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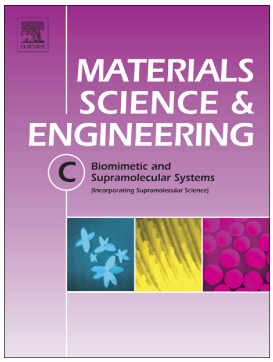

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Development and evaluation of novel nanophotosensitizers as photoantimicrobial agents against *Staphylococcus aureus*

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Antimicrobial photodynamic therapy

Monobrominated neutral red

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Staphylococcus aureus

Abstract

The main aim of the present study was to synthetize polyacrylamide nanoparticles and to use them as photosensitizer carriers. The new monobrominated derivatives (monobrominated neutral red and monobrominated azure B) were the photosensitizers used for antimicrobial photodynamic therapy. They were loaded into the nanocarriers and their antibacterial and oxidative activities were evaluated. The polyacrylamide nanoparticles were evaluated and prepared by inverse microemulsion polymerization. The nanoparticles obtained were characterized by size, polydispersity index, and zeta potential analysis. The Dynamic Light Scattering indicated that the diameter of the particle (z-average) was optimal, with an acceptable polydispersity index. The antibacterial activity of the polyacrylamide nanoparticles loaded with photosensitizers was evaluated against *Staphylococcus aureus*. Both photosensitizers loaded into the nanoparticles showed great potential as antibacterial agents since they suppressed the bacterial growth. The maximum percentage of growth reduction was 35.5% (> 2 Log CFU/mL), with the monobrominated azure B loaded into the nanocarrier with 2 hydroxyethyl methacrylate against methicillin resistant *S. aureus*. The improved physicochemical and photophysical properties of these photosensitizers were accompanied by a significant increase in the photoantimicrobial action, in conventional-sensitive and-methicillin resistant *S. aureus*.