

TITLE: BIOFILM FORMATION OF CLINICAL, ENVIRONMENT AND HAND'S *Klebsiella pneumoniae* STRAINS

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ABSTRACT:

Klebsiella pneumoniae is an opportunistic pathogen able to produce biofilms on biotic and abiotic surfaces, which is directly associated to hospital-acquired infections. The aim of this study was to investigate biofilm formation of clinical, environment and hand's *Klebsiella pneumoniae* strains using three colorimetric detection methods. The study was conducted at Neonatal Intensive Care Unit, in Hospital of the Federal University of Uberlândia. The evaluate of biofilm formation was performed by three methods: Crystal Violet to evaluate biomass, Safranin to evaluate extracellular matrix and 2,3 bis (2-methoxy-4-nitro-5-sulfophenyl)-5-(phenylamino) carbonyl]-2H-tetrazolium hydroxide (XTT) to metabolic activity. Additionally, the Colony Forming Units (C.F.U) test was performed to evaluate the number of cell viability in biofilm. All twenty-eight *Klebsiella pneumoniae* strains tested were able to adhere to polystyrene surface, although 15 strains adhered to a lesser degree than the control, at least one method used in the study. The number of adhered cells to the polystyrene surface varied according to the strain, ranging from 1.0×10^8 to 8.1×10^8 . Quantitative evaluation revealed that in all *Klebsiella pneumoniae* isolates the biomass, extracellular matrix and activity metabolic production could be characterized as strong. None of the isolates was weak biofilm producers. This study demonstrated that *Klebsiella pneumoniae* strains are able to form biofilm on the polystyrene plate. These data are alarming, because *Klebsiella pneumoniae* biofilm formation *in vivo* results in chronic and intractable infections. This ability represents an advantage and ideal niche for its extended prevalence in hospital settings and in various hostile environments, which constitutes a reservoir of pathogens. Additionally, this study demonstrated the use of Crystal-violet, Safranin, XTT and CFU as an inexpensive and highly reproducible tool to study *Klebsiella pneumoniae* bacterial biofilm.

Keywords: biofilms, environment and public health, hands, infant, newborn, *Klebsiella pneumoniae*

Development Agency: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).