

# Natural Pigments from Macroalgae: Enzymatic Extraction and Quantification of Phycobiliproteins from *Palmaria palmata*

Master thesis at the  
Institute of Technical Biocatalysis



## Introduction

Macroalgae represent a renewable source of valuable biocompounds which are a key element in the transition to a bioeconomy. Within these compounds, phycobiliproteins (PBPs) are extensively used in the cosmetic, food, pharmaceutical and biotechnological industries.

Nevertheless, the production of eco-friendly and cost-effective PBPs also requires the development of green and efficient extraction technologies, which represents a major topic nowadays.

Within the extraction process, cell disruption is a key step to maximize PBPs yields without compromising their integrity. In this sense, enzymatic cell disruption has several advantages such as high selectivity, low energy requirements, gentle conditions, and pollutant-free processing. Enzymatic pretreatment can preserve PBPs while allowing high levels of cell disruption.

In this Master Thesis, enzyme processes will be developed to extract pigments from the red algae *P. palmata*. The idea is to improve the extraction efficiency and optimize the process parameters. Furthermore, a method for the quantification of PBPs will be developed.

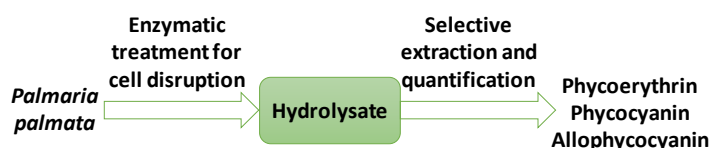


Figure 1: Schematic representation of the project steps

**Beginning: immediate**

## Content of the Thesis

During this master thesis:

- Method development for the identification and quantification of phycobiliproteins.
- Identification of enzymes and enzyme combinations for the efficient hydrolysis of *P. palmata* biomass.
- Investigation of the effect of the enzyme type, enzyme activity and reaction time on PBPs yields.
- Optimization of the enzymatic reaction conditions to achieve the highest PBPs yields.
- Downstream processing of the obtained hydrolysates for PBPs extraction.

## Contact

Name: Ana Malvis Romero  
Institute of Technical Biocatalysis  
Denickestr. 15 (K), Room: 3559  
Phone: +49 40-42878-4545  
Email: ana.malvis.romero@tuhh.de