Cytotoxicity Evaluation of Sun Screen Carrier and GSH in Free Forms and Coated in Solid Lipid Nanoparticles

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Ultraviolet (UV) radiation is an etiologic factor for the development of aging and skin cancers. The cosmetic industry has developed sun protection factor products, which contain a variety of “UV screens”, among others benzophenones (BP). The tripeptide glutathione (GSH) is involved in cellular defense mechanisms for xenobiotics and reactive oxygen species. As a part of our investigation on sunscreen formulations, the present work was aimed at assessing the absence of cytotoxic effects of benzophenone-3 and GSH on V79 cells. Biodegradable polymers have been extensively used for development of drug delivery system. Nanoparticle drug delivery systems have emerged as one of the most promising strategy to achieve modified release of many substances improving efficacy and reducing toxicity. Hamster Chinese fibroblast (V79) cells were used for toxicity evaluation of free GSH, benzophenone-3 and on solid lipid nanoparticles (SLN). Different biomarkers were used for relative toxicity assessment: MTT dye reduction, neutral red uptake (NRU) and nucleic acid content. Prior to *in vitro* experiments, the systems were characterized by means of their physico-chemical properties including size (media diameter of 290 nm and 188 nm for GSH and benzophenone-3 nanoparticles, respectively) and morphology by scanning electronic microscopy. The cytotoxic effects of benzophenone-3 incorporated in nanoparticles were lower compared to the free form evaluated by those viability assays (IC50 of 107 µM for the free form and 1000 µM to benzophenone-3 coated in nanoparticles evaluated by MTT reduction assay). Free GSH had no cytotoxic effects until the maxima concentration used (80 µM) and similar results were determined with SLN-GSH. Unloaded nanoparticles had no cytotoxic effects on V79. These studies suggest new possibilities of nanotechnology, mainly in the cosmetic field, as UV screen carriers for skin protection since it was verified a toxicity reduction *in vitro.*

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