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NEUROPROTECTIVE EFFECT OF *MYRMECODIA PLATYTYREA* AQUEOUS EXTRACT ON H_2O_2-INDUCED ASTROCYTES (C8 -D1A)

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ABSTRACT

Neurodegenerative diseases have become one of the major health concerns in many countries. There are about 5.1 million of Alzheimer disease patients in the Unites States, and by the year 2050 the number may increase up to 20 million. In Malaysia, it is estimated that there are currently about 50,000 people with the disease. Studies showed that the prevalence of the disease is highly increased after age of 60. *Myrmecodia platytyrea* is a medicinal plant originated from Papua New Guinea which has been claimed to have many potential uses in treating ailments. The effects of aqueous extract of this plant as a neuroprotective agent are not known. In this study, the cytotoxic and neuroprotective effect of *M. platytyrea* aqueous extract was evaluated against astrocyte cell lines (C8-D1A) using MTT assay after 48 hours of incubation. After determination of IC_{50} of *M. platytyrea* aqueous extract, the neuroprotective activity was determined against oxidative stress-induced astrocytes. Hydrogen peroxide (1mM) and iron (II) sulfate (0.5 mM) were used as inducer of oxidative stress in this experiment either solely or in combination. Results showed that the aqueous extract exhibited neuroprotective properties through the Fenton reaction. As a conclusion, this study suggested that *M. platytyrea* aqueous extract has potential neuroprotective effect that requires further investigation.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Neuroprotection is a therapeutic intervention process to protect the neurons against injuries and death and slow the disease progression. Neurodegenerative disorders are characterized by the slowly progressive loss of neurons in central nervous system. The major neurodegenerative disorders include Alzheimer's disease (AD) and Parkinson's disease (PD) which usually have progressive nature and the high risk of getting this diseases is elderly population (Sevim et al., 2013). No cure is available to treat this disease yet. But at this moment, the cholinesterase inhibitor is the most prescribed drug class for AD, but this drug is only indicated to manage the symptomatic treatment (Orhan, Orhan, & Sener, 2006, Larner, 2010). In addition, the principal pathogenesis of neurotoxicity in Alzheimer's disease (AD) is linked with the increased levels of β-amyloid (Aβ) peptide in the brain and tau protein aggregation (Ji & Zhang, 2006), manifest via Aβ oligomer and fibril formation (Mattson, 2004; Iuvone et al., 2004). But recent studies have demonstrated that free radicals produced by oxidative stress is also regarded as an important factor that contribute to Alzheimer's pathogenesis (Perry, Cash, & Smith, 2002; Zhao & Zhao, 2013; Zhu et al., 2004). Oxidative stress is associated with mitochondrial dysfunction and extreme decrease in ATP that resulted in imbalance of production of free radical and lipid peroxidation. The