

A new cost effective potassium based LaFeO_3 perovskite for antimicrobial application

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Abstract : The present work is aimed at investigating the antimicrobial activity of Lanthanum Potassium Ferrate (LKFO) nanoparticles against *P. aeruginosa*- a gram-negative bacteria and *S. aureus* - a gram-positive bacteria. For comparative study, series of LKFO nanoparticles was prepared and assessed for antibacterial efficacy. The average size of the synthesized nanoparticles varied from 20 nm to 100nm and X-ray diffraction pattern showed the formation of a single phase LKFO of an perovskite crystal structure after annealing the precursor at 800°C for 8 hr. The antibacterial activity of synthesised nanoparticles were tested on gram positive and gram negative bacteria according to the radial diffusion assay (RDA) for antibacterial agents. The results indicate promising antibacterial activity of $\text{La}_x\text{K}_{1-x}\text{FeO}_3$ ($x= 0.1, 0.2, 0.3$) on both gram-positive and gram-negative bacteria. The presence of potassium in the perovskite catalyst offers substantial benefits for surface mobility and electron donor properties. MIC values for *S.aureus* and *P.aeruginosa*, were in the range of 50 - 400 mg/mL, the enhanced antibacterial activity is attributed to increased doping of potassium (K) stoichiometric ratio of the perovskite nanoparticles. MBC studies showed that the growth of *S.aureus* and *P.aeruginosa* could be ceased above 100 mg/mL of $\text{La}_x\text{K}_{1-x}\text{FeO}_3$ ($x= 0.1, 0.2, 0.3$). Thus the data supports the use of such nanoparticles as a potential antimicrobial agents specially with regards to water purification technology.

Keywords : Potassium based LaFeO_3 perovskite, antibacterial application, *S.Aureus*, *P. Aeruginosa*.

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