Seaweed Res. Utiln., 39(1) : 17 - 22, 2017

Season, locality and parts of the thallus influence fucoidan yield and its compositions among the three Gulf of Mannar brown seaweeds

T. ELUVAKKAL AND K. ARUNKUMAR[1]*

Marine Algae Research Division, Post Graduate and Research Department of Botany
Alagappa Government Arts and Science College, Alagappa University, Karaikudi, Tamil Nadu, India
[1]Present address of corresponding author : Department of Plant Science, School of Biological Sciences
Central University of Kerala, RST Campus, Padanakkad - 671 314, Kasaragod, Kerala, India
Corresponding author : rsrnarun@gmail.com

ABSTRACT

In this study, fucoidan yield and its proximate composition(total carbohydrate, fucose and sulphate) extracted from *Sargassum wightii,Dictyota dichotoma* and *Stoechospermum marginatum* during different seasons and at various localities (Pamban-Palk Bay, Rameswaram, Pamban-Gulf of Mannar and Pudumadam, Gulf of Mannar) were recorded. In *Sargassum wightii,* the composition invarious parts was also reported. The yield and its compositions were found to be maximum in the monsoon and the minimum in summer and optimum in the premonsoon and postmonsoon seasons in the three brown seaweeds collected at Pamban-Gulf of Mannar. Significant difference in the fucoidan yield and its compositions were observed due to the influence of environment and seawater quality of respective locality. Significant variations in the fucoidan yield were recorded among the blade, air bladder and stem of *Sargassum wightii*. But the variations in the fucoidan compositions such as total carbohydrate, fucose and sulphate recorded among the blade, air bladder and stem of *Sargassum wightii* were not significant. This suggested that fucoidan composition in various parts of the brown seaweed *Sargassum wightii* was similar. However, insignificantly higher fucoidan content was found in leaf than air bladder and stem. It is due to the soluble form of fucoidan accumulated in the cytoplasm of leaf blade.

Introduction

Fucoidans are a group of sulphated polysaccharides primarily composed of L-fucose with less than 10 % of other monosaccharides. They are widely found in the cell-walls of brown seaweed, but not in other algae or higher plants. The species *Fucus vesiculosus* contains the highest concentration of fucoidans (up to 20 % on a dry weight basis) and isolated algal cell-walls of brown algae contain more than 40 % in dry weight. This polymer can easily be extracted using either hot water or an acid solution. Although the major physiological purposes of fucoidans in the algae are not thoroughly understood, they are known to possess numerous biological properties with potential human health applications (Berteau and Mulloy, 2003). The bioactivity of fucoidan for human health is evidenced as anticoagulant, anti-viral and anti-cancer (Zhuang*et al*.,1995). No toxicological changes were observed when 300 mg/kg body weight per day fucoidan was administered to rats. However, significant blood-cloting times were observed to be prolonged when concentrations were increased three fold (Li *et al*.,2008). Till date, there are several studies related to fucoidan content of brown seaweeds (Castro *et al*., 2015), but on the seasonal variations in the content and composition of fucoidan, only few studies have been made (Parsons, 1994; Honya *et al*., 1999; (Skriptsova *et al*., 2009; Nimura and Mizuta, 2001; Fletcher *et al*., 2017). Fucoidan level also varied depending on the age of the plants (Nimura and Mizuta, 2001; Zvyagintseva *et al*., 2003). There is a correlation between fucoidan content and seasonality (Honya *et al*., 1999).

Works on fucoidan content in relation to seasons and locality as well as distribution among various parts of the thallus are generally few (Fletcher *et al*.,2017) and lacking in Indian brown seaweeds. Therefore, in this study, fucoidan content was

Received : 27-03-2017; Revised received : 27-07-2017; Accepted : 30-07-2017