

**Title: Antimicrobial activity of *Origanum vulgare* essential oil against carbapenemase-producing *Klebsiella pneumoniae***

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**Abstract:** Carbapenem-resistant *Klebsiella pneumoniae* strains are emerging worldwide causing different nosocomial infections and contributes to treatment failure. The control of multi-drug resistant microorganisms such as *Klebsiella* sp., depends on the development of new drugs that should restrict bacterial dissemination, to reduce the morbidity and mortality rates associated with various infectious diseases. The antibacterial activity of essential oils and their derivatives has been recognized, however, to our knowledge, this was not tested against resistant microorganism, as *Klebsiella pneumoniae* carbapenemase (KPC). In this study, the *Origanum vulgare* (oregano) oil, commercially acquired, was initially tested using the disk diffusion method on Müller-Hinton agar inoculated with a *Klebsiella pneumoniae* carbapenemase (KPC) isolated from public hospital located in the city of Dourados in Mato Grosso do Sul, and incubated for 24 hours at 37°C. The presence of *bla*<sub>KPC-2</sub> gene in this strain was evaluated by PCR and DNA sequencing. The bacterial susceptibility was carried out through disk diffusion (zone diameter of 21 mm) and determination of Minimum Inhibitory Concentration (MIC) was performed using resazurin for the measurement of viable cells. Both techniques were performed according to Clinical and Laboratory Standard Institute (CLSI) and tigecycline used as a positive control. At disk diffusion method, susceptibility was considered when zone diameter was equal or greater than 8 mm. After incubation for 24 hours at 37°C of the KPC strains with oregano essential oil, was observed a MIC of 562.5 µg/mL. This result is promising for multidrug-resistant bacteria, as the one tested. However, further studies to characterize the activity of oregano majoritarian compounds are important in order to improve MIC values as well to assess the reduction of disease development *in vivo*. Currently there are a few therapeutic options for treating patients with infections by carbapenemase-producing bacteria, so it is important the search for new pharmacological alternatives.

**Key-words:** oregano, *Klebsiella* spp., KPC

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