

Antimicrobial Functional Materials: Synthesis and Biological Evaluation of 1,2,4-Oxadiazole Salts

S. Amata,^a V. Talarico,^b C. Calà,^b G. Crisà,^a C. Rizzo,^a S. Buscemi,^a A. Palumbo Piccionello^a

^a STEBICEF Department, University of Palermo, Viale delle Scienze Bld.17, I-90128 Palermo (Italy)

^b Microbiology and Virology Unit, AOJ Policlinico "P. Giaccone", 90127 Palermo, (Italy)

sara.amata01@unipa.it

Antibacterial resistance is globally increasing, making common antibiotics and standard procedures ineffective thus representing a critical step for modern medicine.¹ This phenomenon is not limited to specific clinical settings, but is a systematic problem, with repercussions in surgery, oncology and installation of medical implants.² For this purpose, a series of novel 1,2,4-oxadiazole pyridinium salts with antibacterial properties have been synthesized, taking inspiration from a previously published work.³ 34 compounds have been tested in vitro against Gram-negative (*K.pneumoniae* and *E.coli*) and Gram-positive (*S.aureus*, *S.haemolitycus* and *E.faecium*) resistant strains with dilution and minimal inhibition concentration (MIC) methods. Compounds with electron donating group (-OCH₃) on the phenyl ring, compared with an electron withdrawing group (-NO₂ and -F), show better antibacterial activity. Five compounds with MIC values between 0.5 µg/mL and 4 µg/mL have been incorporated into PVC films and tested as gelators for glycerol-based gels. These systems were fully characterized and tested for antimicrobial activity through the disk diffusion test and release in aqueous solution. This study represents a starting point for the development of potential antibacterial materials for coating medical implants.

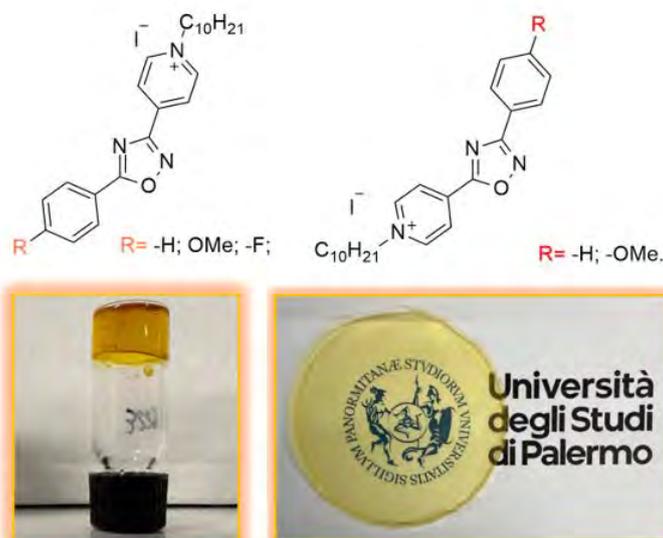


Figure 1: General structures of salts synthesized, example of derived glycerol-based gel (left) and PVC film (right).

References:

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