Université de Bretagne Occidentale

MASTER BIOTECHNOLOGIES

PARCOURS MASTER INTERNATIONAL EN BIOTECHNOLOGIES MARINES

semestre 9

INGREDIENTS AND ACTIVE MOLECULES

Green biotechnology and intelligent mariculture

Objectifs

2 crédits ECTS

Volume horaire

Cours Magistral : 20h
Travaux Dirigés : 12h

Teaching objectives

The impact that biotechnology can have on our society and economy will be reviewed in this unit. An overview of industrial biotechnology and its applications in a number of product categories ranging from food ingredients, vitamins, bio-colorants, solvents, plastics and biofuels will be exposed. This module will also focus on the understanding of the environmental and safety risks associated with biotechnolgy together with methods for limiting damage and risk. New biotechnologies will affect the natural environment primarily in two ways: by bringing relatively “wild” areas, such as estuaries, under domestication, and by forcing areas now domesticated, such as farms, out of production, because of surpluses. The problem of the safety of biotechnology—the risk of some inadvertent side-effect—seems almost trivial in relation to the social and economic implications of these intentional uses. Aquaculture productivity is predicted to increase but will need to be re-designed to avoid pollution. The module will focus on the practice of integrating aquaculture and agriculture, also referred to as Integrated Agri-Aquaculture Systems (IAAS), which is based on the need to achieve more economically viable and environmentally sustainable primary industries, and specifically to enhance farm productivity and water use efficiency through multiple water use for integrated production of both terrestrial and aquatic crops. The importance of life cycle analysis (LCA) in biotechnology will be highlighted.

Compétences visées

Course objectives
- In lectures, to provide a framework for understanding contemporary constraints and opportunities for modern use of marine biomass for food and non-food products within a framework of integrated culture
- In paper analysis and small group work, develop skills in critical analysis and provide confidence in working with complex concepts in biology and society;
- In oral presentations, promote skills in succinct oral communication of science;
- In essays, promote scientific writing skills and to encourage the use of library, archival, electronic and other reference sources.

Descriptif

The unit will focus on the expected changes in society and technology, ranging from the shift in the supply of resources, the growing need for efficiency and sustainability of the production systems, changing consumer perception and behaviour and changing mariculture systems and practices. Many of these changes are expected to speed up the transition from a fossil-based to a bio-based economy and society. The module provides an understanding of the use of raw materials such as water, energy and land/coastal waters in industry and transport. It lays the foundation for further in-depth studies of ways in which biotechnology can support recycling, reuse of existing materials and in the generation of new supplies of raw materials.

During lectures and workshops, the following topics will be covered :

Chapter 1: industrial sustainability

Chapter 2: risk (perception and assessment)and safety in biotechnology

Chapter 3: environmental impact of biotechnology

Chapter 4 : integrated agri-aquaculture systems (IAAS).

Bibliographie

G. Acquaah. Understanding Biotechnology: An Integrated and Cyber-Based Approach 1st Edition. Publisher: Pearson Prentice Hall. ISBN-13: 978-0130945006 .

A. Scragg. Environmental biotechnology.2nd edition. Publisher: Oxford University Press. ISBN-13: 9780199268672

Modalités de contrôle des connaissances

Session 1 ou session unique - Contrôle de connaissances

Nature de l'enseignement	Modalité	Nature	Durée (min.)	Coefficient	Remarques
	CT	Ecrit - devoir surveillé	120	100%	