

Neuroprotective effect of *Scrophularia striata* Boiss on the glutamate neurotoxicity rat cerebellar granule neurons: *in vitro* study

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Background and Aims: Glutamate plays an important role in CNS as an excitatory neurotransmitter. However, it can be a potential neurotoxin substance at concentrations higher than normal level, resulting in neuron loss. Cerebellar Granule Neurons (CGNs) from Sprague-Dawley rats aged 8 days are most commonly used tools to study exitotoxicity. CGNs are known to release glutamate as their principal neurotransmitter and can produce glutamate independently of glial cells. In 8-day old rats, CGNs are still developing, but have begun to express NMDA receptors. Culture of this type of neuron is wildly used in recent experiments. Neuroprotective properties of natural products have extensively been considered in pharmacological and pharmaceutical studies as a solution for neurodegenerative disorders.

Methods: In present study, neuroprotective effect of total, chloroformic, methanolic, ethyle acetatic and petroleum fractions of aerial parts of *Scrophularia striata* Boiss (Scrophulariaceae) at doses of (0.1-10-25-50-75) and 100 µg/ml in glutamate-induced neurotoxicity in rat pups CGNs culture was investigated. Neuronal viability was measured using MTT assay. Statistical analysis was done using SPSS software. One-way analysis of variance (ANOVA) was performed by Tukey post hoc test. Values were considered statistically significant when $P \leq 0.05$.

Results: Results of this study showed a significant neuroprotective activity of high polarity methanolic extract of aerial parts of *S. striata* against glutamate-induced neurotoxicity. Treatment with concentrations of 10 µg/ml of the extracts resulted in the most neuroprotective effect on CGNs in a dose-dependent manner.

Conclusions: It seemed that the aerial parts of *S. striata* contain polar compounds which correspond to neuroprotective effect. Taken together, methanolic fraction of aerial parts of *S. striata* Boiss has neuroprotective effect on CGNs.

Keywords: Glutamate; Neuroprotection; Neurotoxicity; *Scrophularia striata* Boiss.