

N-alkylimidazolium Salts Functionalized with p-Coumaric and Cinnamic Acid: A study of their antimicrobial and antibiofilm effects

Forero-Doria O.

Araya-Maturana R.

Barrientos-Retamal A.

Morales-Quintana L.

Guzmán L.

The bacterial resistance to antibiotics has compromised the therapies used for bacterial infections. Nowadays, many strategies are being carried out to address this problem. Among them, the use of natural compounds like cinnamic and p-coumaric acids stands out. Nevertheless, their utilization is limited because of their unfavorable physicochemical properties. Due to the lack of new therapeutic alternatives for bacterial infections, novel strategies have emerged, such as the use of ionic liquids; given that they can show a broad spectrum of antibacterial activity, this is why we herein report the antibacterial and antibiofilm activity of a series of N-alkylimidazolium salts functionalized with p-coumaric and cinnamic acids. The results from this study showed better antibacterial activity against Gram-positive bacteria, with a predominance of the salts derived from coumaric acid and a correlation with the chain length. Additionally, a lower efficacy was observed in the inhibition of biofilm formation, highlighting the antibiofilm activity against *Staphylococcus aureus*, which decreased the production of the biofilm by 52% over the control. In conclusion, we suggest that the salts derived from p-coumaric acid are good alternatives as antibacterial compounds. Meanwhile, the salt derived from cinnamic acid could be a good alternative as an antibiofilm compound. © 2019 by the authors.

Antibiofilm effects

Antimicrobial agents

Cinnamoylimidazole salts

Ionic liquids

antiinfective agent

cinnamic acid

cinnamic acid derivative

imidazole

imidazole derivative

ionic liquid

propionic acid derivative

trans-3-(4'-hydroxyphenyl)-2-propenoic acid

biofilm

chemistry

conformation

drug effect

microbial sensitivity test

molecular dynamics

structure activity relation

Anti-Infective Agents

Biofilms

Cinnamates

Imidazoles

Ionic Liquids

Microbial Sensitivity Tests

Molecular Conformation

Molecular Dynamics Simulation

Propionates

Structure-Activity Relationship