Mesoporous silica nanoparticles reduce aflatoxin-induced cell damage

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One major mycotoxin affecting human and animal health is the Aflatoxin B_1 (AFB_1), a toxin produced mainly by *Aspergillus* strains. It is well established that AFB_1 cytotoxicity might contribute to DNA adducts formation and the ability to cause oxidative damage. The toxicity studies of mesoporous silica nanoparticles (MSNs) with AFB_1 using NIH3T3 cells and hemolysis test were investigated in the current work. The obtained MSNs (39.97±7.85) presents various shapes and higher BET surface area. The results showed no reduction of the cell viability occurred after the MSNs treatment (0.5–2.0 mg/mL) using NIH3T3 cells. Moreover, MSNs treatment completely reversed the cytotoxic effect of AFB_1 at all concentrations. It been known that the aflatoxins have been linked to hemolytic anemia and

have led to the destruction of erythrocytes (hemolysis). Our study evaluated the impact of the MSNs on human red blood cells (RBCs) using a standard hemolysis assay, which revealed no hemolysis in the MSNs evaluated alone and in those combined with AFB_1. The reduction of the aflatoxin-induced cell damage occurs mainly due the adsorption capacity already verified by same authors in previous studies, which AFB_1 was adsorbed in the first minutes in contact with the MSNs, reaching up to an adsorption capacity of ~70% after 15 minutes. Our study indicates that MSNs do not affect the viability of NIH3T3 cells *in vitro* and display high blood biocompatibility. Moreover, the application of MSNs led to a reduction in cytotoxicity caused by AFB_1 in NIH3T3 cells *in vitro,* which might also positively influence different kinds of cells *in vivo* due to their high adsorption capacity.

Keywords: Aflatoxin B_1. Mesoporous silica nanoparticles. NIH3T3 cells.