

Laser Interferometric Method in the Measurement of Lipopolysaccharides Interactions with Antibacterial Compounds

Michał Arabski*

Department of Microbiology, Jan Kochanowski University, Poland

The aim of my investigations is novel applications of modified laser interferometry method in microbiological, biophysical and biochemical analysis. The measurement system consists of Mach-Zehnder interferometer with a He-Ne laser, a TV-CCD camera and a computer with a system for the acquisition and processing of interference images. The method is based on the phenomenon of diffusion process and linear dependence of the refractive index of the solution concentration. The interference images depend on the refraction coefficient of the solute, which in turn depends on the substance concentration. Laser interferometry might be useful technique in quantitative analysis of antibiotics diffusion (in real time), like ampicillin, ciprofloxacin, streptomycin or colistin, through cellulose and nucleopore membranes (using in clinical practice) as well as in determination of drugs releasing from polymers using as drugs carriers [1]. This method was used in the investigation, important from clinical point of view, like the measurement of liposomes diffusion through artificial skin material and cellulose-based wound dressing to optimization of therapy using liposome encapsulated drugs [2]. Laser interferometry system might be used in analysis of biologically active heteropolymers interactions with biomolecules, like lipopolysaccharides (endotoxin, LPS) with colistin, chitosans or saponins [3-5]. Moreover, I used this technique in verification of ELISA test for the determination of anti-LPS *P. mirabilis* antibody levels in human sera [6]. The results of investigations obtained by the laser interferometry were verified by cultivation methods using in microbiology, immunoserological assays (dot blot techniques, LAL assay, ELISA), bioinformatics tools, electron microscopy, sucrose

gradient centrifugation or *in vivo* toxicity tests. I concluded that interdisciplinary investigations based on stand art techniques using in microbiology or biochemistry as well as laser interferometry method might give a broad insight to clinical applications of tested drugs.

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*Corresponding author: Michał Arabski, Department of Microbiology, Jan Kochanowski University, Świętokrzyska, Poland, E-mail: arabski@ujk.edu.pl

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