

Novel alkylimidazolium ionic liquids as an antibacterial alternative to pathogens of the skin and soft tissue infections

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Keeping in mind the concept of green chemistry, this research aims to synthesize and characterize new ionic liquids (ILs) derived from N-cinnamyl imidazole with different sizes of alkyl chains (1, 6, 8, and 10 carbon atoms), and evaluate their antibacterial activity against Skin and soft tissue infections (SSTIs) causative bacteria. The antibacterial screening was carried out by agar well diffusion and the Minimum Inhibitory Concentration (MIC) and Half Maximum Inhibitory Concentration (IC₅₀) of the different ILs were determined by microdilution in broth, also Molecular dynamics simulations were performed to study the interaction mechanism between ILs and membranes. The MIC value in Gram-positive bacteria showed that as the hydrocarbon chain increases, the MIC value decreases with a dose-dependent effect. Furthermore, Gram-negative bacteria showed high MIC values, which were also evidenced in the antibacterial screening. The molecular dynamics showed an incorporation of the ILs with the longer chain (10 C), corresponding to a passive diffusion towards the membrane surface, for its part, the ILs with the shorter chain due to its lack of hydrophobicity was not incorporated into the bilayer. Finally, the new ILs synthesized could be an alternative for the treatment of Gram-positive bacteria causative of SSTIs. © 2018 MDPI AG. All rights reserved.

Antibacterial

Ionic liquids

Skin

Soft tissue infections

antiinfective agent

imidazole derivative

ionic liquid

animal

chemistry

dose response

drug effect

Gram negative bacterium

Gram positive bacterium

green chemistry

human

microbial sensitivity test

molecular dynamics

soft tissue infection

staphylococcal skin infection

synthesis

Animals

Anti-Bacterial Agents

Dose-Response Relationship, Drug

Gram-Negative Bacteria

Gram-Positive Bacteria

Green Chemistry Technology

Humans

Imidazoles

Ionic Liquids

Microbial Sensitivity Tests

Molecular Dynamics Simulation

Soft Tissue Infections

Staphylococcal Skin Infections