

# HIGHER NATIONAL DIPLOMA IN BIOTECHNOLOGIES IN RESEARCH AND PRODUCTION

We train versatile technicians, ready to work in a laboratory and in bioproduction

## OUR TECHNICIANS ARE :

### *Versatile in biotechnologies, able to take part in*

- Public or private research (molecular, cellular and genetic biology),
- The biotech and pharmaceutical industry (bioproduction, quality control, development of operating procedures),
- Analytical laboratory (medical or environmental biology, food industry),
- Innovative start-ups (gene therapy, biofuels, industrial enzymes).

### *Ready to answer your needs / ready to provide*

- technical assistance in the lab (research, quality control, R&D),
- operational skills in bioproduction (cell culture, purification, traceability),
- quality standards (GPP, ISO, audits) and industrial challenges / issues (scalability, optimisation),
- computer skills (lab software, data management, automatisation).

### *Their assets*

- Polyvalence : they are able to adapt to various environments (research, production, control),
- Scientific rigour : respect of good practices (quality, safety, reproducibility),
- Initiatives : they are used to solving technical problems (fixing an equipment out of order),
- Ready for 4.0 Industry : use of softwares (LIMS, MES), automatization, data analysis.

## THEIR KEY ASSETS

### Operational management of a lab

- Organization : task planning, stock management (reagents, equipment), space optimization,
- Maintenance : ensuring the good functioning of various equipment (centrifuge, PCR, bioreactor),
- Safety : respect of HSE (biohazard waste, IPE), risk analysis,
- Continuous improvement : optimisation of protocols (ex : cost and time management)

### Technological expertise in research

- molecular biology : PCR, cloning, sequencing, CRISPR,
- Cell biology : prokaryotic and eukaryotic cell culture, transfection, production of recombinant proteins,
- Bio-informatics : data analyses (softwares as BLAST, R), data bank management,
- Applied research : setting-up and carrying out experiments, analysing results, writing up protocols.

### Bioproduction and industrialization

- Scaling-up,
- Culture medium preparation, growth follow-up (bioreactor),
- purification of biomolecules (chromatography, filtration),
- validation of procedures (traceability, batch file, GMP norms),
- Optimization of parameters (pH, temperature, time) to improve yield.

### Communication and team work

- Writing up of protocols, technical documents, lab book, audit reports,
- Technical English : understanding research papers, communicating with international suppliers,
- Collaboration : working with researchers, engineers, maintenance technicians.

## EXAMPLES OF MISSIONS GIVEN IN AN INTERNSHIP :

### **Secteur**

Academic research

Pharmaceutical industry

Analysis laboratory

Food industry

### **Missions types**

Cloning a gene, optimizing a PCR protocol, analysing sequencing data.

Production of a therapeutic protein in a bioreactor, validation of a batch according to GMP.

Setting up a detection technique (ELISA, qPCR), managing traceability.

Cultivation of microorganisms for industrial enzymes, testing GM strains.

## COURSES

### **General classes**

Hours/2 years

General knowledge and communication 120 h

120 h

English

120 h

Maths

120 h

Physics and chemistry

150 h

### **Professional classes**

Operational management of a research lab 210 h

210 h

Technological expertise for research in a biological lab 540 h

540 h

Manufacture of a biological product of high added value by biotechnological process 240 h

240 h

Collaboration with professional partners 285 h

285 h

Internships

2 x 8 weeks

## LYCÉE SAINT LOUIS MÉTIERS DE LA BIOLOGIE ET DE LA CHIMIE

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