

Subacute toxicity of cadmium on hepatocytes and nephrocytes in the rat could be considered as a green biosynthesis of nanoparticles

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Abstract: The purpose was to study the toxicity of cadmium (Cd) and to explore its potential to generate nanoparticles during detoxification. In order to demonstrate this, *in vivo* fluorescence imaging, X-ray diffraction, and flow cytometry were performed. The *in vivo* imaging showed a fluorescence signal after Cd treatment (CdCl₂, 1.50 mg/Kg, intraperitoneally). By contrast, the control-rat fluorescence was negative. The fluorescence was divided into three colors, red, yellow, and green, and probably indicates the presence of quantum dots. X-ray diffraction results revealed the presence of Cd sulfide (CdS) and/or Cd selenide (CdSe) nanoparticles following Cd injection in the liver (6.52 nm) and kidneys (56.30 nm). Interestingly, flow cytometry revealed a heterogeneous size distribution and a homogeneous granularity of synthesized nanoparticles. Using the green fluorescence channel and the red fluorescence channel, a narrow green emission spectrum and a broad red emission spectrum were detected, respectively, by cytometric analysis.

Keywords: XRD, *in vivo* imaging, flow cytometry, quantum dots, cadmium sulfide, cadmium selenide