

## **Cytotoxicity of nickel zinc ferrite nanoparticles on cancer cells of epithelial origin**

### **ABSTRACT**

In this study, in vitro cytotoxicity of nickel zinc (NiZn) ferrite nanoparticles against human colon cancer HT29, breast cancer MCF7, and liver cancer HepG2 cells was examined. The morphology, homogeneity, and elemental composition of NiZn ferrite nanoparticles were investigated by scanning electron microscopy, transmission electron microscopy, and energy dispersive X-ray spectroscopy, respectively. The exposure of cancer cells to NiZn ferrite nanoparticles (15.6-1,000  $\mu\text{g}/\text{mL}$ ; 72 hours) has resulted in a dose-dependent inhibition of cell growth determined by MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay. The quantification of caspase-3 and -9 activities and DNA fragmentation to assess the cell death pathway of the treated cells showed that both were stimulated when exposed to NiZn ferrite nanoparticles. Light microscopy examination of the cells exposed to NiZn ferrite nanoparticles demonstrated significant changes in cellular morphology. The HepG2 cells were most prone to apoptosis among the three cells lines examined, as the result of treatment with NiZn nanoparticles. In conclusion, NiZn ferrite nanoparticles are suggested to have potential cytotoxicity against cancer cells.

**Keyword:** Anticancer; Apoptosis; Cancer cells lines; NiZn ferrite nanoparticles.