

EVALUATION OF DIVERSE ANTIOXIDANT ACTIVITIES *IN VITRO* OF POLYSACCHARIDES DERIVED FROM BROWN ALGAE

Lara Čižmek^{1,2*}, Sanja Babić^{1,2}, Klaas Van Hayelwick³, Ana Dobrinčić⁴, Verica Dragović-Uzelac⁴, Rozelindra Čož-Rakovac^{1,2}

¹Ruder Bošković Institute, Bijenička 54, 10000 Zagreb, Croatia

²Center of Excellence for Marine Bioprospecting (BioProCro), Ruđer Bošković Institute, Bijenička 54, 10000 Zagreb, Croatia

³University of Ghent, Faculty of Bioscience Engineering, Onderbergen 1, 9000 Gent Belgium

⁴University of Zagreb, Faculty of Food Technology and Biotechnology, Pierottijeva 6, 10000 Zagreb, Croatia

*lczmek@irb.hr

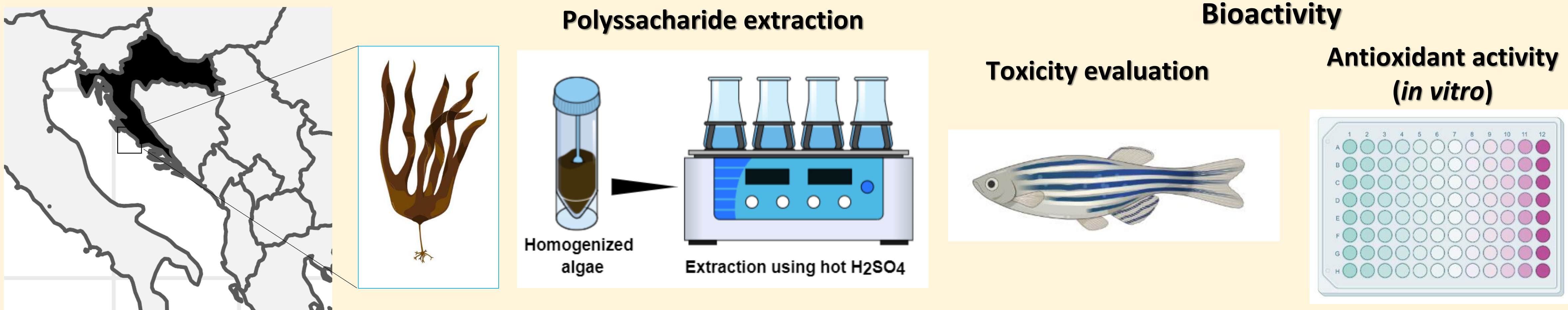
INTRODUCTION

Among a large number of marine extracts and different isolated bioactive compounds, polysaccharides are recognized as one of the most promising sources of different biological activity (1, 2). Their structure and biological activity are highly influenced by growth location and harvesting season that cause even intra-species variation, thus offering an inexhaustible source of novel bioactive compounds (3) with unique physiological and chemical properties, including anti-inflammatory, antioxidant, antimicrobial, antiviral, anti-coagulant, and antitumor activities (4).

OBJECTIVES

- Comprehensive research and determination of antioxidant activities *in vitro* of water-soluble polysaccharide extracts from 5 brown algae:
 - Cystoseira barbata*
 - Cystoseira compressa*
 - Halopteris scoparia*
 - Fucus virsoides*
 - Padina pavonica*
- Test of embryotoxicity potential to determine their safety for non-target organisms and humans.

METHODS



RESULTS

Table 1. Sample abbreviations and extraction yield of obtained polysaccharides from five brown algae using hot sulphuric acid.

Species name	Sample abbreviation	Extraction yield (%)
<i>Cystoseira barbata</i>	CYBA	10.83
<i>Cystoseira compressa</i>	CYCO	14.81
<i>Halopteris scoparia</i>	HASC	7.21
<i>Fucus virsoides</i>	FUVI	18.21
<i>Padina pavonica</i>	PAPA	5.66

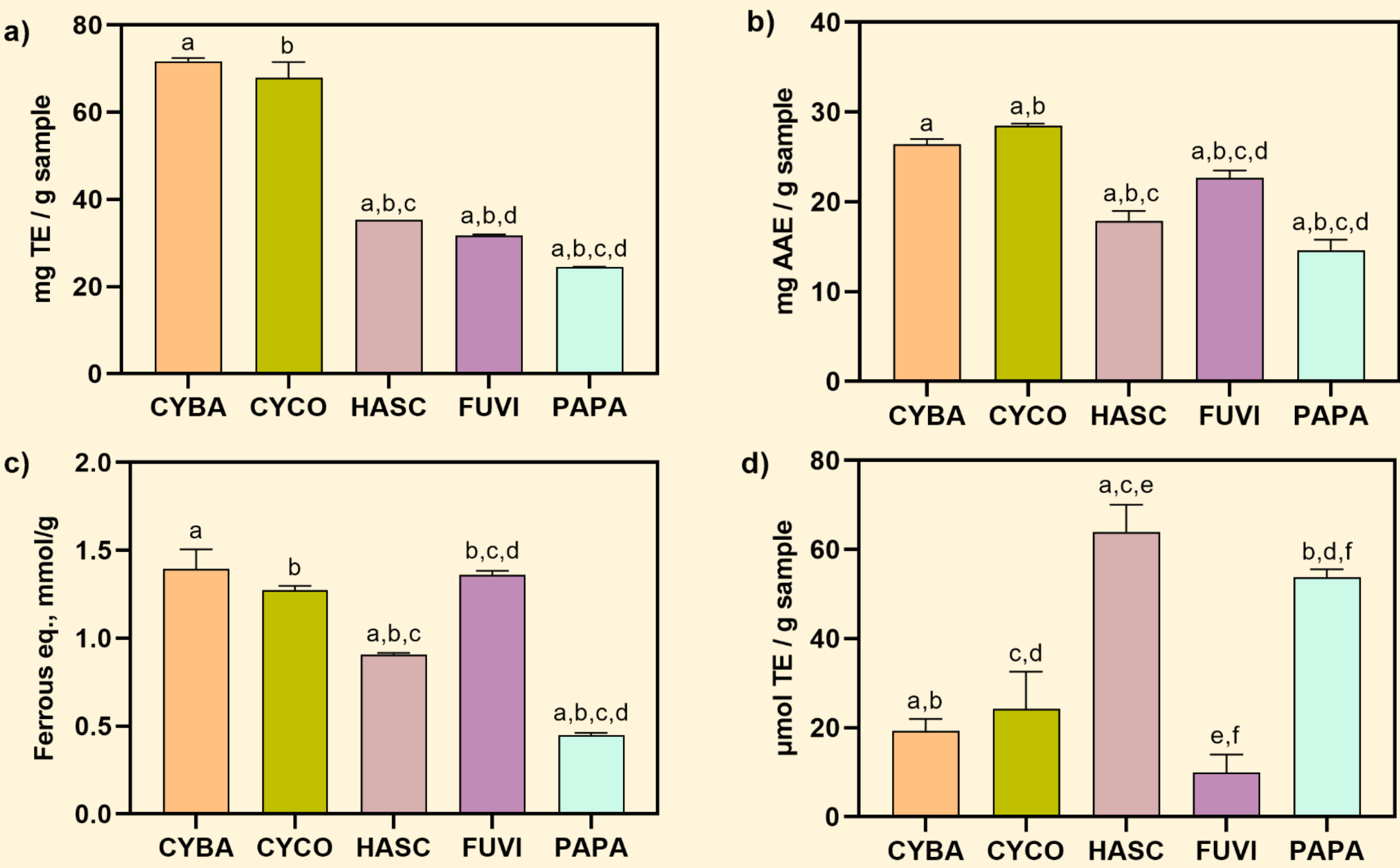


Figure 1. Results of four different antioxidant activity assays: **a)** ABTS, **b)** DPPH, **c)** FRAP, and **d)** ORAC. The tests were performed on the polysaccharide's fractions (10 mg/mL) of five brown algae from the Adriatic Sea. Columns marked with the same letter indicate a significant difference ($p < 0.05$).

CONCLUSIONS

- Pretreatment with organic solvents for the removal of interfering compounds was conducted and extraction of polysaccharides in acidic conditions followed by precipitation was performed. A high extraction yield was obtained for all samples.
- Results of both ABTS and DPPH measurements implied 2-3 fold higher ($p < 0.05$) activity for CYBA and CYCO fractions than HASC, FUVI, and PAPA with the inhibition percentage around 80 %, and positive correlation with Pearson corr. coefficient of $r^2 = 0.8$ ($p < 0.05$).
- The results obtained using FRAP assay implied that a large number of polysaccharides use the electron transfer (ET) mode of action in radical quenching.
- ORAC assay revealed that the highest activity was obtained for HASC which implies extraction of polysaccharides with different substituent groups.
- The results, along with no toxic effect, show the potential of marine-derived compounds in different areas of research and applications.

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