



### **Fund “Nauka” Project № 11005 Resume – Competition-Based Session 2011:**

**“Determination of in vitro susceptibility of hospital *Stenotrophomonas maltophilia* isolates to antibacterial agents by disc diffusion method and E-test comparative study”**

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In the last two decades there has been a steady upward trend in the incidence of infections caused by *Stenotrophomonas maltophilia*. A number of studies have proven the role of this bacterial species as an opportunistic pathogen in human pathology. In most cases, these are severe infections in hospitalized patients. *S. maltophilia* causes infections with various localizations – bacteremia, uro- and lung infections, hepatobiliary tract, skin and soft tissues, endocarditis, meningitis and eye infections of varying severity. Of particular interest are chronic lung infections in patients with cystic fibrosis, which are an independent risk factor for death in them.

Despite the many scientific reports in Europe and Asia of an increase in the incidence of *S. maltophilia* infections and an increase in the relative proportion of multidrug-resistant isolates, we still lack systematic studies on its epidemiology and local levels of resistance to antibacterial drugs.

In all cases, treatment should be based primarily on the results of the antimicrobial susceptibility test. The disk diffusion method is most often used in practice. The results obtained have only a qualitative expression: sensitive (S), intermediate (I) or resistant (R). In critically ill patients, the results presented in this way can be very misleading. In these cases, a more accurate determination of sensitivity is required by the reference method for determining the minimum inhibitory concentration (MIC) of antimicrobial agents accepted as the gold standard. The advantage of determining the MIC is that it is possible to apply the pharmacological (PK-PD) approach when conducting antibiotic therapy. Thus, on this basis, the therapeutic choice, dosage regimen and duration of treatment can be optimized. A disadvantage of this method is that it is time consuming, which is extremely important in cases of life-threatening infections.

An innovative method combining the advantages of the mentioned two standard methods (simplicity of technical implementation, maximum speed and accuracy) is the so-called E-test (epsilometer). There is no accumulated practical experience with the use of the E-test in Bulgaria, which in our opinion determines the relevance of the proposed project.

### **Objectives of the study:**

1. To study the resistance of 90 hospital strains of *S. maltophilia* via E-test, isolated during the period 2007-2011, to antibacterial agents recommended for the treatment of infections caused by this microorganism: trimethoprim/sulfamethoxazole, ciprofloxacin, levofloxacin, doxycycline, ceftazidime, ticarcillin/ clavulanic acid, polymyxin B, polymyxin E, doxycycline, chloramphenicol.
2. To evaluate the activity of the recently introduced in our country antimicrobial drugs tigecycline and polymyxin E, for which in Bulgaria there is still insufficient microbiological and clinical experience in its use for the treatment of severe nosocomial infections caused by multidrug-resistant Gram-negative bacteria.
3. To evaluate the activity of chloramphenicol, which has recently been withdrawn from clinical use for systemic use, and to obtain up-to-date data on its efficacy in the treatment of severe systemic infections caused by multidrug-resistant isolates *S. maltophilia*.
4. To obtain comparative data on the susceptibility to the studied antimicrobial agents by E-test and the Bauer-Kirby disk-diffusion method and to evaluate the reliability of the E-test as an alternative to the standard methods used in laboratory practice.

### **Research methods used:**

Reference methods for testing the susceptibility of *S. maltophilia* to antimicrobials:

1. Disc-diffusion method of Bauer - Kirby.
2. E-test to determine the minimum inhibitory concentration (MIC) of antimicrobial agents.

### **Characteristics of the contributions:**

1. For the first time in Bulgaria through E-test summarized data on the antimicrobial drug sensitivity of problematic nosocomial strains of *S. maltophilia* are provided and the data obtained by the two tested methods – DDM and E-test are compared.
2. Data on susceptibility to tigecycline and colistin, recently introduced for clinical use in Bulgaria, recommended for the treatment of infections caused by *S. maltophilia*, shall be provided.
3. Data on the susceptibility of *S. maltophilia* isolates to ticarcycline/ clavulanic acid and ceftazidime, the only beta-lactam antibiotics with good activity against this bacterial species, are provided.
4. Based on current literature data and in accordance with the obtained results, recommendations are made for rational antimicrobial chemotherapy of nosocomial infections caused by multidrug-resistant *S. maltophilia*. This creates preconditions for refining the existing and introduction of new therapeutic schemes.