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# Encapsulated nanocurcumin: Effective strategy against lead induced oxidative stress in Swiss Albino mice to enhance the bioavailability

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## Abstract

Exposure to toxic metals remains a widespread occupational and environmental problem in world. Among these toxic metal, lead holds an important position because of its ubiquitous presence. Lead affects nearly all organ systems including gastrointestinal, hematopoietic, cardiovascular, nervous, immune, reproductive, and renal system because it targets ubiquitous enzymatic reactions of the body by binding with sulfhydryl and carboxyl groups and also produces deleterious effect by its ability to mimic or compete calcium in many biological pathways. Encapsulation of curcumin in chitosan nanoparticle could be an effective strategy to combat lead toxicity in ameliorating such damages. Therefore, the present study was designed to evaluate the efficacy of nano-encapsulated curcumin (NC) and compare it to bulk curcumin on various biochemical variables indicative of oxidative stress in lead induced toxicity in mice model. Swiss Albino mice were exposed to lead acetate (25 mg/kg, i.p.) either alone or in combination with curcumin (15 mg/kg, orally) and nanocrcumin (15 mg/kg, orally) for 2 weeks to evaluate the therapeutic efficacy of encapsulated curcumin nanoparticle on various biochemical variables suggestive of alterations in heme-biosynthesis pathway, oxidative stress and lead concentration in blood and soft tissues. Co-administration of nanocurcumin with lead restored the altered levels of δ-aminolevulinic acid dehydratase (ALAD), glutathione (GSH and GSSG) and also resulted in depleted levels of reactive oxygen species (ROS), and TBARS in lead exposed groups. Nanocurcumin due to its chelating property efficiently removed lead from blood and soft tissues as compared to bulk curcumin. Thus, the present study concludes that the nanocurcumin showed better protection then bulk curcumin against lead induced toxic manifestations in blood and soft tissues of mice suggesting a novel approach. The observations also recommend the enhanced antioxidant enzymes level and depleted reactive oxygen species by co-administration of encapsulated curcumin which also. Successfully chelate out lead from blood as well as from soft tissues. Thus, the beneficial property of nanocurcumin proves to be better and effective strategy against lead poisoning.