

ANTIOXIDATIVE ACTIVITIES OF SOME DIETARY FIBERS DETERMINED BY AN NIR EMISSION SPECTROSCOPY

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Constituents of several representative seaweeds, such as wakame *Undaria pinnatifida*; hijikia *Hizikia fusiforme*; and kombu *Laminaria japonica*, were found to have fairly large reaction rates determined by quenching experiments of emission spectra in the near-infrared region (I_{max}: 1270 nm) from singlet oxygen (1O₂).

Emission spectra of singlet oxygen generated from an aqueous solution of Rose Bengal under irradiation with a green laser (330 nm) were measured by a near-infrared (NIR) emission spectrometer constructed in our laboratory.

The quenching experiments were as follows: Intensities of emission spectra were measured in the absence (I₀) and in the presence of the seaweed constituents (I); Ratios of I₀/I were plotted against every concentration of the quenchers (Stern-Volmer plots) which gives a straight line. The slope of each line gives a k_{qt} value which gives a quenching constant k_q value (an antioxidative constant against singlet oxygen) when the t value (half-life time of singlet oxygen in the solvent used) was given.

The determined reaction rates are between 10³-10⁵ (g/l)⁻¹s⁻¹; the larger ones are as large as that of ascorbic acid, 8.4 x 10⁴ (g/l)⁻¹s⁻¹. Most of these seaweed constituents also showed antioxidative activity against auto-oxidation and superoxide as well as their immunological enhancing activity.

These results suggest a possibility that dietary fibers which are supposed to prevent the large-intestine cancer by their physical properties may prevent the cancer, at least in parts, by their chemical, antioxidative activity.