

Neuroprotective and antioxidant activity of flavonoids isolated from *Serjania erecta* Radlk

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Introduction: Nowadays Alzheimer's disease is the leading cause of dementia in the world. The major neuropathological signs of this disease include the formation of neurofibrillary tangles, extracellular deposition of A β peptide and extensive neuronal loss. A β peptide accumulation seems to be the initial factor of degeneration associated to this disease, but its neurotoxicity mechanism is not elucidated yet. However, many studies have shown that the generation of free radicals is involved in this system, leading to oxidative stress, which can initiate processes that culminate in death of neuronal cells, reflecting the different symptoms presented by Alzheimer's patients. Several *in vivo* studies using Alzheimer's animal models and *in vitro* studies with neuronal PC12 cells have shown that A β peptide efficiently produces ROS and nitric oxide, an important cellular signaling molecule involved in many physiological and pathological processes that favor an extremely destructive environment. Nowadays, the most commonly indicated treatment for AD aims the recovery of the cholinergic deficits, but obtained results have not been positive for all patients. More recently there has been an extensive interest in the search for new therapeutic agents that may reduce disease progression and provide a protective effect for preventing neuronal damages. Literature data have shown that adaptogenic plants, known for their antioxidant and protective properties, are a promising therapeutic target in the search for bioactive compounds that may play such activities. *Serjania erecta* Radlk, an adaptogenic plant, popularly known as cipó-cinco-folhas produces flavonoids with validated antioxidant and protective activities. **Objective:** The aim of this work was to evaluate the neuroprotective and antioxidant effects of the flavonoids isolated from methanol extract of *S. erecta* under oxidative stress induced by A β_{25-35} peptide in PC12 cell line culture. **Methods:** The flavonoids were isolated by chromatographic techniques including column chromatography, thin layer chromatography and high performance liquid chromatography. The protective activity of isolated flavonoids against toxicity induced by peptide A β_{25-35} was evaluated using the cell viability assay (MTT). The flavonoid that showed the best result was tested through LDH assay in order to verify its protection on cell membrane damage which is induced by the presence of A β_{25-35} peptide. Likewise it was also quantified the NO production caused by the same peptide, and the possibility of vitexin attenuate this process. This assay was carried out through indirect mechanism, using the Griess reaction. **Results:** The three isolated flavonoids showed protective activity. The most effective was the vitexin that exhibited significant protective activity in lower concentration (25 μ g/mL). The flavonoid quercetrin in the same concentration also showed protective activity, but inferior than that presented by vitexin. The isovitexin displayed significant activity only in the highest concentration tested (200 μ g /mL). MTT results lead to the selection of the flavonoid vitexin to continue the trials and its efficacy in protecting cell membrane damage and decreasing nitric oxide concentration was validated. **Conclusion:** *S. erecta* purified flavonoids show protective and antioxidant effectiveness, mainly the vitexin which presented significant activity even in lower concentrations.

Keywords: Neuroprotective, antioxidant, flavonoid, *Serjania erecta*, A β peptide.

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