

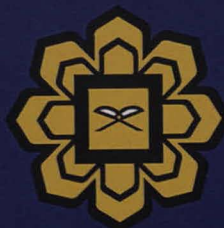
**EXPERIMENTAL METHODS  
IN MODERN BIOTECHNOLOGY**

**Editors**

**Ibrahim Ali Noorbacha**

**Mohamed Ismail Abdul Karim**

**Hamzah Mohd Salleh**

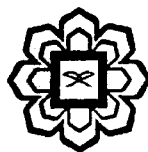


**IIUM Press**

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Ibrahim Ali Noorbatcha  
Mohamed Ismail Abdul Karim  
Hamzah Mohd Salleh



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# Techniques of Extraction and Purification of Fucoxanthin from Brown Seaweeds

Irwandi Jaswir, Dedi Noviendri, Hamzah Mohd Salleh, Muhammad Taher and Kazuo Miyashita

## 1. Introduction

Seaweed is classified as red seaweed, brown seaweed and green seaweed depending on their nutrient and chemical composition (Rajasulochana *et al.*, 2009). The estimated range of seaweeds is probably around 45,000 species. About 6000 species of seaweeds have been identified and are grouped into different classes (Chandin *et al.*, 2008). Most of seaweeds are divided into three categories based on their colours such as red (4,500 species), green (900 species) and brown (1,000 species) (Ismail *et al.*, 2002). Furthermore, Phang (2006) has been reported that the tally of Malaysian marine algae (seaweeds) now stands at 373 specific and intra specific taxa (17 taxa of Cyanophyta, 102 Chlorophyta, 182 Rhodophyta and 72 Phaeophyta) (phang, 2006).

Seaweeds serve as an important source of bioactive natural substances. Seaweeds have been used as food stuff in the Asia diet for centuries as it contains carotenoid, dietary fibres, proteins, essential fatty acids, vitamins and minerals (Rajasulochana *et al.*, 2009). Among carotenoids, fucoxanthin, which is the major xanthophylls carotenoid found in brown seaweed (Hosokawa *et al.*, 2004).

Fucoxanthin is a characteristic carotenoid of brown seaweed (Phaeophytes), such as *Hijikia fusiformis*, *Undaria pinnatifida* and *Sargassum fulvellum* (Shiratori *et al.*, 2005; Maeda *et al.*, 2007). Fucoxanthin (3'-acetoxy-5,6-epoxy-3,5'-dihydroxy-6',7'-didehydro-5,6,7,8, 5',6'-hexahydro- $\beta,\beta$ -caroten-8-on) is a xanthophyll that is widely distributed in nature and is the principal pigment found in brown seaweed (Roh *et al.*, 2008). This compound is the most abundant of all carotenoids mainly found in brown seaweeds and accounts for >10% of the estimated total natural production of carotenoids (Matsuno,2001). It has a unique structure including an allenic bond and 5,6-monoepoxide in the molecule. The chemical structure of fucoxanthin is shown in Fig. 1.

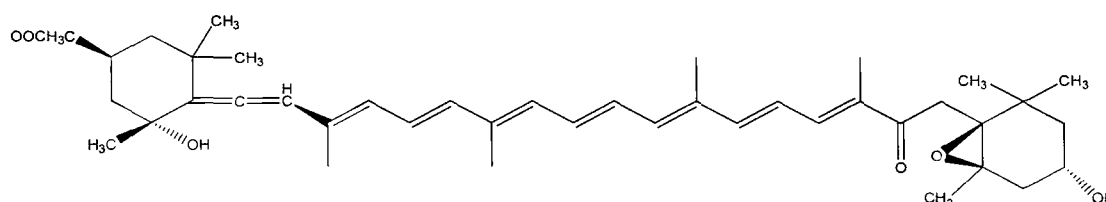


Fig. 1. Chemical structure of fucoxanthin (Heo *et al.*, 2008; Mori *et al.*, 2004).

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