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Commercial-scale Preparation of Biofunctional Fucoxanthin from Waste Parts of Brown Sea Algae *Laminalia japonica*

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Fucoxanthin exhibits a preventative function with degenerative diseases such as cancer and metabolic syndrome without side effects. Therefore, commercial-scale preparation of fucoxanthin is needed, but it has been very difficult to find the required resources to do so. The aim of this study is to develop a preparation method of fucoxanthin using waste parts of cultured kombu (*Laminalia japonica*). Around 79,000 t of cultured kombu is discarded in Japan during thinning out and forming processes, which includes a high amount of fucoxanthin (21.3-17.8 mg/100 g fresh weight). Waste parts of kombu were examined to obtain better quality fucoxanthin. Heating increased fucoxanthin recovery, and additional washing with tap water reduced the salt content of the fucoxanthin extract. Cutting waste parts of kombu into 5-mm wide strips made extraction easier without the leakage of fucoxanthin during handling. After freezing and transportation to the extraction factory, kombu showed the best recovery of fucoxanthin and the lowest content of salt following two extractions with 3 volumes of absolute ethanol. To remove chlorophylls the extract was subjected to silica gel column chromatography. Finally, 1490 g fucoxanthin was obtained from 10 t of waste parts of kombu and the recovery ratio was 82%. The fucoxanthin obtained was stable and reduced by only 2% in 6 months storage at 4°C. Thus, waste

parts of cultured kombu are a good bioresource for fucoxanthin extraction.

Keywords: fucoxanthin, bioresource, brown algae, waste kelp, extraction, preparation

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