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BACKGROUND: Among the vast worldwide marine biodiversity, macroalgae could be the most suitable source for bioprospection and sustainable development due to the great availability of the enough biomass production of raw materials for industries in the fields of nutrition, medicine, agriculture and cosmetics. In order to build the basis for developing a sustainable use of Colombian macroalgae, a preliminary study of primary and secondary metabolites in several genus from Colombian coasts was carried out. This work included *Gracilaria sp.* and *Acanthophora spicifera* (Rhodophyta), and *Sargassum c.f. ramifolium* (Ochrophyta).

METHODS

1. Samples

Sargassum ramifolium was collected from El Cabo de la Vela in the Department of La Guajira, *Sargassum sp* was collected in Playita Jacobo located in Providence and the samples of *Gracilaria sp* and *Acanthophora spicifera* were collected in the beach of Rodadero in Santa Marta - Magdalena.

1. Polysaccharides.

The extracts of polysaccharides were obtained from the previously cleaned and defatted (ethanol, ethyl acetate and hexane) samples through extraction with hot water, shaking and alcoholic precipitations. Crude precipitates were submitted to dialysis and ultrafiltration using 10 kDa and 100 MWCO membranes and freeze drying. NMR and FTIR spectroscopic techniques allowed to identify agar and carrageenan polysaccharides structures in Rhodophyta as well as fucoidan and alginate in Ochrophyta algae

2. Fatty acids and sterols.

Sterol analysis were carried out from fresh algae by the extraction and chromatographic method according with AOAC 970.51 protocol. The crude organic lipid extracts were saponified and sterified as established in the guide AOAC 996.06 for quantification of fatty acids and identification according to the retention time of the corresponding peaks in the standard "F.A.M.E. Mix C14-C24". Analytical GC of fatty acid methyl ester and of sterol acetates was carried out by GC-MS.

3. Antioxidant compounds

Antioxidant activity of selected macroalgae were compared with the vitamin E analog Trolox ((S)-(-)-6-hydroxy-2,5,7,8-tetramethylchroman- 2-carboxylic acid] by TEAC (Trolox Equivalent Antioxidant Antioxidant) assay and by the 1,1-Diphenyl-2-picrylhydrazyl colorimetric method (DDPH). The Oxygen Radical Absorbance Capacity (ORAC) and the Ferric Reducing Antioxidant Power (FRAP) assay used ascorbic acid.

Table 2. Some sterols detected in macroalgae from the Colombian coast

Name	Tr	Target ion	MW	<i>Gracilaria sp</i>	<i>Acanthophora spicifera</i>	<i>Sargassum ramifolium</i>	<i>Sargassum sp.</i>
Dehydrocholesterol	11.4	456	384	+	-	-	+
Cholesterol	11.6	458	386	+	+	+	+
Clionasterol	12.0	486	414	-	-	-	+

Table 3. Fatty acid composition of some Macroalgae from Colombia coast (% total)

Fatty acids	<i>Gracilaria sp</i>	<i>Acanthophora spicifera</i>	<i>Sargassum ramifolium</i>	<i>Sargassum sp.</i>
14:0	0,02	0,04	0,04	0,02
15:0	<0,01	0,01	<0,01	<0,01
16:0	0,62	0,33	0,31	<0,01
16:1ω9	<0,01	0,02	0,04	0,01
17:0	<0,01	<0,01	<0,01	<0,01
18:0	0,04	<0,01	0,01	<0,01
18:1ω9	0,05	0,1	0,13	0,04
18:2ω6	0,01	0,02	0,03	0,02
18:3ω6	<0,01	<0,01	<0,01	<0,01
18:3ω3	<0,01	<0,01	0,01	<0,01
20:0	<0,01	<0,01	<0,01	<0,01
20:1ω9	<0,01	<0,01	<0,01	<0,01
20:2ω6	<0,01	<0,01	<0,01	<0,01
20:3ω6	0,01	<0,01	<0,01	<0,01
20:4ω6	0,01	<0,01	0,03	0,01
20:5ω3	<0,01	<0,01	<0,01	<0,01
22:0	<0,01	<0,01	0,01	<0,01
22:1ω9	<0,01	<0,01	<0,01	<0,01
22:6ω3	<0,1	<0,01	<0,01	<0,1

RESULTS

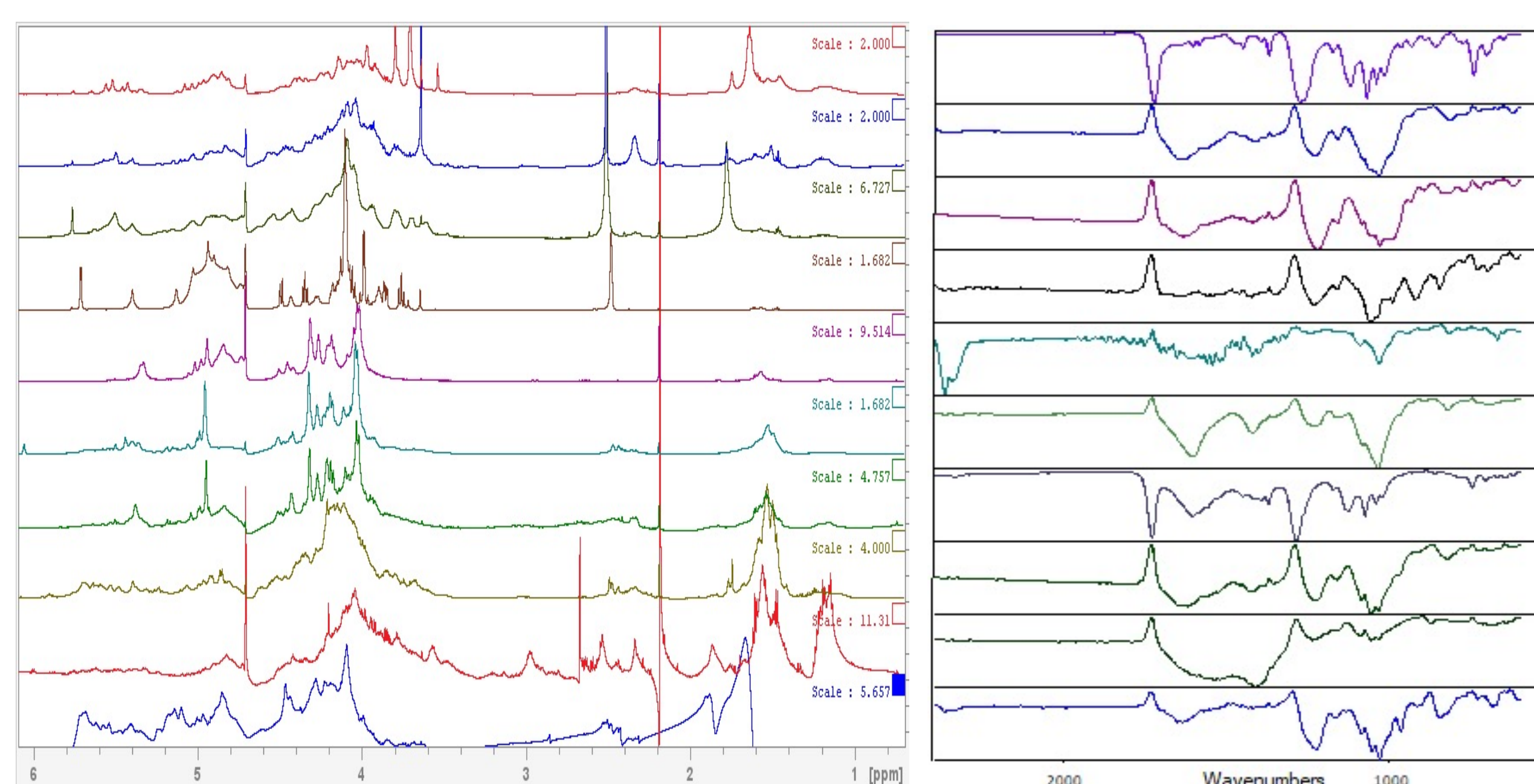


Figure 1. Polysaccharides identified from some Colombian macroalgae by **¹H-NMR (left):** (1) *Gracilaria sp*, (2) *Acanthophora spicifera*, (3) Commercial carrageenan (4) *S. ramifolium*, (5) *Sargassum sp.* (6) Commercial Fucoidan, (7) Commercial Alginate

Table 1. Antioxidant properties of selected macroalgae

Sample	DDPH (mg Trolox/100 g)	ORAC (mg Trolox/100 g)	FRAP (Eq Ascorbic acid/100g)	ABTS (mg Trolox/100 g)
<i>Gracilaria sp</i>	28.00	497.3	45.05	255.91
<i>Acanthophora spicifera</i>	39.2	541.39	49.2	283.46
<i>Sargassum ramifolium</i>	106.6	3474.86	120.26	1760.35
<i>Sargassum sp.</i>	55.75	2340.23	126.65	1257.62

CONCLUSION

The species included in this study are underutilized seaweeds which need to be assessed to fulfill the pertinent information required to establish their commercial value as a contribution for adding value to the local biodiversity available in Colombia. The presented results are hoped to contribute with the developing of a sustainable use of Colombian algae Unique structures need to be determined by purification and chemical characterization to confirm details for individual species and for different collecting areas, which could provide insights about their variability looking for a quality for possible commercial use.

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