Phenolic compounds and in vitro antioxidant activity of selected species of seaweeds from Danish coast

Water and ethanol extracts of 16 species of seaweeds collected along the Danish coasts were screened for antioxidant activities using four in vitro antioxidant assays (2,2-diphenyl-1-picrylhydrazyl radical scavenging activity, reducing power, ferrous ion-chelating and liposome model system). Furthermore their effectiveness in retarding lipid peroxidation in fish oil was evaluated by an accelerated stability test. Significant differences were observed in total and individual phenolic content and the antioxidant activities of seaweed species evaluated. Ethanol was more efficient for polyphenol extraction than water. Polysiphonia fucoides and all the Fucus species tested showed highest radical scavenging activity, reducing power, inhibition of oxidation in liposome model system and in fish oil and were high in phenolic content. These seaweeds could be potential rich sources of natural antioxidants for protection of foods against oxidation. In general, the various antioxidative assays correlated well with the total phenolic content, indicating that algal polyphenols are active components in these extracts. However, in some of the antioxidative assays some species with low total phenolic content also showed good antioxidative effects indicating that some other co-extracted active compounds such as pigments and tocopherols in ethanol extracts and sulphated polysaccharides, proteins or peptides in water extracts may also contribute to the overall antioxidant properties and this needs further investigation.