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Inhibition of lipid peroxidation and H_2O_2-induced DNA damage by Red alga *Grateloupia filicina* extract

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Introduction

Natural antioxidant compounds like rosemary extracts and ascorbic acids play an effective role in oil peroxidation, recently it has been investigated that, ascorbic acid inactive as an antioxidant in mayonnaises containing fish oil. As well as rosemary extracts and compounds when test in bulk oil promote oxidation in corresponding oil. Therefore, the term of natural antioxidants is continuous to captive in the interest of food and biochemical industry.

G. filicina is traditional food in Kangwandoarea of Korea, previously Atukorala, Lee, Song, Ahn, Shin, Cha, Shahidi, & Jeon, (2003) revealed this alga as a potential source of natural antioxidants. Therefore, in this study, *G. filicina* extract was introduced at different concentration into fish oil and linoleic acid, and stored under forced connected oven (65℃) for extend their shelf life and oxidative stability. Further more, we introduced *G. filicina* extract to control hydrogen peroxide-induced DNA damage in rat lymphocytes. The damage was evaluated by means of single cell gel electrophoresis (Comet assay).

Materials and methods

The alkaline comet assay was conducted according to Singh, Graham, Singh, & Khan, (1995) with little modification. The weight gain data was obtained according to the procedure described Wanasundara & Shahidi, (1996). Acetic acid-chloroform method described by the AOCS, (1990) was used for determination of POV of oil samples. For TBAS value, One gram of oil sample was dissolved in 3.5 ml cyclohexane and 4.5 ml of 7.5 % trichloro acetic acid (TCA) / 0.34 % thiobarbituric

acid (TBA) were subsequently added and the resulted sample was shaken for 5 min. After centrifuging for 15 min at 1,000 g samples were heated in a water bath at 100℃ for 10 min. Conjugated diene hydroperoxies content was measured according to the method described by (Abdalla & Roozen, 1999).

Results and discussion

The antioxidant activity of an extract of *G. filicina* was evaluated using single cell gel electrophoresis and in linolec acid and fish oil induct period at 65℃. The algal extract inhibited H_2O_2 induced DNA damage significantly, through scavenging of H_2O_2 radical in vitro by means of comet assay. The maximum DNA damage inhibition was 68.9 % at concentrations of 50 μM, where the relative tail intensity decreased with the increase of concentration. The extract on the oxidation of refined fish oil and linoleic acid was investigated under forced-air oven conditions at 65℃. Progression of oxidation was examined using weight gain, peroxide value (PV), 2-thiobarbituric acid reactive substances (TBARS) and conjugated dienes data. Effectiveness of the methanol extract at 0.03 % and 0.05 % levels was superior to that of α-tocopherol at 0.01 % and the activity of 0.05 % extract was higher than that of BHA and BHT at 0.01%.

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