

## Evaluation of the Effect of Six Terpenoids and Phenolics from *Echinophora Cinerea* against Cisplatin-Induced Oxidative Stress and Apoptosis in PC12 Cell Line

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### Abstract

**Introduction:** *Echinophora cinerea* is a plant from Apiaceae family and it is used as vegetable, yogurt and cheese seasoning and is used for gastric ailments in ChaharMahalBakhtiari province. It is a rich source of antioxidant constituents, hence it can potentially have protective effects. So, its phytochemical investigation seems to be crucial.

**Methods and Results:** Plant material was extracted. The latter extract was fractionated with VLC and further purified using reversed phase HPLC. The structures of pure compounds were elucidated using spectroscopic methods such as <sup>1</sup>HNMR and mass. Cytotoxic effects of cisplatin alone and with other fractions were tested. The effects of isolated compounds against apoptosis induced by CIS were investigated through the measurement of mitochondrial membrane potential, Bax and Bcl2 and caspase-3 activation. We also assessed the oxidative stress by measuring reactive oxygen species. Six compounds (quercetin-3-O-β-D-glucopyranoside, Kaempferol glycoside, osthol, verbenone, isoimperatorin and echinophorin B) were purified and identified. Treatment of cells with QUE and OST before exposure to the CIS increased cell viability. These compounds protected the cells against CIS-induced cytotoxicity. In addition, pretreatment with QUE and OST decreased CIS-induced apoptosis through up-regulation of Bcl2, inhibition of caspase-3 activity and increasing of mitochondrial membrane potential. As well, OST decreased ROS generation.

**Conclusion:** Given that flavonoids are the most important groups of phenolic compounds found in nature, and due to their antioxidant and antiapoptotic effect these could be considered as neuroprotective agent.

**Keywords:** Verbenone, Quercetin-3-O-β-D-glucopyranoside, Kaempferol glycoside, *Echinophorin B*.