

**TITLE:** EVALUATION OF ANTIMICROBIAL ACTIVITY OF ACETYLCYSTEINE AND ACETYLCYSTEINE ASSOCIATED WITH BROMELAIN ON A NOSOCOMIAL *KLEBSIELLA PNEUMONIAE* (ESBL POSITIVE) ISOLATE

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**ABSTRACT:**

Bacteria of the species *Klebsiella pneumoniae* are responsible for a series of infections in debilitated and immunocompromised patients, especially those with long periods of hospital stay, such as patients with COVID-19 and those using invasive devices. Due to the emergence of multi-drug resistant *Klebsiella pneumoniae*, this study aims to search for new therapeutic agents with antimicrobial activity facing the nosocomial *Klebsiella pneumoniae* (ESBL positive) previously isolated by the research group. *Klebsiella pneumoniae* ATCC™ BAA-2814 was activated according to the manufacturer's standard protocol and used as a control in the experiments because it has an extended spectrum of beta-lactamase (ESBL) and Carbapenems (KPC). Nosocomial *Klebsiella pneumoniae* (ESBL positive), previously determined by the automated Vitek 2 system, was thawed and subsequently incubated in Mueller-Hinton (MH) broth for 24 h at 37°C, the turbidity of the culture was adjusted to 0.5 on the scale of MacFarland. From a previous AST test to determine the concentrations to be used, doses from 1.5625ug/ml to 200ug/ml were used for acetylcysteine and its association with bromelain. To determine the minimum inhibitory concentration (CIM), a 96-well plate was used, where 70ul of MH+20ul of drugs (gentamicin at 2ug/ml, acetylcysteine, acetylcysteine associated with bromelain) were placed in separate wells for each drug and 10uL of the bacterial suspension. After 24h of incubation at 37°C, 20uL of resazurin 0.01% was added and after two hours a visual reading was performed and then the plate was read in a spectrophotometer at 620nm. To determine the minimum bactericidal concentration, 10uL of each well was placed in plates containing Mueller-Hinton agar and incubated at 37°C for 24h, later the plates were analyzed. The tests were performed in quadruplicate in two independent experiments. The minimum inhibitory concentration for acetylcysteine was 1.56 ug/ml and the concentration of 200ug/ml had microbicidal action for nosocomial *K. pneumoniae* (ESBL positive). The CIM for bromelain solution associated with acetylcysteine was 12.5 ug/ml and the concentration of 100ug/ml demonstrated microbicidal activity against nosocomial *K. pneumoniae*. Acetylcysteine and its association with bromelain have antimicrobial activity and the ability to inhibit the growth of nosocomial *Klebsiella pneumoniae* (ESBL positive).

**Keywords:** Nosocomial *Klebsiella pneumoniae*, bromelain and acetylcysteine, antimicrobial activity.

**Development agency:** Coordenação de Aperfeiçoamento de Pessoal de Nível Superior- CAPES.