

## Effect of metal oxide nanoparticles on barley oxalate oxidase

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Barley oxalate oxidase (OxO), a manganese-containing protein, is largely employed for the determination of oxalate in various biologic materials. The present report describes *in vitro* effects of nanoparticles (NPs) of three metal oxides, i.e., zinc oxide (ZnO), copper oxide (CuO), and manganese oxide (MnO<sub>2</sub>), on the activity and stability of OxO purified from barley roots. The transmission electron microscopy and X-ray diffraction studies of these NPs revealed their very fine crystalline structure with the diameter in the range 30–70, 50–60, and 20–60 nm for ZnO NPs, CuO NPs, and MnO<sub>2</sub> NPs, respectively. The addition of suspension of these three NPs into assay mixture of enzyme individually, led to the adsorption of OxO over their surface, as confirmed by Fourier transform infrared spectra and UV–Vis spectroscopic studies. Compared to free enzyme, MnO<sub>2</sub> NPs-bound enzyme showed improved activity (35% stimulation at 2.5 mg/ml concentration), while ZnO NPs- and CuO NPs-bound enzyme had no substantial improvement. The kinetic properties of individually NPs-bound enzyme were studied and compared with those of free enzyme. The MnO<sub>2</sub> NPs-bound enzyme also showed marked improvement in its storage and thermal stability compared to free enzyme.

### Biography

Vinita Hooda is working as Assistant Professor in the Department of Botany, Maharshi Dayanand University, Rohtak (Haryana), India. She got her Ph.D. degree in Biochemistry from Maharshi Dayanand University in 1998 and since then she is actively engaged in the teaching and research work. She has so far published fifteen research articles in national and international journals of repute and currently guiding three Ph.D. students and five M.Sc. dissertation students. Her area of interest relates to the field of bionanotechnology.

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