CYTOTOXIC PROFILES OF A NANODRUG DELIVERY BASED ON 6-MERCAPTOPURINE-COATED MAGNETITE-PEG NANOPARTICLES TOWARDS LEUKEMIA (WEHI-3B) CELL LINES

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A drug active, 6-mercaptopurine (MP) was coated on the surface of Fe_3O_4-PEG nanoparticles using co-precipitation method in order to form a new magnetic nanocomposite (FPEGMP). The physico-chemical properties of the nanocomposite were studied via X-ray diffraction, infrared spectroscopy, magnetic measurements, thermal analysis and transmission electron microscopy. The resulting superparamagnetic nanocomposite has spherical shape with average particle size diameter of 11 nm. Thermal analyses and Fourier transform infrared (FTIR) spectroscopy revealed the formation of PEG-MP on the surface of iron oxide nanoparticles and the enhancement of the thermal stability of the nanocomposite compared to its counterpart, free 6-mercaptopurine. Release behavior of MP from FPEGMP nanocomposite was found to be sustained and governed by pseudo-second order kinetic. The maximum percentage release of MP from FPEGMP nanocomposite reached about 60% and 97% within approximately 92 and 72 hours when exposed to aqueous solutions at pH 7.4 and pH 4.8, respectively. Anti-cancer activity of the nanocomposite shows that the choice of coating material as well as the percentage of loading of the active agent could affect the cytotoxic activity of nanocomposite towards the mouse myelomonocytic leukemic cell line (WEHI-3B).