Introduction/Objective: The unrestricted use of antimicrobials in terminal diseases may bring deleterious effects to patients, such as questionable and poorly generalizable benefits in terms of symptom control and survival gain, in addition to increased hospital costs and antimicrobial resistance. The present study aims to describe the collaboration of the palliative care team in antimicrobial stewardship in a philanthropic hospital.

Methods: Patients in terminal care who are using antimicrobials are evaluated regarding survival estimates and whether the antimicrobial in use aims at cure, infection control, or symptom control. Daily, the pharmacist of the stewardship team receives the list of patients followed by the palliative care team and verifies them regarding antimicrobial use. Interventions related to the appropriateness of the prescription or escalation are compiled to generate pharmacoeconomic indicators.

Results: Results obtained in the first semester of 2025 after the interventions of the palliative care team in stewardship demonstrated that there was a reduction in carbapenem prescriptions (3.45%), which contributes to the reduction of antimicrobial resistance in this hospital unit, in addition to an increment of R$116,608.85 since there was also a reduction in the use of high-cost antimicrobials and an increase in bed turnover, due to the discharge of patients who had been hospitalized only for the demand of antimicrobial use.

Conclusion: With the emerging antimicrobial resistance, the role of professionals involved in stewardship becomes essential as a barrier against the inappropriate use of antimicrobials. The main challenges faced are related to the attending medical team, since it is essential to understand that antimicrobials are not risk-free treatments and, depending on the patient, they may add suffering without effectively changing the prognosis.

Keywords: Palliative care, Stewardship, Pharmacoeconomics.

https://doi.org/10.1016/j.bjid.2026.104636

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ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS

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Introduction/Objective: Microbial resistance has a major impact on infection control. In this context, the antimicrobial activity of essential oils has gained prominence in modern research, being fundamental to guide their use and to combat microbial resistance. Thus, this study aimed to determine the minimum inhibitory concentration (MIC) and minimum microbicidal concentration (MMC) of four essential oils – *Ocimum gratissimum* (clove basil), *Lantana trifolia* (capiçoba), *Schinus terebinthifolius* (Brazilian peppertree), and *Siparuna guianensis* (negramina) — against bacterial and fungal strains (*Staphylococcus aureus, Streptococcus sobrinus, Candida tropicalis, Cutibacterium acnes*).

Methodology: Antimicrobial activity was evaluated by the broth microdilution method in Mueller Hinton broth, according to the Clinical and Laboratory Standards Institute (CLSI, 2022) protocol. Tested concentrations ranged from 30 to 0.23 mg/mL. Dimethyl sulfoxide (DMSO) was used as a solvent control and azithromycin (40 μg/mL) as a positive control. Microbial inocula were prepared from the 0.5 McFarland scale and serial dilutions, resulting in concentrations of 0.5×10^5 CFU/mL (bacteria) and 0.5×10^3 CFU/mL (fungi). After incubation at 37°C for 24 h, the MIC was defined as the lowest concentration that visually inhibited growth. The MMC was determined by plating inhibited wells on BHI agar followed by re-incubation.

Results: The four essential oils tested showed variations in antimicrobial activity. Clove basil was the most effective, with MICs between 3.75 and 7.5 mg/mL for all microbial strains. Oils from Brazilian peppertree and negramina showed less expressive activity against this group of microorganisms, with MICs often above 30 mg/mL. Capiçoba oil had variable performance, with good responses against some strains. Overall, the comparison between MIC and MMC indicated a predominant microbicidal effect in the most active oils.

Conclusion: The essential oils tested demonstrated *in vitro* antimicrobial activity, with emphasis on *O. gratissimum*. Further studies, including *in vivo* models, are recommended to better evaluate the potential of these natural compounds.

Keywords: Essential oils, Antimicrobial activity, Microbial resistance.

https://doi.org/10.1016/j.bjid.2026.104637

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ACTIVITY OF NEW ANTIMICROBIALS AGAINST MULTIDRUG-RESISTANT CLINICAL ISOLATES OF *KLEBSIELLA PNEUMONIAE* AND *ACINETOBACTER BAUMANNII*

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Introduction/Objective: Given the scarcity, or even absence, of effective therapies for the treatment of infections caused by multidrug-resistant (MDR) *K. pneumoniae* and/or *A.*

baumannii in Brazil, combinations of β-lactams with next-generation β-lactamase inhibitors and tetracycline derivatives have emerged as promising antimicrobials.

Objective: To evaluate the *in vitro* activity of new antimicrobials against MDR isolates obtained from patients hospitalized in ICUs of six hospitals in the metropolitan region of São Paulo.

Methods: A total of 121 isolates of *K. pneumoniae* and 27 of *A. baumannii*, prospectively collected from patients hospitalized in six ICUs of the metropolitan region of São Paulo between 08/01/2023 and 10/31/2024, resistant to carbapenems, were analyzed. MICs for polymyxin B/E (POL), omadacycline (OMC), and eravacycline (ERV) were determined by broth microdilution (Sensititre, Thermo Fisher). For *K. pneumoniae*, 118 isolates without evidence of metallo-β-lactamase production were additionally tested for ceftazidime-avibactam (CZA), imipenem-relebactam (IMR), and meropenem-vaborbactam (MEV). Resistance genes of 55 *K. pneumoniae* and 21 *A. baumannii* were correlated with phenotypes.

Results: The susceptibility rates of *K. pneumoniae* to CZA, IMR, and MEV were 87.29%, 74.58%, and 82.20%, respectively. Among the 59 isolates resistant to amikacin (AMI) and POL, these rates were 96.91%, 75.86%, and 82.76%. Applying FDA breakpoints, 6 isolates (4.96%) were resistant to OMC (MIC > 8 mg/L) and 12 (9.92%) were intermediate (8 mg/L). Even among AMI/POL-resistant isolates, OMC susceptibility was 91.53%. For ERV, the MIC_{90} was 1 mg/L in the overall group and 2 mg/L among resistant isolates. Of the 55 genomes analyzed, 92.73% carried blaKPC-2, 3.64% blaNDM-1, and 1.82% both. Two isolates with blaNDM-1 showed favorable MICs for ERV (0.5 mg/L) and OMC (≤ 4 mg/L). In *A. baumannii*, MIC_{50}/MIC_{90} values were 2/8 mg/L for OMC and 0.5/2 mg/L for ERV. Among the 10 isolates resistant to POL, OMC showed an increased MIC_{90} to 8 mg/L, but ERV maintained a profile similar to the overall group.

Conclusion: *K. pneumoniae* strains showed excellent activity to CZA, IMR, and MEV. MDR *K. pneumoniae* and *A. baumannii* strains were also susceptible to OMC and ERV, including subgroups resistant to POL, reinforcing the potential of these drugs as therapeutic options in highly resistant settings such as Brazilian ICUs.

Keywords: Microbial resistance, *Acinetobacter baumannii*, *Klebsiella pneumoniae*, New antimicrobials, β-lactamase inhibitors.

https://doi.org/10.1016/j.bjid.2026.104638

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IN VITRO ACTIVITY OF AZTREONAM-AVIBACTAM AGAINST CLINICAL ISOLATES OF ENTEROBACTERALES COLLECTED IN BRAZIL FOR THE ATLAS SURVEILLANCE PROGRAM, 2018–2023

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Introduction: Aztreonam-avibactam (ATM-AVI) was developed for the treatment of infections caused by Enterobacterales, particularly carbapenem-resistant isolates that produce metallo-β-lactamases (MBLs). Aztreonam is stable to hydrolysis by MBLs, while avibactam inhibits class A and C β-lactamases, which may also be co-produced with MBLs that inactivate aztreonam. In this study, the *in vitro* activity of ATM-AVI was evaluated against clinical isolates of Enterobacterales, both MBL producers and non-producers, collected as part of the global ATLAS surveillance program.

Methods: A total of 3151 non-duplicate Enterobacterales isolates collected from different infection sites in Brazilian hospitals between 2018 and 2023 were evaluated. Susceptibility testing was performed using broth microdilution. Antimicrobial susceptibility profiles were interpreted according to BrCAST (2025) breakpoints, including the established breakpoint for ATM-AVI of > 4 mg/L. Carbapenemase-encoding genes were investigated by PCR followed by sequencing.

Results: The majority of Enterobacterales species evaluated were *Klebsiella pneumoniae* (36.0%; n = 1137), followed by *Escherichia coli* (31.6%; n = 998) and *Enterobacter* sp. (12.6%; n = 399). Overall, ATM-AVI inhibited 100% of isolates (MIC50/90, 0.06/0.25 mg/L), including those producing carbapenemases (588/960 isolates tested [61.2%]). Overall susceptibility to colistin (MIC50/90, 0.25/>8 mg/L), meropenem (MIC50/90, ≤ 0.06/> 16 mg/L), cefepime (MIC50/90, ≤ 0.125/> 32 mg/L), and aztreonam (MIC50/90, 0.25/> 64 mg/L) was 85.7%, 80.6%, 58.4%, and 56.9%, respectively. Among the 960 isolates tested for carbapenemases, 119 (12.4%) were positive for NDM-1 and 492 (51.2%) for KPC. Twenty-five isolates showed coproduction of two carbapenemases, 24 with KPC-2+NDM-1 and one with KPC-2+IMP-1. All 492 KPC-positive isolates were 100% and 94.72% susceptible to ATM-AVI and ceftazidime-avibactam, respectively.

Conclusion: ATM-AVI demonstrated excellent *in vitro* activity, inhibiting 100% of Enterobacterales isolates, both carbapenemase producers and non-producers, including MBLs. Antibiotics that retain activity against MBL-producing bacteria represent an urgent medical need, especially given the rising prevalence of severe infections caused by these difficult-to-treat microorganisms.

Keywords: Metallo-β-lactamases, Carbapenemases, Enterobacterales, *Klebsiella pneumoniae*, Bacterial resistance.

https://doi.org/10.1016/j.bjid.2026.104639

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MICROBIAL ACTIVITY OF POMEGRANATE LEAF EXTRACT AGAINST RESISTANT *STAPHYLOCOCCUS AUREUS*

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