Use of languages

Principal working language: catalan (cat)

Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: Yes

Contact

Name: Mohammed Moussaoui
Email: Mohammed.Moussaoui@uab.cat

Teachers

Jaume Farrés Vicén

Prerequisites

There are no compulsory prerequisites. However, part of the contents of some 1st year and 2nd year courses are needed to be able to follow the course correctly. In particular, those of the following courses: Biocatalysis, Molecular Biology, Microbiology and Cell Culture.

Objectives and Contextualisation

The course aims to integrate the knowledge of biochemistry and molecular biology with those of microbiology and biochemical engineering, with emphasis on their application to the biotechnological processes.

Content

THEORY

PART I. INTRODUCTION


PART II. THE BIOTECHNOLOGICAL PROCESS


5. Immobilized biocatalysts (I). Concept, characteristics and industrial utility - Types of immobilization supports - Immobilization methods - Types of bioreactors for immobilized biocatalysts.


7. Microbial cells (I). Microorganisms of industrial interest - Advantages of microorganisms Elemental composition of microorganisms and culture media - Obtaining, selection and conservation of microorganisms - Collections of type strains.

8. Microbial cells (II). Genetic manipulation and metabolic engineering of microorganisms - Improvement of strains by mutagenesis, gene recombination and recombinant DNA techniques.

9. Fermentations. Concept of fermentation - Operating regimes - Batch, fed-batch, continuous and perfused fermentation - Kinetics of the growth of a discontinuous culture - Kinetic parameters: specific growth rate \( \left( \mu_m \right) \) and Monod constant \( \left( K_S \right) \). Yield \( \left( Y_{X/S} \right) \). Metabolic quotient \( \left( q_g \right) \). Factors affecting growth rate - Kinetics of product formation - Primary and secondary metabolism products - Product yield \( \left( Y_{P/S} \right) \).


PART III. BIOREACTORS


14. Aeration of the bioreactor. General considerations. Transfer of gas-liquid matter. Specific rate of oxygen uptake. Critical oxygen concentration \( \left( C_{CRIT} \right) \). Oxygen transfer rate. Considerations that affect the oxygen transfer rate. Experimental determination of \( k_{La} \). Elements used in aeration: types and efficiency. Hold-up: concept and distribution in stirred bioreactors.


PART IV. BIOTECHNOLOGICAL PRODUCTS


18. **Biological products of industrial interest.** Products of primary and secondary metabolism. Production of ethanol, acetone-butanol, glycerol, lactic acid and glutamate.


**SEMINARS**

Proposed topics:


4. **Biomining and bioremediation.** Metal leaching. Oil degradation and heavy metal recovery.


10. **Bioethics and Legislation in Biotechnology.** Medical, social and economic impact of biotechnology. Biotechnology practices posing ethical-social problems. Information derived from the Human Genome project.