Fucoidan content and composition of *Colpomenia sinuosa* and *Myriogloea major* from Argentine Patagonia

N. M. A. Ponce, F. G. Dellatorre, E. Latour, P. Raffo and C. Stortz

Aquaculture & Fisheries Research and Development Group – National Technological University

GIDTAP-UTN
Grupo de Investigación y Desarrollo Tecnológico en Acuicultura y Pesca

The 7th Conference of the International Society For Applied Phycology

ISAP 2021

May 14, 2021 to August 13, 2021

Virtual Platform

Illustrated by Hiroko Uchida

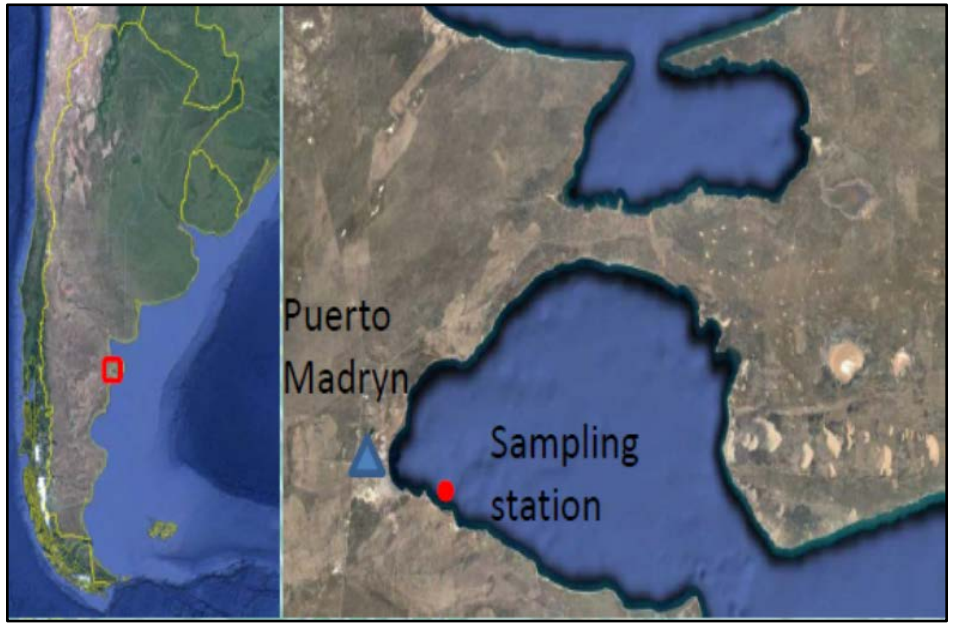
Fernando Gaspar Dellatorre – dellatorcnp@gmail.com / +54 9 280 4394457

Introduction

- Fucoidans are a class of sulfated polysaccharides, present in the cell wall of brown seaweeds, with intense bioactivity and increasing commercial applications.
- A common trait of brown seaweeds fucoidans is their high content of L-fucose residues and sulfate.
- Fucoidan from different species show variable amounts of other sugars or glucuronic acid and have also variable structural characteristics [1].
- The bioactivity of fucoidans is determined by their chemical composition and structure and is consequently linked to their biological origin.
- In this work, we present preliminary data on fucoidan yield and sulfate and monosaccharide composition of Colpomenia sinuosa (Mertens ex Roth) Derbès & Solier and Myriogloea major Asensi 1973, an endemic species of Argentine Patagonia.

Materials and methods

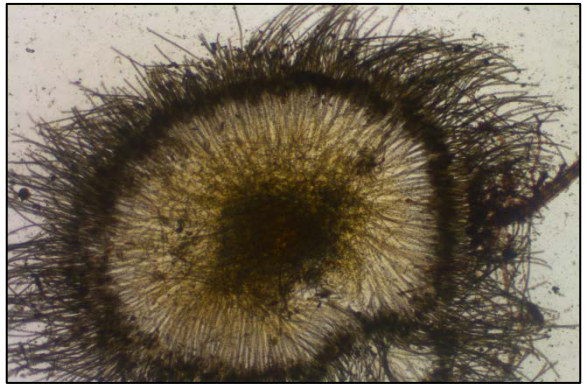
- Samples were taken from an intertidal rocky shore in the southwest margin of Nuevo gulf (Patagonia, Argentina) between January and May 2019.



- Macroalgal thalli were cleaned, washed, air-dried, and milled.

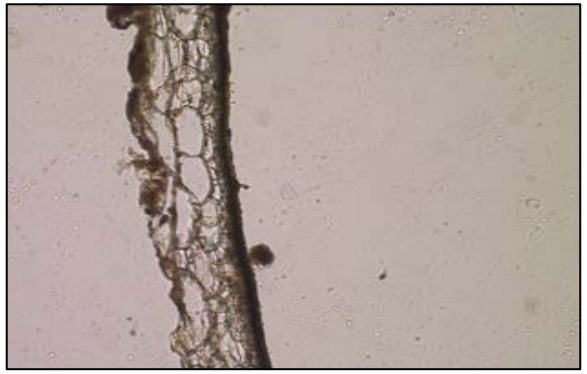
Myriogloea major Asensi 1973

- Order: Ectocarpales Family: Chordariaceae
- Cylindrical, solid, very gelatinous thalli, between 20 cm to more than one meter in length, with a diameter between 0.5 and 1.0 cm.



Colpomenia sinuosa (Mertens ex Roth) Derbès & Solier 1851

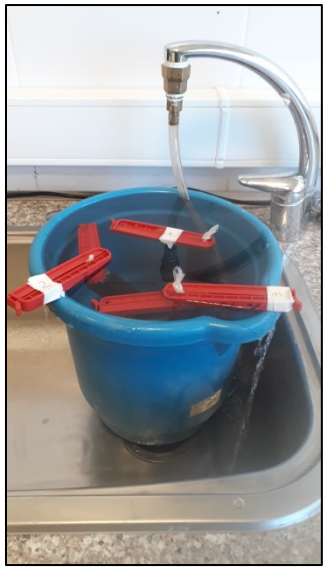
- Order: Ectocarpales Family: Scytosiphonaceae
- Spherical, light brown, early hollow thalli, from spherical to irregularly flattened and somewhat sinuous, with extended base, 3 to 10 cm in diameter when mature.



Materials and methods: Fucoidan extraction

- Fucoidan extraction technique was adapted from Ponce et al., (2003). An acid (0.01 M HCl; pH = 2) extraction (6 h at room temperature) followed by centrifugation, filtration, dialysis, and freeze-drying






Materials and methods: Characterization of the extracts

- Total carbohydrates were determined in the dried extract by the phenol-sulphuric method using fucose as standard.
- The sulfate content was determined turbidimetrically.
- Uronic acid content was determined according to the method of Filisetti-Cozzi & Carpita.
- Monosaccharide composition was determined by GC after acid hydrolysis and reduction to acetylated alditols [2]

Results and discussion

- Extraction yield (% in dry weight basis) was 1.3 ±0.05 % and 19.8 ±0.4 % for C. sinuosa and M. majors respectively.
- Neutral carbohydrates (anhydrous) mass proportion was 55.4 ±0.6 and 70.8 ±1.7 respectively for C. sinuosa and M. major.
- Uronic acids represented a 9.3 ±1.2 and for C. sinuosa and 8.5 ±0.8 for Myriogloea major.
- Sulphate groups (expressed as SO3Na) represented a mass proportion of 14.3 ±1.2 and 24.4 ±3.3 respectively for C. sinuosa and M. major.

- Monosaccharide composition:

	Colpomenia *sinuosa*	Myriogloea *major*
Fucose	46 ±2.8 %	82.2 ±7.8 %
Galactose	18.9 %	2.1 %
Xylose	18.1 %	2.0 %
Arabinose	11.2 %	-
Mannose	5.3 %	-
Glucose	tr	13.6 %

Conclusion

- Preliminary results suggest that M. major could be a suitable candidate for fucoidan production. Further studies are needed to elucidate chemical structure and composition and to evaluate potential therapeutic properties.

- References:
- [1] M.T. Ale, A.S. Meyer, Fucoidans from brown seaweeds: An update on structures, extraction techniques and use of enzymes as tools for structural elucidation, RSC Advances, 3 (2013) 8131-8141.
- [2] N.A. Ponce, C.A. Pujol, E.B. Damonte, M.L. Flores, C.A. Stortz, Fucoidans from the brown seaweed *Adenocystis utricularis*: extraction methods, antiviral activity and structural studies, Carbohydrate Research, 338 (2003) 153–165.