Bioactive compounds from Fucus vesiculosus were extracted and their antioxidant efficacy in fish-oil-enriched foods was evaluated. Water extract (WE) and ethyl acetate fraction (EAF) were obtained and characterised. Furthermore, WE and EAF were added to fish-oil-enriched milk or mayonnaise. Oxidation during storage was evaluated. EAF showed highest phenolic and pigment contents compared with WE. Antioxidant efficacy was found to be dependent on the concentration in the foods. Furthermore, high antioxidant activity in the foods was related to high radical scavenging, high or moderate metal chelating ability, as well as high phenolic and carotenoid contents.