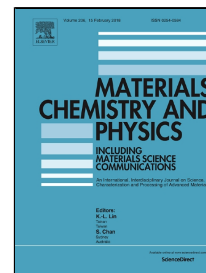


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Influence of the various synthesis methods on the ZnO nanoparticles property made using the bark extract of *Terminalia arjuna*



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## **Influence of the various synthesis methods on the ZnO nanoparticles property made using the bark extract of *Terminalia arjuna***

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### **Abstract**

In this study, ZnO nanoparticles were green synthesised from *Terminalia arjuna* bark extract using Zinc acetate as a precursor. The prepared ZnO nanoparticles were synthesised employing three different synthesis methods namely Sonication, Wet-chemical and Hydrothermal methods. The most effective processing method and its influence over the nanoparticles property was determined by subjecting a comparative assessment between the ZnO nanoparticles in virtue of its property with the change in processing methods during its synthesis. The structure/morphology of the green synthesised ZnO nanoparticles were ascertained through X-ray diffraction, particle size analysis, scanning electron microscope, transmission electron microscope, and surface area analysis technique. The crystallinity of ZnO nanoparticles was retained as spherical structure even though the nanoparticles processing parameters varies by different synthesis methods. It was observed from physico-chemical and biological characterisation studies that ZnO synthesised using hydrothermal method exhibits high surface area ( $217 \text{ m}^2 \text{ g}^{-1}$ ) and small particle size (21 nm) with low toxicity in *Danio rerio* and good antibacterial activity against *Escherichia coli* (22.5 mm) and *Staphylococcus aureus* (25.4 mm). These results could be strongly attributed to the definable structure of ZnO nanoparticles formed

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