

**Study of cytotoxic and apoptogenic properties of nano-liposomes forms of crocin compared to crocin in various human cancer cell lines.**

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**Introduction:** Saffron (dried stigmas of *Crocus sativus* L.) is known for its anti-cancer properties. In this study, cytotoxic and apoptogenic properties of crocin, the major coloring compound of saffron, and its nano-liposomal form to help crocin cellular delivery, are investigated emphasizing on cell death mechanisms.

**Methods:** For the preparation of nano-liposomes containing crocin, Dehydration and Rehydration (DRV) method was used. To prepare nano-sized liposomes, the thermobarrel Extruder (Northernlipids, Canada) was used. Hela and MCF7 cells were cultured and exposed to crocin (1, 2 and 4 mM/L) and crocin liposomes in lower doses. Cell viability was quantitated by MTT assay. Apoptotic cells were determined using PI staining of DNA fragmentation by flow cytometry (sub-G1 peak). Bcl-2 and Bax expression were studied by RT-PCR.

**Results:** MTT assay revealed a significant and concentration-dependent cytotoxic effect of crocin on Hela and MCF7 cells in comparison to non-malignant cells. IC<sub>50</sub> of crocin nano-liposomal forms showed enhanced effect compared to the crocin solution. Flow cytometry and RT-PCR revealed apoptosis induction by the crocin and liposomal crocin.

**Conclusion:** crocin, one of the main ingredients of saffron, has some interesting cytotoxic and apoptogenic effects on neoplastic cells possibly through increased Bax/Bcl2 expression. Liposome encapsulation enhances the effect of crocin on cancerous cells. It comparatively has little effects on non-malignant cells.