Study of cytotoxic and apoptogenic properties of different saffron extracts in human cancer cells

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Objective: saffron (dried stigmas of *Crocus sativus* L.) is a rich source of carotenoids and is known for its anti- cancer and anti-tumor properties. In this study cytotoxic and apoptogenic properties of different saffron extracts was evaluated in some common human cancer cells including breast cancer (MCF-7), hepatocellular carcinoma (HepG2) and human cervix epitheloid carcinoma cells (HeLa). **Methods**: Malignant and non-malignant cells (HFSF-PI 3) were cultured in DMEM medium and incubated with different concentrations of saffron extract (100 to 2000 ug/ml). Cell viability was quantitated by MTT assay. Apoptotic cells were determined using PI staining of DNA fragmentation by flow cytometry (sub-G1 peak). Role of caspase were studied using the pan-caspase inhibitor, z- VAD-fmk. **Results**: Hydroalcoholic extract was more toxic compared to ethanolic and aqueous one. Saffron could decrease cell viability in cancer but not in normal cells starting at 200 ug/ml as a concentration and time dependent manner. The IC50 values against MCF-7 (Hydroalcoholic), HeLa and HepG2 (Alcoholic extract) were determined 400, 800 and 950 µg/ml, respectively.This toxicity was also partially induced by apoptosis. z-VAD-fmk completely inhibited apoptosis of MCF-7 cells induced by saffron indicating apoptosis was caspase dependent. **Conclusion**: Saffron could induce pronounced cell death in cancer cells in which apoptosis or programmed cell death play an important role. Saffron could be considered as a promising chemotherapeutic agent in cancer treatment in future.