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A POTENTIAL ALGAECIDE FROM THE PRUNING WASTES OF GRAPE (*Vitis vinifera*) STEMS AND LEAVES

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Abstract

A series of water quality and ecological problems are caused by algal blooms, and natural allelochemicals are considered as the source of algaecides due to their friendly advantages to environment. It has been reported that abundance of secondary metabolites are found in grape plants, and the extracts from the plant exhibit antioxidant, antibacterial and antifungal capacities. In order to reveal the anti-algal activity of grape pruning wastes and promote their usage, we analyzed the composition of the extracts from grape leaves and stems, and determined their effects on *Chlamydomonas reinhardtii*. The compounds identified from leaf and stem extracts included alcohols, aldehydes, ketones, acids, esters, phenolics, furans and terpenoids. Among these compounds, phenolics, furans and terpenoids were the main components. All of leaf and stem extracts can inhibit *C. reinhardtii* cell growth and reduce chlorophyll content and maximal efficiency of photosystem II photochemistry (Fv/Fm), and the inhibitory effects were enhanced with the increase of the extract concentration. The methanol extracts from grape leaves (MEL) contained the most compounds and had the strongest inhibitory effects. The response index (RI) of cell multiplication, chlorophyll a content, chlorophyll b content and Fv/Fm was -0.84, -0.83, -0.85 and -0.96, respectively, after the cells were treated with 12 $mg \cdot ml^{-1}$ MEL for 24 h. It has been reported that phenolics and terpenoids exhibit a wide range of antibacterial, antifungal and anti-algal properties, and they might be the main active ingredients to inhibit *C. reinhardtii* growth. Therefore, grape pruning wastes have a potential use value as an algaecide.

Key words: algaecide, extract, grape, leaf, stem

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