

Biocidal activity of Ba²⁺ doped CeO₂ NPs tested against *Streptococcus mutans* and *Staphylococcus aureus* bacterial strains

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Characterization Techniques

The CeO₂, MgCeO₂, CaCeO₂, SrCeO₂ and BaCeO₂ NMs were characterized by X-ray diffractometer (XRD) (model: X'PERT PRO PANalytical) instruments. The morphology and elemental analysis were out by Carl Zeiss Ultra 55 FESEM and with EDAX: Inca instruments. The FTIR spectra were, recorded in the region of 400-4000 cm⁻¹ using the Perkin-Elmer spectrometer. A JASCO V-650 spectrophotometer measured the UV-Visible spectra of the CeO₂ NPs. The PL spectra were measured by using the JASCO Spectrofluorometer FP-8200.

Antimicrobial assay

The antimicrobial assay of CeO₂, MgCeO₂, CaCeO₂, SrCeO₂ and BaCeO₂ NMs were evaluated by the disc diffusion method tested *Streptococcus mutans* (MTCC 896) and *Staphylococcus aureus* (MTCC 96) strains. The bacterial suspension was prepared by inoculating into the Mueller-Hinton broth (MHB) and incubated at 37 °C until a final concentration of 10⁶ CFU/mL was, reached. The test bacterial strains (100 µL) were, uniformly streaked MHA plates. After inoculation, 30µL of each NPs solution (CeO₂, MgCeO₂, CaCeO₂, SrCeO₂ and BaCeO₂ at a concentration of 2 mg/mL), were loaded with 6 mm diameter discs and incubated for 24 h. The inhibition zones were measured. The Ofloxacin was used positive controls.

Measurement of MIC and MBC assay

The MIC and MBC were calculated for SrCeO₂ and BaCeO₂ NMs by the Micro-dilution measurement in the current work. The SrCeO₂ and BaCeO₂ NMs stock solutions (50mg/mL) were, suspended in a sterile 0.5% of Dimethyl sulfoxide (DMSO). The various concentrations 200, 400, 600, 800, 1000, 1500 and 2000 µg/mL NPs located plate were inoculated with the test bacteria and growth colony formation were measured.

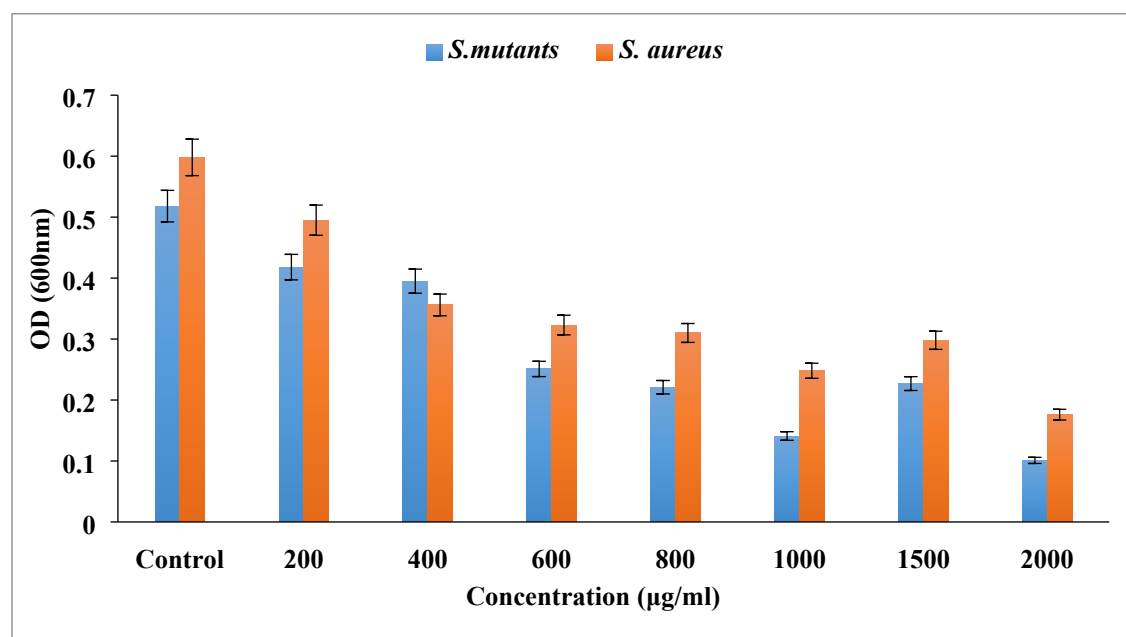


Figure SI1: Estimation of the MBC for SCO NMs

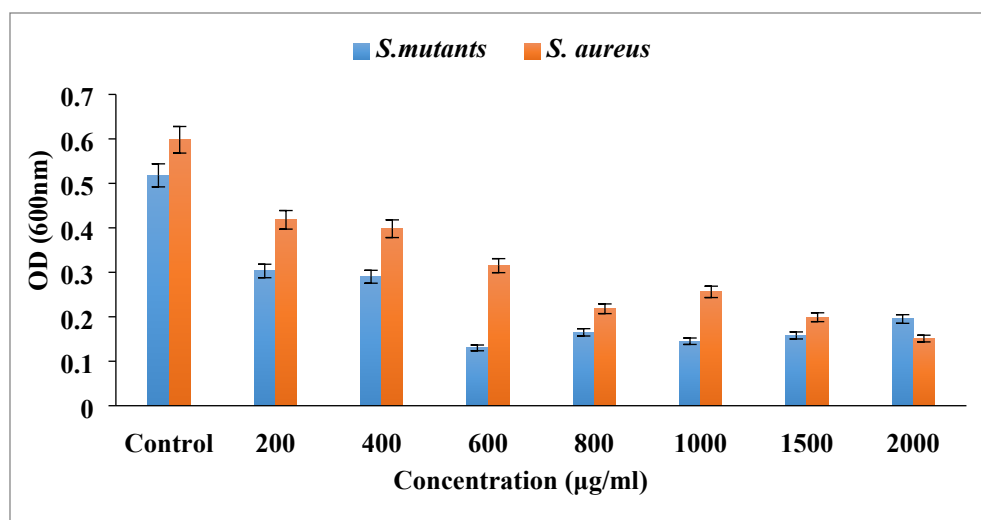


Figure SI2: Estimation of the MBC for BCO NMs