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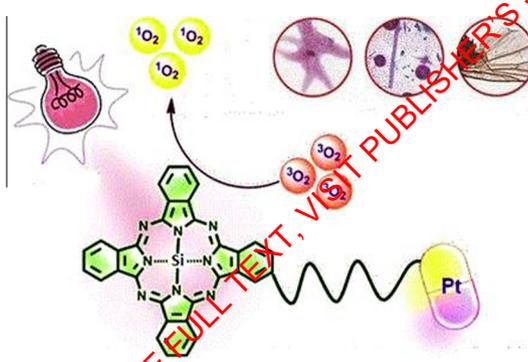
Photophysical behavior and antimicrobial activity of dihydroxosilicon tris(diaquaplatinum)octacarboxyphthalocyanine

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HIGHLIGHTS

- Platination of dihydroxosilicon octacarboxy phthalocyanine have been established.
- Improved photophysical activity due to presence of platinum was demonstrated.
- Additive effect of photodynamic activity of silicon phthalocyanine and cytotoxicity of platinum was discussed.
- High antimicrobial activity under illumination towards *Candida albicans* and *Escherichia coli* by the conjugate was established.

GRAPHICAL ABSTRACT



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ABSTRACT

Platination of dihydroxosilicon octacarboxyphthalocyanine (OH)₂SiOCPc was successfully carried out to give dihydroxosilicon tris(diaquaplatinum)octacarboxyphthalocyanine (OH)₂SiOCPc(Pt)₃ conjugate. Slight blue shifting of the absorption spectrum of (OH)₂SiOCPc(Pt)₃ was observed on conjugation with platinum. Comparative photophysical behavior and antimicrobial photo-activities of (OH)₂SiOCPc(Pt)₃ conjugate with (OH)₂SiOCPc or Pt nanoparticles revealed that the heavy atom, Pt on the periphery of the phthalocyanine significantly enhanced its singlet oxygen generation with a quantum yield of 0.56 obtained for the (OH)₂SiOCPc(Pt)₃ conjugate. The (OH)₂SiOCPc(Pt)₃ conjugate showed highest antimicrobial activity towards *Candida albicans* and *Escherichia coli* compared to (OH)₂SiOCPc and Pt nanoparticles alone under illumination.

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Introduction

Cis-diamine derivatives of platinum complexes have been reported as cytotoxic agents in chemotherapy of cancer though there are still few challenges due to poor selectivity in tumors [1]. There have been great prospects shown in light sensitized activity of

metallophthalocyanines (MPcs) in non-invasive treatment of superficial tumors through photodynamic therapy (PDT) of cancer [2] and in the photoinactivation of bacteria or viruses [3,4] through photodynamic antimicrobial chemotherapy (PACT). This is due to the MPcs intense absorption in the red region of visible light, selective localization in cells and efficient generation of singlet oxygen (¹O₂) [5]. Recently, selective accumulation in tumor cells of Pt(II) complexes was shown to improve when they were covalently conjugated with porphyrin analogs [6–8]. The conjugates showed a synergistic effect of photodynamic activity of the porphyrins and

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