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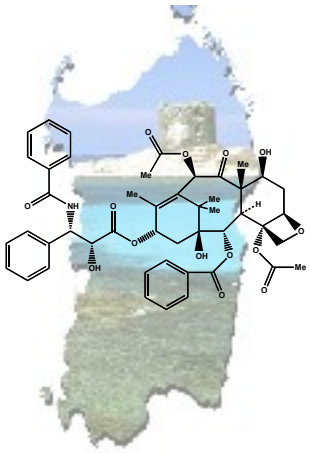

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NANOPARTICLES BASED ON HYDROXYPROPYLCYCLODEXTRYN: PREPARATION AND *IN VITRO* VIABILITY STUDY ON CACO2 CELLS

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Cyclodextrins (CDs) are cyclic α-(1-4)-linked oligosaccharides of α-D-glucopyranose [1]. β-Cyclodextrin is the most accessible, the lowest-priced and generally the most useful of parent cyclodextrins. Apart from these naturally occurring cyclodextrins, many cyclodextrin derivatives have been synthesised [2].

The main interest in cyclodextrins lies in their ability to form solid inclusion complexes with several compounds [3], by a molecular complexation. There are numerous applications for CDs in the pharmaceuticals field, such as excipients [2], owing to the low ability of CDs to pass through biological membranes [4]. The β-cyclodextrins increase the drug solubility enhancing the bioavailability of insoluble drugs, increase drug permeability of water-soluble drugs by direct action on mucosal membranes and thus they are considered as penetration enhancers [5,6]. Recently, CDs have also been studied for use as potential therapeutic agents; in particularly, their effects on the CNS have been examined. Camargo *et al*. tested the use of hydroxypropyl-β-cyclodextrin (HP) against Niemann-Pick type C, which is a neurogenerative disorder characterised by greatly altered somatic cholesterol metabolism. Treatment with HP in a mouse model had moderate effect in delaying neurological symptoms and in decreasing liver cholesterol storage [7]. Moreover, CDs were presented as a new ideal class of antiprion compound due to their ability to reduce to undetectable levels the pathogenic isoform of the abnormal prion protein This antiprion activity is dependent on the size of the cyclodextrin [8].

The work purpose was to prepare and *in vitro* characterise solid nanoparticles based on HP by high pressure emulsification method; the effect on the viability of the formulations on Caco2 cells has been also evaluated.

A series of W/O emulsions named HPO1-HPO6 has been set using the High-Pressure Homogenizer "Panda NS100L".

Manufacturing parameters such as water-oil ratios, amount of HP and pressures of emulsification have been studied aiming for the most stable nanoemulsion which has been dried to obtain solid

nanoparticles. Size characterization of both emulsions and solid nanoparticles has been performed by laser diffraction spectroscopy. Morphology of nanoparticles has been observed by Scanning Electron Microscopy (SEM). Cytotoxicity of HPO6 formulation at different concentrations has been assessed after 24 hours on Caco2 cells by using the reduction of MTT reagent.

Parameters employed for the preparation of the formulation HPO6 resulted suitable to obtain a stable and homogeneous nanoemulsion being Mean Diameter and Polydispersivity Index of about 360 nm and 1.0, respectively. The exsiccation process of nanoemulsion determines an increase of particle size which resulted anyway in the nano size order. The dried particles of HPO6s morphologically analyzed by SEM, show nanoparticles with smooth surface but not completely shaped.

HPO6 displayed concentration-dependent cytotoxicity towards Caco2 cells. However this effect has been ascribed to the residue of surfactant: 100% of cell viability has been found by avoiding the presence of the surfactant

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