

**In-situ synthesis of zinc oxide doped hydroxyapatite nanocomposite and its antibacterial activity**

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**Abstract:** Bioactive nanocrystalline hydroxyapatite ceramics have been widely used in hard tissue engineering application. During recent years efforts has been made to enhance its mechanical and biological property. In present investigation, we studied the effect of metal ion dopant in the structure and antibacterial property of hydroxyapatite powder which was synthesized by hydrothermal method at low temperature. For this, zinc oxide was doped in hydroxyapatite to obtain a general composition  $\text{Ca}_{10-x}(\text{PO}_4)_6(\text{OH})_2\text{Zn}_x$ . Structural and morphological properties of powders were analyzed by using X-ray Diffraction (XRD) and Scanning electron microscope (SEM). XRD pattern shows that hydroxyapatite and zinc oxide powders have hexagonal and wurtzite structure respectively. From Scherrer formula, it was found that zinc oxide doping did not affect the crystallite size of hydroxyapatite. It was further observed that zinc oxide completely incorporated into hydroxyapatite structure with additional peak of zinc oxide. SEM of hydroxyapatite powder showed that it has flower shape. From antibacterial testing, it found that Zone of inhibition increases with increasing Zinc oxide content in Hydroxyapatite. To investigate antibacterial activity of zinc oxide over hydroxyapatite powder, disc diffusion method and two bacterial strains namely *Bacillus* and *E.Coli* were used for this purpose.