

Rhizophora Mucronata Extract High in Catechins has a Protective Effect

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Introduction

Alzheimer's disease (AD) threatens becoming the scourge of the twenty-first century, necessitating immediate research into multipotent drugs for AD treatment. Tropical red mangrove *Rhizophora mucronata* has been utilised as an astringent, antiseptic, antibacterial, anti-ulcerogenic, and anti-inflammatory agent in traditional oriental medicine. The goal of this investigation was to see if the catechin-rich methanolic leaf extract of *R. mucronata* (MERM) could protect against Ab-induced neurotoxicity. When PC12 cells were exposed to Ab (25–35), cellular oxidative stress, the amount of apoptotic cells, and caspase-3 activity increased, eventually leading to neuronal death [1-3].

Pretreatment with MERM (50 mg/ml) inhibited lipid peroxidation and protein oxidation by considerably reducing cell mortality and decreasing intracellular reactive oxygen and nitrogen species. By maintaining the mitochondrial membrane potential and reducing caspase-3 activity, MERM reduced Ab (25–35)-induced apoptosis. By successfully scavenging ROS/RNS species, MERM also restored the antioxidant state of the Ab (25–35) treated cells. The presence of (+)-catechin as a significant ingredient was revealed by HPTLC analysis of MERM. The findings show that MERM effectively reduced the neurotoxicity caused by Ab-associated oxidative stress, hinting that MERM could be used to treat Alzheimer's disease.

Description

Background

Alzheimer's disease (AD) is a serious neurological illness that causes memory loss and cognitive function impairment in the elderly. One of the key pathological hallmarks of Alzheimer's disease (AD) is the accumulation and fibrillation of amyloid beta-protein (Ab), which leads to the formation of amyloid plaques in the brain. Several pathophysiological mechanisms are involved in AD, including oxidative stress, metabolic changes, mitochondrial dysfunction, DNA damage, apoptosis, calcium/ions disruption, and glutamate excitotoxicity. Although the mechanism of Ab-induced neurotoxicity is unknown, numerous lines of evidence point to Ab-induced increased oxidative stress and inflammation as initiators/mediators of neuronal damage in Alzheimer's disease. Furthermore, a study found that ROS increases the activity of the enzymes b- and g-secretase, which are implicated in the production of the neurotoxin Ab. As a result, inhibiting Ab-mediated oxidative and nitrosative cell death, as well as the enzymes acetyl cholinesterase and beta secretase, could be a potential strategy for preventing and treating AD.

AChE inhibitors (donepezil, galantamine, and rivastigmine) and N-methyl-

D-aspartate (NMDA) receptor inhibitors are currently available for the treatment of Alzheimer's disease. AD is not highly responsive to modern western treatments due to the complexity of the pathophysiology. As a result, traditional medicinal herbs that are multitargeting have received more attention in the search for a novel medicine to treat Alzheimer's disease [4,5]. *Rhizophora mucronata* (Lam.) is a tropical red mangrove that has been employed as an astringent, antiseptic, antibacterial, anti-ulcerogenic, and anti-inflammatory agent in traditional oriental medicine. *R. mucronata* has been reported to have high antioxidant and cholinesterase inhibitory properties *in vitro*. On the basis of these findings, the current work examined the effect of a catechin-rich methanolic extract of *R. mucronata* (MERM) on Ab-mediated pathogenesis in PC12 cells capabilities [6].

Conclusion

Effect

In India, it is used to cure diabetes, while in Thailand it is used as an astringent for diarrhoea, nausea, and vomiting, as well as an antiseptic when boiled in water. Antifungal, antibacterial, anti-inflammatory, stomach antiulcer, wound healing efficacy, and a protective role in naphthalene-induced mitochondrial dysfunction have all been documented in the extract of various species of this genus. Polyphenols, which operate as antioxidants, are also the main active ingredients of these pharmacological and biomedical. *Rhizophora mucronata* (Lam.) is a tropical red mangrove that has been used in traditional oriental medicine as an astringent, antiseptic, antibacterial, anti-ulcerogenic, and anti-inflammatory agent. *In vitro*, *R. mucronata* has been shown to exhibit strong antioxidant and cholinesterase inhibitory effects. The current study investigated the effect of a catechin-rich methanolic extract of *R. mucronata* (MERM) on Ab-mediated pathogenesis in PC12 cells based on these findings.

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest of author towards this manuscript.

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