Université de Bretagne Occidentale

MASTER BIOTECHNOLOGIES

PARCOURS MASTER INTERNATIONAL EN BIOTECHNOLOGIES MARINES

semestre 9

INGREDIENTS AND ACTIVE MOLECULES

Bioactive molecules from marine animal biomasses

Objectifs

The objective is to make the student ready to develop and propose a comprehensive approach for enhancing the value of fisheries and aquaculture products from animal origin (including by-products) for the development of new added-value molecules and ingredients, intended for food, feed, aquaculture, cosmetics, ...
Marine biotechnologies are targeting niche markets by offering products with low volumes and high added-values, and also mass markets like bio-sourced polymers.

2 crédits ECTS

Volume horaire

Travaux Pratiques : 4h
Travaux Dirigés : 12h
Cours Magistral : 20h

Pré-requis nécessaires

Bases of biology, biochemistry, enzyme engineering, microbial engineering.
Possibly, bases of marine biology and ecology.

Compétences visées

Learning outcomes:

- A comprehensive vision of blue biotechnologies on a worldwide scale.
- The capacity to identify the research teams and research activities for establishing collaborations.
- The ability to identify the emerging markets, their size and their potential.
- The ability to transpose data and concepts of the scientific literature into R & D approaches integrating scaling-up.
- The capacity to explain the biological activities and functionality of molecules to non-specialists while having a dialogue with experts.
- The ability to inject new ideas, and to create innovative products.
- The ability to understand what is hindering and driving in marine process, and to choose the most appropriate strategy for achieving the final objective.

Descriptif

Introduction: Global overview of how enhancing the value of fisheries and aquaculture products from animal origin: definitions, resources, markets, notion of value chain, current trends, and examples of innovation in Norway.

Chapter 1: Concentrates and isolates of proteins: conventional methods, Ph-shift, pulps.

Chapter 2: Gelatines et collagens: general properties, specificities of marine collagens, impact of process on techno functional properties. Niche and mass applications of gelatines. Innovative uses in nutraceutics, nutri-cosmetics et biomaterials (tissue engineering, ...)

Chapter 3: Enzymes in industrial processes: 3.1. Fish protein hydrolysates (FPH) with functional properties: pH-stat method, characterisation of peptidic populations, choice of enzymes for FPH. 3.2 Use of enzymes for the controlled destructuration of complex matrices: application to microalgae.

Chapter 4: Peptides exhibiting biological activities: definitions, examples in food, feed, nutraceutical, cosmetics,

Chapter 5: Biopolymers (chitin and chitosan, chondroitin sulphate, hyaluronic acid: general characteristics, extraction process, properties et example of uses.

Chapter 6: Marine lipids: structures and functions: PUFA and phospholipids

Bibliographie

Handbook of Marine Biotechnology 2015 SPRINGER

Marine Biotechnology : Enabling Solutions for Ocean Productivity and Sustainability (2013) OECD

An Introduction to Biomaterials, Second Edition (2011) Jeffrey O. Hollinger, CRC Press

Added Value to Fisheries Waste (2008) J.-P. Bergé Ed., © Transworld Research Network, Kerala, India.

Maximising the Value of Marine By-Products (2007) F. Shahidi Ed In: F. Shahidi (Ed.). Woodhead (GB),

Improving seafood products for the consumer (2008). T. Børresen (Ed.) Woodhead (GB)

Seafood research from fish to dish. Quality, safety and processing of wild and farmed fish (2006) Luten J., Jacobsen C., Bekaert K., Saebo A., Oehlenschlager J. (Eds.). Editions Wageningen Academic Publishers (Netherlands),

Marine Biotechnology I & II (2005), Le Gal & Ulber (Eds.) SPRINGER
Chitine et chitosane: du biopolymère à l'application (2009), Crini, Badot & Guibal, Presses Univ. Franche-Comté,
Biofutur N° 301 : Biotechnologies marines (Juillet-Août 2009), Tec & Doc
Substances naturelles d'origine marine : Chimiodiversité, pharmacodiversité, biotechnologies (2005) Kornprobst JM Tec & Doc

Modalités de contrôle des connaissances

Session 1 ou session unique - Contrôle de connaissances

Nature de l'enseignement	Modalité	Nature	Durée (min.)	Coefficient	Remarques
UE	CT	Ecrit - devoir surveillé	120	50%	
UE	CT	Ecrit - mémoire		30%	
UE	CT	Oral - exposé	35	20%	