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Biological Activities of *Monostroma nitidum* Wines

Shao-Chi Wu[1], Kuo-Chang Zen[1], Jiun-Ru Chen[2] and Chorng-Liang Pan[2]*

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ABSTRACT

The subject of this research is to investigate the changes on antioxidative properties and anti-mutagenicity of the *Monostroma (M.) nitidum* wine, which made from *M. nitidum* (green alga) via fermentation with yeasts to produce green algal wine. As to the ability of chelating on ferrous ions of *M. nitidum* wines, the tested results indicated that *M. nitidum* wines were inferior to *M. nitidum* extract and its hydrolysate solution. The α-diphenyl-β-picrylhydrazyl (DPPH) free radical scavenging effect of *M. nitidum* wines ranged from 65.3% to 69.1%, which were better than *M. nitidum* extract and hydrolysate solution. The Trolox equivalent antioxidant capacity (TEAC) of *M. nitidum* wines increased with an increase in their ethanol content, and the *M. nitidum* wines with 20% sucrose added and fermented by the S6 yeast group obtained the highest TEAC (1.9 mM). The inhibitions of *M. nitidum* wines against the mutagenicity induced by 4-NQO were evaluated by *Salmonella typhimurium* TA98 and TA100, reaching 37-48% and 52-63% inhibition of mutagenesis, respectively. The inhibition effect of *M. nitidum* wines against the mutagenicity induced by indirect-acting mutagen Benzo[a]pyrene (B[a]P) with S9 mix were evaluated by *Sal. typhimurium* TA98 or TA100, reaching 28-45% and 37-55% inhibition of mutagenesis, respectively. The antioxidative abilities and antimutagenicity activities values were correlated with the soluble total polyphenols content in *M. nitidum* wines.

***Key words**: Antioxidative properties, Antimutagenicity,* Monostroma nitidum*, Wine.*

INTRODUCTION

For the green alga, *Monostroma* (*M.*) *nitidum*, the thalli are foliaceous, soft and gelatinous, with a yellowish green color, being about 2-4.5 cm tall and 18-33 μ thick. They are distributed in Hong Kong, Taiwan, China Sea, Ryukyu, and Japan. The main component of *M. nitidum* is mucilage, containing xylose (1.98%), galactose (19.25%), galacturonic acid (23.17%) and rhamnose (52.95%) (Chen *et al*., 2009).

Sulfated polysaccharides from Monostromaceae display many biological activities, such as anticoagulant, antiviral, antiherpetic, and antioxidant activities (Zhang *et al*., 2008). Maeda *et al*. (1991) research on heparinoid-active sulfated polysaccharides from *M. nitridum* showed 6-fold more antithrombin-activity than the heparin standard. Harada and Maeda (1998) found the chemical structure was rhamnan sulfate. Lee *et al*. (2004) study on sulfated polysaccharides from *M. nitidum* showed potent anti-Herpes simplex virus type 1 (HSV-1) activity. *M. nitidum* diet fed 30 Sprague-Dawley rats demonstrated the potential of seaweed as a natural source of sulfated polysaccharide substances with potential use in chemoprevention medicine (Charles *et al*., 2007). A notable reducing effect on plasma cholesterol in rats was found in the basic fraction of water-extractives, and it's could isolated arginine, glycine betaine, and β-homonetaine (Abe and Kaneda, 1973a). Among the two betaines, only β-homobetaine could reduce plasma cholesterol (Abe and Kaneda,

[1] Department of Food Science and Technology, Tung-Fang Design University, Kaohsiung, Taiwan 829, R.O.C.

[2] Department of Food Science, National Taiwan Ocean University, Keelung, Taiwan 202, R.O.C.

* Corresponding author. E-mail: b0037@ntou.edu.tw