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NEUROPROTECTIVE POTENTIAL OF *PIPER BETLE* AGAINST BSO-INDUCED NEURONAL CELL DEATH

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Background:

Neuronal loss resulting in neurodegenerative diseases has been associated with increased oxidative stress. The brain is more susceptible to oxidative damage due to its high oxygen consumption, high iron and polyunsaturated fatty acids contents but low in antioxidants. Thus the higher metabolism in the brain induces an increased generation of free radicals which will react with the polyunsaturated fatty acids with consequent cell damage and ultimately cell death via apoptosis. The low endogenous antioxidants in the brain can be remedied with increased intake of exogenous antioxidants. Plants and herbs are rich in antioxidants and thus the aim of the present study is to evaluate the effectiveness of *piper betle* (*sirih*) in preventing oxidative stress-induced cell death. BSO is used to induce increased oxidative stress condition in the neurons.

Materials and Methods:

Apoptosis was induced in neurons by incubating cells with BSO for 24 hours. The neuroprotective effects of hot water extract of *piper betle* was analysed by incubating cells with the extract after incubation with BSO. Cell viability was assayed using the MTS assay, apoptosis using flowcytometry FITC Annexin V Apoptosis Detection Kit and the morphological changes determined using propidium iodide and calcein-AM dyes. The activities of the enzymes involved in the apoptotic pathway were also determined by measuring the caspase-8 and -9 activities using a commercial colorimetric kit.

Results:

Results showed that the hot water extract of *piper betle* was able to prevent BSO-induced neuronal cell death via apoptosis when used at low concentrations (0.001-25µg/ml). This neuroprotective effects seemed to involve the inhibition of caspase-9 activity. However, at high concentrations (>50µg/ml) it is cytotoxic to the cells.

Conclusion:

The present finding showed that hot water extract of *piper betle* exerts neuroprotective effects against oxidative-stress-induced neuronal cell death when used at low concentrations.

Keywords:

Piper betle, antioxidant, neuroprotection