FOUR ALGAE STRAINS COLLECTED FROM LAS CANTERAS BEACH AS SOURCES OF ANTIOXIDANTS

A. Cunill*, A. M. Baracaldo, M. Rico, A. Rivero and M. Suárez de Tangil

Departamento de Química, Universidad de Las Palmas de Gran Canaria, Campus de Tafira, 35017 Las Palmas de Gran Canaria, SPAIN.
Instituto de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria, Unidad Asociada ULPGC-CSIC, Las Palmas de Gran Canaria, SPAIN.
anna.cunill101@alu.ulpgc.es, ana.baracaldo101@alu.ulpgc.es, milagros.ricosantos@ulpgc.es, argimiro.rivero@ulpgc.es, miguel.*suarezdetangil@ulpgc.es*

Abstract: The massive influx of algae affects the entire coastal ecosystem. These algae could become a source of natural products with several applications in the food, feed, cosmetic and pharmaceutical industries. Four algae strains (*Dictyota dycotoma, Dictyota fasciola, Hypnea spinella and Sargassum vulgare*) were isolated from samples collected from Las Canteras beach (Las Palmas de Gran Canaria, Gran Canaria), freeze-dried and kept in darkness until analysis.

Despite synthetic compounds butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) are classified as cancer promoters (Saito et al., 2003), they are widely used antioxidant food additives. Therefore, their replacement by safer antioxidants has been extensively studied (Jerez-Martel et al., 2017). Algae extracts were screened for their capacity to scavenge 1,1-diphenyl-2-picrylhydrazyl radical (Bondet et al., 1997). All algae samples showed higher radical scavenging activity than BHT (12.75%), and *S vulgare* exhibited higher activity than BHA (75.1 and 62.47% respectively). Their reducing ability was also estimated using the ferric reducing antioxidant power assay and ranged from 37.8 to 154.2 µmol of reduced Fe^{+2} g^{-1} of dry biomass (Benzie and Strain, 1996).

Seaweed polysaccharides show several bioactive properties (Amna Kashif et al., 2018; Bauer et al., 2021). Freeze-dried algae were subjected to: (i) acid hydrolysis (3M HCl) at 121ºC for 1h; (ii) aqueous extraction. Carbohydrates were determined with the anthrone colorimetric method using a glucose standard curve ($y=0.0103x+0.1459$; $R^2=0.9982$). Contents (expressed as mg of glucose g^{-1} of dry biomass) ranged from 0.75 to 6.40 in aqueous extracts, and from 4.52 to 8.63 in acid hydrolysates of dry biomass.

This study confirms the potential possibilities of these algae collected from Las Canteras as sources of antioxidants. The massive influx of algae on the coasts could become a revulsive for the local economy by developing new commercial and industrial activity using these algae as raw material.

Key words: Algae, Las Canteras, Carbohydrates, Radical scavenging activity

Acknowledgments: The authors thank Fernando Esquiroz Martel for providing algae strains. Anna Cunill thanks the scholarship ref.21CO1/012584, and Ana Mª Baracaldo also thanks the scholarship ref.21AE1/195628, both financed by the Ministerio de Educación y Formación Profesional.

References:

Amna Kashif, S., Hwang, Y. J., Park, J. K. (2018). Potent Biomedical Applications of Isolated Polysaccharides from Marine Microalgae Tetraselmis Species. Bioprocess Biosyst. Eng., 41(11), 1611–1620.

Bauer, S., Jin, W., Zhang, F., Linhardt, R. J. (2021). The Application of Seaweed Polysaccharides and Their Derived Products with Potential for the Treatment of Alzheimer's Disease. Mar. Drugs, 19(2).

Benzie, I.F.F.; Strain, J. The ferric reducing ability of plasma (FRAP) as a measure of antioxidant power: The FRAP assay. Anal. Biochem. 1996, 239, 70–76.

Bondet, V., Brand-Williams, W., Berset, C. (1997). Kinetics and Mechanisms of Antioxidant Activity Using the DPPH• Free Radical Method. LWT - Food Sci. Technol., 30(6), 609–615.

Jerez-Martel, I., García-Poza, S., Rodríguez-Martel, G., Rico, M., Afonso-Olivares, C., Gómez-Pinchetti, J. L. (2017). Phenolic Profile and Antioxidant Activity of Crude Extracts from Microalgae and Cyanobacteria Strains. Journal of Food Quality, doi:10.1155/2017/2924508.

Saito, M., Sakagami, H., Fujisawa, S. (2003). Cytotoxicity and Apoptosis Induction by Butylated Hydroxyanisole (BHA) and Butylated Hydroxytoluene (BHT). Anticancer Research, 23, 4693–4701.