

## STUDY OF THE POTENTIAL OF TWO RED ALGAE EXTRACTS AGAINST OXIDATIVE STRESS. OPTIMISATION AND QUANTIFICATION OF ANTIOXIDANT COMPOUNDS

Samanta García-Oms\*<sup>1</sup>, Javier Pacheco-Juárez<sup>2</sup> Dolores Cejalvo-Lapeña<sup>3</sup>, José Miguel Lloris-Carsi<sup>4</sup> and Carolina Padrón-Sanz<sup>3</sup>

<sup>1</sup>Escuela de Doctorado, Universidad Católica de Valencia "San Vicente Mártir", 46008 Valencia, Spain

*samanta.garcia@ucv.es*

<sup>2</sup>Instituto Universitario de Estudios Ambientales y Recursos Naturales (i-UNAT), Universidad de Las Palmas de Gran Canaria, 35017 Las Palmas de Gran Canaria, Spain

*javier.pacheco@ulpgc.es*

<sup>3</sup>Centro de Investigación Traslacional San Alberto Magno, Universidad Católica de Valencia "San Vicente Mártir", 46001 Valencia, Spain

*carolina.padron@ucv.es*

<sup>4</sup>Facultad de Medicina, Departamento de Cirugía, Universidad de Valencia, 46010 Valencia, Spain

*jm.lloris@uv.es*

### Abstract:

Oxidative stress occurs when there is an imbalance between the action of free radicals (ROS) and endogenous enzymatic antioxidants, causing oxidative damage at cellular level (Grande *et al.*, 2006). Therefore, in these situations, it is necessary to apply exogenous antioxidants (Machu *et al.*, 2015). Seaweeds are a natural source of these compounds, their antioxidant capacity is mainly due to the presence of active biomolecules, which could be beneficial in the treatment of cellular damage caused by oxidative stress (Sánchez-Bonet *et al.*, 2021; Yalçın *et al.*, 2021). The objective of this study was therefore to obtain crude extracts from the red algae: *Palmaria palmata* and *Porphyra sp.*, and characterize their composition by means of chromatographic techniques.

To obtain extracts with the highest antioxidant activity, UAE extraction was used and the variables optimised were: quantity of algae, type, volume and concentration of solvent, time-power and temperature. Optimal extraction conditions were: 8 g of algae, 20 mL of ethanol-water (40:60), 10 min-300 W and 65 °C for *P. palmata* and 35 °C for *Porphyra sp.*

Antioxidant activity was determined by the DPPH method, obtaining better results for *Porphyra sp.* than *Palmaria palmata* (87.64% vs. 78.70%, respectively). These results were confirmed by ORAC and FRAP assays. In addition, the total content of polyphenols (Folin-Ciocalteu) and polysaccharides (Dubois) of the optimised extract were determined. Lastly, by means of HPLC-DAD, the polyphenol content was determined by quantifying 11 polyphenols in *Palmaria palmata* and 10 in *Porphyra sp.* And, by means of HPLC-FI, the pigments: fucoxanthin, violaxanthin, lutein and chlorophyll a' in *Palmaria palmata*, and lutein and chlorophyll a' in *Porphyra sp.* were identified and quantified.

The results obtained confirm the high potential of *Palmaria* and *Porphyra* algae in the possible treatment of oxidative stress.

**Key words:** Oxidative stress, natural antioxidants, *Palmaria palmata*, *Porphyra sp*, liquid chromatography

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