

Title: STUDY OF THE INTERACTION BETWEEN ANTIBACTERIALS DRUGS IN DIFFERENT STRAINS OF UROPATHOGENIC *Escherichia coli*

Authors Froes, Y.N. ¹, Santos, A.R.C ², Tavares, P.B. ², Ferreira, G.F. ³, Monteiro, A.S. ¹

Institutions ¹CEUMA – Universidade CEUMA (Rua Josué Montello, 1 - Renascença II, São Luís - MA, 65075-110), ²UNIVALE – Universidade Vale do Rio Doce (Rua Moreira Sales 850, Campus Armando Vieira, Governador Valadares – MG, 35030-390), ³UFJF – Universidade Federal de Juiz de Fora (Rua José Lourenço Kelmer, S/n - Martelos, Juiz de Fora - MG, 36036-330)

Abstract:

The uropathogenic *E. coli* (UPECs) causes urinary tract infection (UTI) and possess several virulence factors such as hemolysin and fimbriae, there is a widespread use of antibiotics that can lead to a process of bacterial resistance. UPECs form colonies that adhere to a surface in an irreversible way, making conventional antimicrobials ineffective towards them. One way to increase the effectiveness of treatments is the investigation on combining antimicrobial agents suitable to treating infections. To assess this process the checkerboard method and the Time-Kill Curves tests have been widely used. This study evaluates 39 UPECs strains for susceptibility to different antimicrobials by use of the disc diffusion method, in order to determine sensitivity and resistance of isolates. Two ways of determining the minimum inhibitory concentration of antibiotics are in place: VITEK system and micro dilution tests. The study evaluates the combination of antimicrobials, ofloxacin, gentamicin, sulfisoxazole, norfloxacin, ampicillin and cephalothin, by means of the checkerboard method. Trials of Time-Kill curves also take place to evaluate the bactericidal effect of antibiotics, ofloxacin and gentamicin with cephalothin with norfloxacin and the susceptibility of the strains in presence of drug combinations. An evaluation of studies of cell viability in biofilms to antimicrobial fronts, to determine the bactericidal effect of higher concentrations than the MIC for planktonic cells also plays a crucial part in this work. With the disk diffusion method and VITEK system, strains show higher strength to the following antimicrobials: nalidixic acid; tetracycline; cephalixin; cephalothin; ampicillin, and sulfamethoxazole/trimethoprim. The checkerboard method evaluates interactions among antimicrobials and shows association between cephalothin/gentamicin and norfloxacin/ofloxacin. UPEC strains denote synergism in all isolates under test. With Time-Kill Curve one observes synergistic interaction between gentamicin and ofloxacin for 7 strains. Cell viability tests for biofilm-producing strains ampicillin is the least effective antimicrobial agent in reducing cell viability by 59%, whereas gentamicin is the most effective after 24 h of incubation, in reducing cell viability by 77.51%. Therefore, the combination of antimicrobial agents may be an alternative for the treatment of UTIs, as well as other current infections, reducing the probability of treatment failure.

Keywords: *E.coli*, biofilm, checkerboard, Time-Kill Curve