Cytotoxic evaluation of liposomes/chitosomes using chicken fibroblast cell line

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Liposomes are biocompatible structures that can be applied as versatile carrier systems for unstable ingredients. Especially in the food sector, liposomes are used to encapsulate bioactive compounds, aiming to facilitate their incorporation into the food matrix for animals and human nutrition. This strategy allows the production of functional foods with higher nutrient absorption through the intestine. However, liposomes' major drawback is the encapsulated compound's leakage during storage and digestion. In this way, liposome coverage using biopolymers is recommended to avoid leakage and increase stability in a non-toxic system. In the present work, liposomes were produced by the thin-film method, and chitosan was selected as the coating material for liposomes using two strategies: electrostatic interactions (chitosomes) and ionic gelation by adding sodium tripolyphosphate (TPP-chitosomes) solution drop-wise. The produced particles were characterized through transmission electron microscopy (TEM). Cytotoxicity was assessed in chicken fibroblast cells (CEC-32) treated with particles in four different concentrations (20%, 10%, 5%, 1%) in two-dimensional (MTT assay) and three-dimensional (Alamar blue) structures. TEM images clearly showed that liposomes were composed of a lipid bilayer. The three categories of particles had very similar morphology: elliptical format, with approximately 100 nm medium size. However, the TPP-chitosomes micrograph showed a crosslinked network, possibly formed by TPP-crosslinked chitosan. Such a network could act as a delivery modulator for the compound to be encapsulated in this system. The treatment with particles at concentrations of 5% and 1% didn't decrease the cell viability of bidimensional cells at 24h, 48h, and 72h. In tridimensional cells, particles didn't reduce cell viability. In conclusion, these particles represent a potential system for encapsulating compounds in non-toxic nanosystems.