

**TITLE:** EVALUATION OF ANTIMICROBIAL ACTIVITY OF CINNAMALDEHYDE AGAINST *ACINETOBACTER BAUMANNII* RESISTANT TO CARBAPENEMS

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**ABSTRACT:**

*Acinetobacter* spp. display mechanisms of resistance to all existing antibiotic classes as well as a prodigious capacity to acquire new determinants of resistance. The increasing recovery in the clinic of multidrug-resistant (MDR) *Acinetobacter baumannii* is a frightening reality. The search for new active substances isolated from plants, which can be obtained more easily and perhaps at lower cost has motivated many pharmaceutical companies to invest in studies with natural products. The antimicrobial properties of plant-derived products have been tested against several pathogens. Cinnamaldehyde is the predominant active compound found in the cinnamon oil from the stem bark of *Cinnamomum cassia*, known for their antimicrobial activity. Thus, this study aimed to analyze the antimicrobial activity of cinnamaldehyde in nosocomial *A. baumannii* isolates resistant to carbapenems. The strains of *A. baumannii* resistant to carbapenems were isolated from patients with a diagnosis of nosocomial infection in different teaching hospitals in Ceará, Northeast of Brazil. Briefly, each strain was grown on brain heart infusion (BHI) tube at 37°C for 24 h, the adjustment the inoculum was prepared to contain  $\sim 10^8$  CFU/mL and growth of the pathogens was monitored by taking absorbance readings (optical density [OD] 620 nm). The minimum inhibitory concentration (MIC) was determined in triplicate for nosocomial *A. baumannii* isolates. For determining the minimum bactericidal concentration (MBC), just after the MIC experiments, the cultures were seeded on Mueller Hinton Agar and incubated aerobically for 24 h at 37°C. The MBC corresponded to the lowest concentration of the compound to which no viable bacteria was observed. The cinnamaldehyde was diluted in BHI added of dimethyl sulfoxide (5%) (DMSO; that enhances compound solubility) in 96-wells plates resulting in concentrations from 500 to 0.97  $\mu\text{g/mL}$ . The results demonstrated that cinnamaldehyde was active against all strains with a multidrug resistance phenotype of *A.baumannii* tested and inhibited bacterial growth at 250 $\mu\text{g/mL}$ . The MBC values were also 250 $\mu\text{g/mL}$  indicating a bactericidal action for cinnamaldehyde in this concentration. It is important to highlight that at the used concentration, the vehicle (DMSO) did not affect bacterial growth. The results confirmed the antimicrobial properties of cinnamaldehyde, indicating that this compound could be used as an alternative to the control of *A. baumannii* MDR in hospital environment.

**Keywords:** *A. baumannii*; Cinnamaldehyde; Multidrug-resistant bacteria.

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