The interaction of SiO2 nanoparticles changed the function and structure of horseradish peroxidase

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**Abstract:**

Horseradish peroxidase is an important member of plant peroxidases group and was studied widelغ group and was studied widely.p and was studied widely.y and catalyzes a large variety of substrates by hydrogen peroxide. This method is an effective way to delete toxic hydrogen peroxide from intracellular regions. Horseradish peroxidase, isoenzyme C with molecular weight at 44 KD contains 308 amino acid residues, two calcium ions and four disulfide bonds. This enzyme has also one tryptophan and its fluorescence was quenched by group. This enzyme has prominent position in pharmaceutical, chemical and biotech industry and has widespread use at medical diagnosis and biosensors. Therefore, the methods to Improve stability and activity of this enzyme increase its application in many cases. In this research, the influence of Sio2 nanoparticles was studied by spectrophotometric and spectrofluorimetric techniques. Enzyme kinetics studies at 35°C showed that SiO2 nanoparticles decrease the activity of enzyme and act as enzyme inhibitor. Intrinsic fluorescence studies on the effects of SiO2 nanoparticles on peroxidase at 35 and 45°C temperatures confirmed that by increasing the temperature, the emission intensity of enzyme decrease. The Stern–Volmer quenching constant show that the mechanism of fluorescence quenching of enzyme was dynamic in the present of SiO2 nanoparticles.

Key words: Horseradish peroxidase, spectrophotometric, spectrofluorimetric, SiO2 nanoparticle.