sciences, Uzhhorod National University.
Marchenko Dmytro	Ph.D. in Machine Friction and Wear (Tribology), Associate Professor of Department of Tractors and Agricultural Machines, Maintenance and Servicing, Lecturer, Deputy dean on academic affairs of Engineering and Energy Faculty of Mykolayiv National Agrarian University (MNAU), Mykolayiv, Ukraine
Harchenko Roman	Candidate of Technical Sciences, specialty 05.22.20 - operation and repair of vehicles.

## **DEVELOPMENT AND VALIDATION OF UV SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF AZLOCILLIN IN PHARMACEUTICAL FLUID**

**Karpova Svitlana**

Candidate of pharmaceutical sciences,  
Associate professor of inorganic and physical chemistry department  
Kharkiv National University of Pharmacy

**Ivashura Marina**

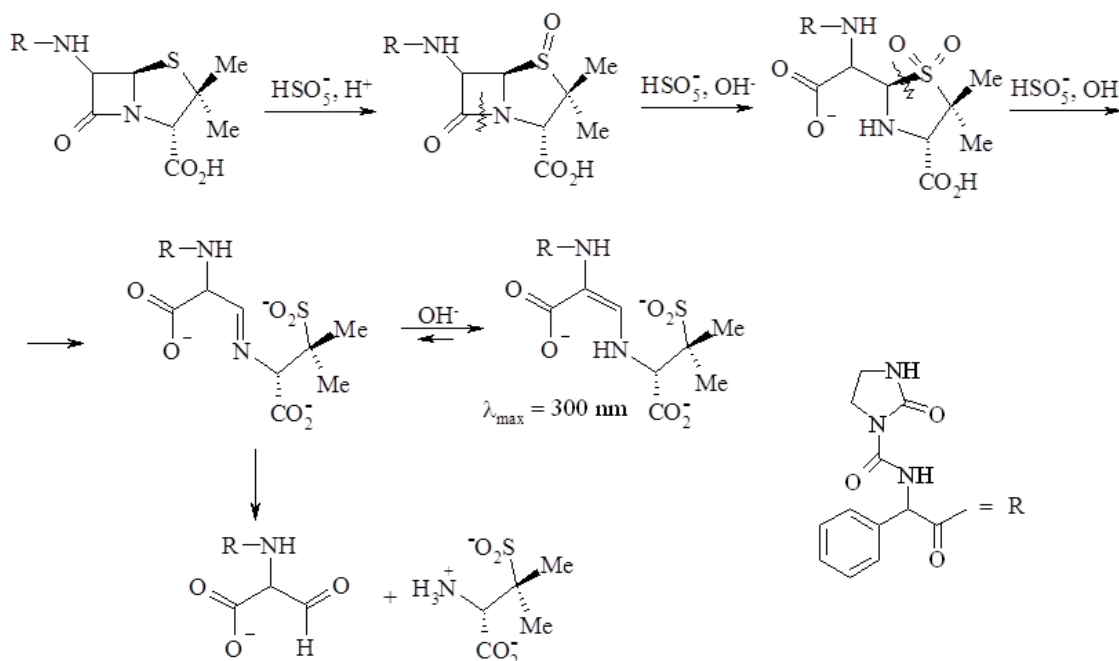
Candidate of agricultural sciences,  
Associate professor of inorganic and physical chemistry department  
Kharkiv National University of Pharmacy

**Mozgova Olena**

Candidate of pharmaceutical sciences,  
Associate professor of inorganic and physical chemistry department  
Kharkiv National University of Pharmacy

Lyme disease is one of most common vector-borne diseases, reporting more than 300,000 cases annually in the United States. Treating Lyme disease during its initial stages with traditional tetracycline antibiotics is effective. However, 10–20% of patients treated with antibiotic therapy still shows prolonged symptoms of fatigue, musculoskeletal pain, and perceived cognitive impairment. When these symptoms persists for more than 6 months to years after completing conventional antibiotics treatment are called post-treatment Lyme disease syndrome (PTLDS). Though the exact reason for the prolongation of post treatment symptoms are not known, the growing evidence from recent studies suggests it might be due to the existence of drug-tolerant persisters. In order to identify effective drug molecules that kill drug-tolerant borrelia we have tested two antibiotics, azlocillin (Azl) and cefotaxime that were identified by us earlier. The in vitro efficacy studies of Azl and cefotaxime on drug-tolerant persisters were done by semisolid plating method. The results obtained were compared with one of the currently prescribed antibiotic doxycycline. We found that Azl completely kills late log phase and 7–10 days old stationary phase *B. burgdorferi*. Our results also demonstrate that azlocillin and cefotaxime can effectively kill in vitro doxycycline-tolerant *B. burgdorferi*. Moreover, the combination drug treatment of Azl and cefotaxime effectively killed doxycycline-tolerant *B. burgdorferi*. Furthermore, when tested in vivo, Azl has shown good efficacy against *B. burgdorferi* in mice model. These seminal findings strongly suggests that Azl can be effective in treating *B. burgdorferi* sensu stricto JLB31 infection and furthermore in depth research is necessary to evaluate its potential use for Lyme disease therapy [1].

(2S,5R,6R)-3,3-dimethyl-7-oxo-6-[[[(2R)-2-[[[(2-oxoimidazolidin-1-yl)carbonyl]amino]-2-phenylacetyl]amino]-4-thia-1-azabicyclo[3.2.0]heptane-2-carboxylic acid (Azl) belongs to the ureidopenicillin class and it is used for the treatment of serious infections caused by susceptible strains of microorganisms [2]. Literature review revealed enormous analytical methods were reported for the estimation of azlocillin individually or in combination with other drugs [3]. International Pharmacopoeia recommends to determine penicillin summary in semisynthetic penicillin by neutralization method after preparation hydrolysis by excess of sodium hydroxide titrated solution at heating [4].



The scheme of peroxo acid oxidation and perhydrolysis conjugated reactions of AzI on the time are shown on Fig.

The following quantitative procedures of penicillin determination are described: using potentiometry titration and ionometry, spectrophotometry, extraction photometry, voltammetry and polarography, micelle electrokinetic capillary and paper chromatography, chemiluminescence and kinetic analysis methods [5-8].

A new procedure for the quantitative determination of *Azl* sodium in the Azlocillinum<sup>®</sup> preparation by the method of back spectrophotometric method using potassium peroxomonosulfate (KHSO<sub>5</sub>) as an analytical reagent was developed [9].

Thus, the improvement of the known and development of new methods of quantitative determination of penicillin is rather important. The existing pharmacopoeial methods of penicillin preparations determination are quite complex, long-lasting and require the application complex and expensive devices. The disadvantage of the known simple enough in performance methods of

spectrophotometric determination of penicillin, which are based on the determination of the final products of their hydrolytic cleavage, is the requirement of prolonged heating.

The developed method of Azl kinetic determination has several advantages: makes it possible to identify the preparation in much smaller quantities than the pharmacopoeial iodometric method, it is applicable to the same range of concentrations, as in photometric determination of hydrolysis products, but it doesn't require prolonged heating of the reaction mixture, it is simpler and faster than the method of chromatographic analysis.

The reaction kinetics of the peroxyacidic oxidation and perhydrolysis of Azl with potassium caroate in the alkaline medium is studied. As an oxidizing agent, the potassium triple salt of peroxymonosulfuric acid,  $2\text{KHSO}_5 \cdot \text{KHSO}_4 \cdot \text{K}_2\text{SO}_4$ , syn. "Oxone", was applied. The procedure was developed and the possibility of the quantitative determination of Azl in the Azlocillinum<sup>®</sup> preparation based on the results of the kinetic-spectrophotometric method with potassium caroate as reagent was shown. RSD = 2.0 %,  $\delta = + 1.1$  %.

#### REFERENCES:

1. United States Pharmacopeial Convention 2015; 3795.
2. British Pharmacopeia: London: The Stationery Office, Vol. 1-6. 2014; 5860.
3. Wang P, Wang B and Cheng X: A Method for Determination of Penicillin G Residue in Waste Penicillin chrysogenum Using High Performance Liquid Chromatography, Applied Mechanics and Materials 2015; 768: 15-24.
4. Diaz-Bao M and Barreiro R: Method for Determining Penicillin Antibiotics in Infant Formulas Using Molecularly Imprinted Solid-Phase Extraction, Journal of Analytical Methods in Chemistry 2015; [10.1155/2015/959675](https://doi.org/10.1155/2015/959675).
5. Batrawi N, Wahdan S and Al-Rimawi F: A Validated Stability-Indicating HPLC Method for Simultaneous Determination of Amoxicillin and Enrofloxacin Combination in an Injectable Suspension, Scientia Pharmaceutica 2017; 85(6): 1-8.
6. Kipper K, Barker C and Standing J: Development of a novel multi-penicillin assay and assessment of the impact of analyte degradation: lessons for scavenged sampling in antimicrobial pharmacokinetic study design 2017; [10.1128/AAC01540-17](https://doi.org/10.1128/AAC01540-17).
7. Shapiro A: Investigation of  $\beta$ -lactam antibacterial drugs,  $\beta$ -lactamases, and penicillin-binding proteins with fluorescence polarization and anisotropy: a review, Methods and Applications in Fluorescence 2016; 4(2): 1-8.
8. Liu, Sun, Zhao: Assay detection for azlocillin sodium and sulbactam sodium for injection by HPLC. Chinese Journal of Pharmaceutical Analysis 2008; 28: 1568-1570.
9. Batrawi N, Wahdan S, Al-Rimawi F: A Validated Stability-Indicating HPLC Method for Simultaneous Determination of Amoxicillin and Enrofloxacin Combination in an Injectable Suspension. Scientia Pharmaceutica 2017; 85(6): 1-8.