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Identification of Antioxidative Component of Marine Microalgae

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Introduction

Marine microalgae are used extensively in mariculture as food for marine animals, in particular larval and juvenile molluscs, crustaceans and fish. A wide range of microalgae has been tested, because not all species are equally successful in supporting growth of a particular animal. In addition, bioactivities of marine microalgae are recently investigated for the effective exploitation of unutilized marine resources. The term antioxidant is defined as any substance that, when present at low concentrations compared to that of an oxidizable substrate, significantly delays or inhibits oxidation of that substrate. Antioxidants have attracted a great attention to protect the quality of food from deterioration by lipid peroxidation and to defend living organisms against damage caused by free radicals. Synthetic antioxidants such as butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) may be added to food products to retard lipid oxidation. However, use of synthetic antioxidants in food products is under strict regulation due to the potential health hazards caused by such compounds. Therefore, search for natural antioxidants as alternatives to synthetic ones is of great interest among researchers. In this study, we report the identification and structural analysis of an antioxidantive component from two marine microalgae, *Nannochloris oculata* of *Chlorophyceae* and *Phaeodactylum tricornutum* of *Bacillariophyceae*

Materials and Methods

Methods. Two species of marine microalgae, *Nannochloris oculata* of *Chlorophyceae* and *Phaeodactylum tricornutum* of *Bacillariophyceae* were

purchased from Korea Marine Microalgae Culture Center, and used in experiments after dry-freezing.

Free radical scavenging activity assay. Radical scavenging activity (RSA) was examined by reduction of radicals formed by ionization of 2,2-dipheyl-2-picrylhydrazyl (DPPH). Solution of DPPH were prepared in methanol at concentration 1.5×10^{4} M. Each extract in 2 ml of methanol was added to a methanolic solution of DPPH. The mixture was shaken and left to stand at room temperature for 30 min. The absorbance of the resulting solution was measured spectrophotometrically at 517nm.

Result

Two species of marine microalgae, *N. oculata* and *P. tricornutum* were selected because their growth rates were higher and cultures were easier. The antioxidative activity of two species of marine microalgae was determined by measuring radical scavenging effect on DPPH radical. The chloroform fraction of P. tricornutum showed antioxidative activity, and thus fractionated with mixed solvents. The potential antioxidative activity was detected in dichloromethan : methanol (5:1) fraction. This fraction was further purified by preparative thin layer chromatography and repeated reverse-phase HPLC. The antioxidative activity, IC_{50} of the purified compound was 8.3 $\mu g/m\ell$. On the basis of chemical and spectroscopic evidence, the isolated compound was identified as mixture of zeaxanthin and lactucaxanthin. The antioxidative activity of the purified compound was comparable to those of α-tocopherol, BHT and BHA.

Reference

Asida S., S.A. Noguchi and T, Suzuki. 1994. Antioxidative Components, Xanthone Derivatives, in Swertia Japonica Mkino. *JOACS*, 71, 1095-1099

Brown, M.R. and S.W. Jeffrey. 1992. Biochemical composition of microalgae from the green algal calsses chlorophyceae and prasinophyceae. 1. Amino acids, sugars and pigments. *J. Exp. Mar. Biol. Ecol.* 161, 91-113