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Research Article

Optimization of polyphenol extraction from *Vitis vinifera* L. leaves, antioxidant activity and its correlation with amelioration effect on AlCl₃-induced Alzheimer's disease

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ABSTRACT

This research focused on optimization of polyphenol extraction from *Vitis vinifera* L. (cv. Flame Seedless) leave based on 2,2-diphenyl-1-picrylhydrazyl (DPPH•) scavenging capability in additional discussion of structure-activity relationship according to its amelioration effect on AlCl₃-induced Alzheimer's disease. The highest extraction yield was found for acidified aqueous solvents. While the highest total phenolic and flavonoid contents were found for aqueous solvents. The hydroacetic extract showed significantly superior content in total phenolic and flavonoid accompanied by highest DPPH scavenging capability than other tested extracts. High-Performance Liquid Chromatography with Diode-Array Detection (HPLC/DAD) analysis of extracts led to identifying catechin, rutin, isoquercetin, quercitrin, apigenin-7-O-glucoside, quercetin, kaempferol and myricetin for the first time in *V. vinifera* L. (cv. Flame Seedless) leaves. In addition, quercetin-3-O-β-D-arabinopyranoside was isolated for the first time from *V. vinifera* L., detected as a major flavonoid in all extracts. This study emphasized the role of solvents played in polyphenol extraction and antioxidant activity from *V. vinifera* L. (cv. Flame Seedless) leaves. The hydroacetic extract mainly composed of flavonoidal compounds which could ameliorate AlCl₃-induced cerebral damages and neurocognitive dysfunction. This may lead to the development of new nutraceutical and pharmaceutical agents used as anti-oxidative stress and neuroprotective agent on Alzheimer and aging diseases.

Keywords: *Vitis vinifera*, hydroacetic extract, quercetin derivatives, antioxidant, structure-activity relationship.

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1. INTRODUCTION

Polyphenols were the most important bioactive phytochemicals because they exerted a multiplicity of biological activities and beneficial health effects including inhibition of some degenerative diseases for a human such as cardiovascular diseases, cancers, reducing plasma oxidation stress and slowing aging [1]. Several

studies recorded that the polyphenol could improve memory decline, motor, and cognitive performance as well as oxidative status in the cerebellum [2].

Vitis (grapevines) is a genus of 60 species, among of them *Vitis vinifera*, belonging to family Vitaceae [3]. *Vitis vinifera* leaves are used in traditional food (dolmathes) in some