
Enhancement of R-phycoerythrin extraction from *Mastocarpus stellatus* by the use of enzymatic hydrolysis

Huu Phuoc Trang Nguyen^{*†1}, Joël Fleurence¹, Michèle Morançais¹, and Justine Dumay^{†1}

¹Mer Molécules Santé (MMS) – Université de Nantes : EA2160 – LUNAM Université de Nantes, MMS, Nantes, 2 rue de la Houssinière, BP 92208 44322, Nantes Cedex 03, France, France

Résumé

R-phycoerythrin (R-PE) is the major phycobiliprotein in the red algae. R-PE can be exploited for pigment extraction and utilization such as natural colorant. *Mastocarpus stellatus*, abundantly found in French Brittany coasts, is known as a rich source of carrageenan and protein. In this study report, *Mastocarpus stellatus* is also investigated as a potential source of R-PE. The algae pretreatment is one of the important stage of the extraction procedure and determine the final extraction yields. In this study, the highest algal conditioning is achieved from freeze-dried seaweeds and grinding with liquid nitrogen. Indeed, R-PE extraction from the algal freeze-dried increased more three times than the wet algae. R-PE extraction from most seaweed is difficult due to the presence of large amounts of anionic cell-wall polysaccharides. Based on the algal cell wall degradation, enzymes are able to improve the extraction of R-PE. According to our results, action of enzymes degrading these polysaccharides is effective for the extraction R-phycoerythrin from *M.stellatus*. Using algal freeze-dried and different cell-wall-degrading enzymes have brought about the most interesting results for R-PE yield than algal thawed, especially using the enzyme xylanase. This preliminary step is then followed by the optimization of hydrolysis condition (enzyme substrate ratio, temperature and pH) by the mean of experimental design. After using the method response surface methodology, the R-phycoerythrin of algal freeze-dried extraction yields is 2.2 times greater than without enzyme treatment, 1.8 times greater than without optimization which could be considered as a good potential for the valorization of this biomass.

Mots-Clés: R, phycoerythrin, *Mastocarpus stellatus*, Enzyme xylanase, Extraction

*Intervenant

†Auteur correspondant: nguyenhuophuoctrang@gmail.com

‡Auteur correspondant: justine.dumay@univ-nantes.fr