IMIDAZOLIUM METHANESULFONATE SALTS OUTPERFORM CONVENTIONAL ANTIFUNGALS AGAINST CANDIDA SPP.: A PROMISSING STRATEGY FOR BIOMATERIAL-BASED INFECTION CONTROL IN CANCER

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INTRODUCTION: *Candida* spp. are major opportunistic pathogens responsible for mucosal and systemic infections, particularly in cancer patients, where immunosuppression and epithelial barrier disruption create a favorable environment for fungal colonization. In oncologic settings, the widespread use of invasive medical devices, such as catheters and stents, further increases the risk of *Candida*-associated infections due to the strong ability of these fungi to adhere to surfaces and form biofilms. Biofilm formation contributes to antifungal resistance and persistent infections, representing a major clinical challenge. Conventional antifungal therapies often show limited efficacy against biofilm-associated *Candida* and resistant non-*albicans* species. Therefore, there is growing interest in novel compounds and antifungal biomaterials capable of preventing microbial adhesion and colonization. In this context, imidazolium methanesulfonate salts have emerged as promising candidates due to their potent antifungal activity and applicability in advanced biomaterial-based strategies. **OBJECTIVE:** To evaluate the antifungal activity of imidazolium methanesulfonate salts against clinically relevant *Candida* species associated with oncologic settings. **METHODS:** Isolates of *Candida albicans* (CFP00107, CFP00283, CFP00292, CFP00895, ATCC 44858), *Candida glabrata* (ATCC 2001), *Candida tropicalis* (CFP00319, ATCC 13803), *Candida krusei* (ATCC 34135), and *Candida parapsilosis* (CFP00893) were investigated. Minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) assays were performed according to adapted CLSI guidelines. The compounds C_{16}MImMeS and C_{18}MImMeS were tested at concentrations ranging from 0.0019 to 1.0 µg/mL. Miconazole, ketoconazole, fluconazole, and amphotericin B were used as reference antifungal agents. Results were recorded after 24 and 48 h of incubation at 37 °C. **RESULTS:** C_{16}MImMeS exhibited MIC and MFC values ranging from 0.0125 to 0.0625 µg/mL against *Candia albicans*, 0.0125 µg/mL against *Candida glabrata*, 0.0625 to 0.250 µg/mL against *Candida tropicalis*, 0.25 µg/mL against *Candida krusei*, and 0.125 µg/mL against *Candida parapsilosis*. C_{18}MImMeS showed MIC and MFC values ranging from 0.0125 to 0.0156 µg/mL against *Candida albicans*, 0.0625 µg/mL against *Candida glabrata*, 0.0312 to 0.0625 µg/mL against *Candida tropicalis*, 0.0312 µg/mL against *Candida krusei*, and 0.312 µg/mL against *Candida parapsilosis*. In contrast, conventional antifungal drugs exhibited MIC and MFC values of 1.0–2.0 µg/mL. Overall, both imidazolium methanesulfonate salts demonstrated markedly superior antifungal potency across all tested species. **CONCLUSION:** Imidazolium methanesulfonate salts displayed potent broad-spectrum antifungal activity at concentrations substantially lower than those required for conventional antifungal agents. Their high efficacy against multiple *Candida* species, including resistant non-*albicans* pathogens, highlights their potential to

overcome current therapeutic limitations. These findings support their development as innovative candidates for next-generation antifungal strategies, particularly biomaterial coatings and device-related infection control in vulnerable cancer patients.

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