

OSBORNE FRACTIONATION: AN APPROACH FOR RED MACROALGAE PROTEIN ASSESSMENT

Agricultural, Marine and Food Biotechnology

OP - (733) - OSBORNE FRACTIONATION: AN APPROACH FOR RED MACROALGAE PROTEIN ASSESSMENT

Nunes, Rafaela (Portugal)¹; Ferreira-Santos, Pedro (Portugal)¹; Moreira, Catarina (Portugal)¹; Teixeira, José (Portugal)¹; Rocha, Cristina (Portugal)¹

1 - Centre of Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

Body

Although animal sources enhance consumers' nutritional satisfaction, their cost, consumer's dietary restrictions, as well as an increasing interest in vegetarianism, organic food and locally grown foods emphasizes the importance of finding new sustainable alternatives of protein sources in order to satisfy anticipated increased global needs without magnifying the negative impact.

Porphyra dioica, *Gracilaria verrucosa* and *Chondrus crispus* are examples of red algae species that are used as a source of valuable compounds that can satisfy the demand for different foods and help to decrease the impact on animals use as the main food nutrients supplier.

Since there are a wide range of different proteins in macroalgae, it is important to study and assess which kind of proteins are present in different species, which will help to predict if they can be used to replace some conventional animal proteins.

The main objective of this work was the application of Osborne method for protein recovery from red algae species using different solvents (e.g., H₂O, NaCl, EtOH and NaOH). The produced fractions were characterized in terms of extraction yields, protein content (Lowry method) and molecular weight by gel electrophoresis (SDS-PAGE).

Results showed that the maximum protein content was obtained for *Porphyra dioica* and the minimum value for *Chondrus crispus* (i.e., 29.12 and 7.13 %, respectively). Regarding Osborne fractionation, all species showed higher protein content in water and NaOH resulting proteins fractions, being the best results associated with *Gracilaria verrucosa*, with a total protein extraction yield ($\frac{g_{\text{protein}}}{g_{\text{biomass}}}$) of 12.39 %. Comparing to the initial protein content of *Gracilaria verrucosa* ($17.45 \pm 0.05 \%_{\text{dw}}$) it is possible extract 70.99 % of total protein where 35.83 % and 18.05 % corresponds to water and NaOH fractions, respectively. From the SDS-PAGE gels it is clearly visible that different species showed proteins with different molecular weights.

Thus, it can be concluded that the Osborne method is a promising approach to characterize algal protein and can help choosing the best conditions for higher protein recovery from red macroalgae. The extracted proteins may be applied into different food prototypes in order to substitute conventional animal protein sources.

Acknowledgements

Portuguese Foundation for Science and Technology (FCT) - UIDB/04469/2020 unit and SFRH/BD/07527/2020; BioEcoNorte project (NORTE-01-0145-FEDER-000070); NORTE 2020 (Programa Operacional Regional do Norte 2014/2020); Portugal 2020; ESIF- European structural and investment funds.

Palavras-chave : Macroalgae, Osborne, Protein