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Potential anticancer activity of the fruit peels of *Solanum melongena* L. against hepatocellular carcinoma *in vitro* and *in vivo*

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Solanum melongena L. is one of the most common and important vegetables in the world. Peel is the major byproduct of its fruits and in many cases it is being wasted. The peels of the fruits of *Solanum melongena* L. were extracted using methanol in an approach to search for bioactive conserves in such waste products. Fractionation and purification of the methanol extract of the peels (MEP) yielded five steroidal compounds; three steroidal alkaloids: solasodine (1), solamargine (4) and solasonine (5) together with two steroidal glycosides; β-sitosterol-3-O-β-D-glucoside (2) and poriferasterol-3-O-β-D-glucoside (3) were isolated. Identification of the aforementioned compounds was carried out on the basis of physico-chemical properties and spectral analysis (^{1}H-NMR, ^{1}H-^{1}H COSY, ^{13}C-NMR and HMBC). MEP together with the isolated compounds were tested against five human cancer cell lines representing the most common types of cancer in Egypt; colon cancer cell line (HCT116), larynx cancer cell line (HEP2), breast cancer cell line (MCF7), cervix cancer cell line (HELA) and hepatocellular carcinoma (HEPG2). MEP, solasodine and solamargine showed significant activities against the five tested human cancer cell lines, however their pronounced cytotoxic activity was noticeable and obvious against the hepatocellular carcinoma (HEPG2). Consequently, MEP (IC_{50} 2.14 ± 0.35) was tested *in vivo* against hepatocellular carcinoma with the aim of confirming its anticancer activity. MEP showed a dose dependent anticancer activity through stabilization of the hepato-cells verified by reduction in α-fitorotein (AFP) which is considered a liver tumor indicator (30.98 % at 100 mg/kg b wt and 45.77% at 200 mg/kg b wt), in addition it also restored the levels of AST (35.97 % at 100 and 48.78 % at 200 mg/kg b wt), ALT (31.22 % at 100 and 43.16 % at 200 mg/kg b wt) and albumin (26.42 at 100 and 47.64 % at 200 mg/kg b wt) in a dose dependent manner. Histopathology of liver tissues treated with MEP showed also normal liver cells, normal portal tracts and absence of fibrosis and inflammation. Our findings showed that MEP which is a source of steroidal alkaloids and sterol glycosides exhibited potential anticancer activity against hepatocellular carcinoma- *in vitro* and *in vivo* -and this supports the reuse of waste products as it could be a source of a new remedy for treating major diseases.

Keywords: Solanum melongena L., peels, anticancer, solasodine, solamargine, solasonine.