

**THE EFFECTS OF FOOD PROCESSING AND STORAGE ON ANTIOXIDANT  
ACTIVITY OF EDIBLE SEAWEEDS FROM SABAH WATERS**

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## ABSTRACT

Three edible seaweed species were identified and selected from the division of Rhodophyta, Chlorophyta and Phaeophyta based on their high *in vitro* antioxidant activity, availability and abundancy in Sabah waters. The objective of the study was to determine the effect of sun-drying, oven drying (50°C and 70°C) and freeze drying on antioxidant activity of red seaweed *Kappaphycus alvarezii*, green seaweed *Caulerpa lentillifera* and brown seaweed *Sargassum polycystum*. Assessment of antioxidant activity using FRAP (ferric reducing antioxidant power), DPPH (1,1-diphenyl-2-picrylhydrazyl) and  $\beta$ -carotene bleaching assays showed significant ( $P < 0.05$ ) differences for both *K. alvarezii* and *C. lentilifera* fresh samples and samples tested under different drying treatments. Thermal processing had been found to enhance the recovery of phenolic compounds in all seaweeds. Effect of different drying methods and storage conditions on the antioxidant activity of the different seaweed species varied. Phenolic content of green seaweed was more affected by low storage temperature as compared to room temperature. Various cooking preparations such as blanching, boiling, stir-frying and pickling had different effects in retaining and enhancing antioxidant compounds in seaweeds. Boiling increased total flavonoid,  $\beta$ -carotene and lutein in green seaweed while blanching increased total carotenoid in red seaweed. Overall, freeze drying showed better nutritional quality and antioxidant activity as compared to thermal drying. Freeze drying resulted in the least losses of antioxidant compounds such as carotenoids ( $\beta$ -carotene, lutein, zeaxanthin), flavonoids (quercetin, kaemferol, epicatechin, epigallocatechin), vitamin C and vitamin E ( $\alpha$ -tocopherol) content. However, the equipment and operation cost for freeze drying are higher and its drying capacity is lower than that of oven drying. Therefore, in selecting the most appropriate drying treatment, the economic factors and the way the seaweeds will eventually be used should be considered.