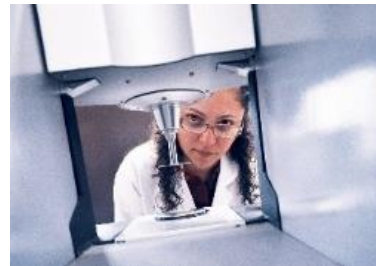


Tools and equipment



Procédés verts
Microfluidique
Fonctionnalisation
Végétaux Matrices Biodisponibilité Interactions
Valorisation Transferts
Poudres Lait
Bactéries Structuration
Agroressources
Abiotique Polyphénols Lipides Biocompatibilité Biotique
Halieutique Enzymes
Ciblage Alimentaire Antioxydants
Vecteurs
Auto-assemblage
Formulation

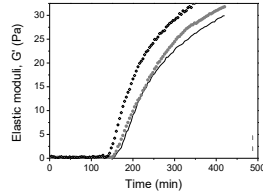


Tools for the study of the structure of soft matter from molecular level to macroscopic level

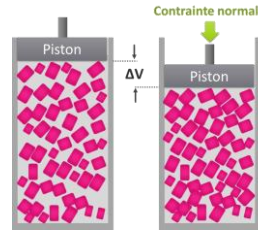
RHEOLOGICAL BEHAVIOUR

Liquid dispersions

- Viscosity
- Gel point



Rheological behaviour of powders



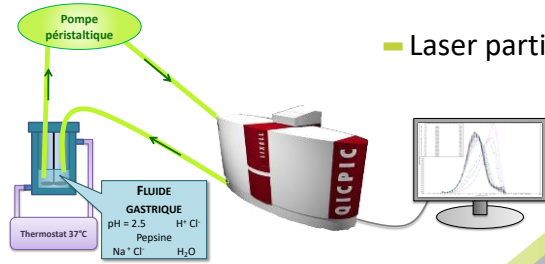
Penetrometry

Macroscopic level

PARTICLE SIZE (LIQUID DISPERSIONS OR POWDERED MATERIALS)

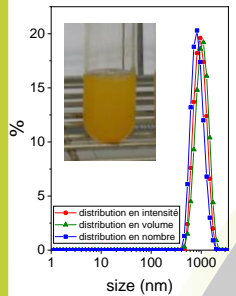
Microparticles

- Particle size and shape analysis
- Laser particle size analysis



Nanoparticles

Dynamic light scattering (DLS)



Nanometric scale
10⁻⁹ m

LABORATORY LEVEL

Micrometric level
10⁻⁶ m

- Instrumented microwaves
- Microfluidic chips
- Instrumented reactors

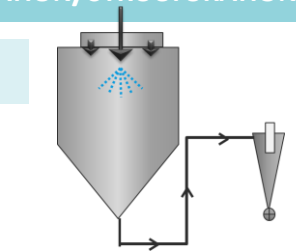
FORMULATION/STRUCTURATION

PILOT LEVEL

- High pressure homogenizer
- Ultrasonic probe
- Microfluidizer

- Mixer - cooker - homogenizer

- Powder mixer



- Spray drying tower

- Encapsulator

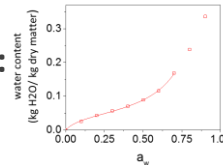
STRUCTURE AND MOLECULAR INTERACTIONS

Stability and thermal behaviour of polymers:

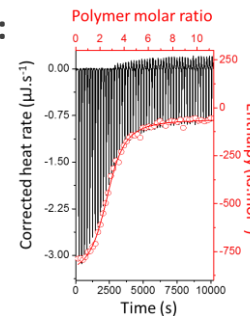
- Thermogravimetric analysis (TGA)
- Differential scanning calorimetry (DSC)

Interactions with water:

Hygroscopy/hydrophilia (DVS)



Study of interactions: Isothermal titration calorimetry (ITC)

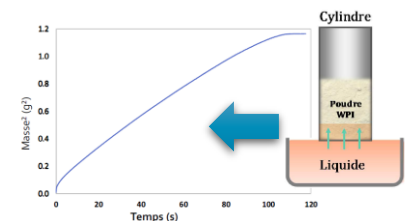


Permeability to gases:

Permeameter

Molecular structure: Fourier-transform infrared spectroscopy (FTIR)

Interface properties (Liq/Liq; Liq/Gas; Sol/Liq): Tensiometer (platinum plate and ring, Washburn cell)



SEPARATION – ASSAY – IDENTIFICATION – PURIFICATION

Fatty acid composition: GC

Lipid classes: TLC-FID

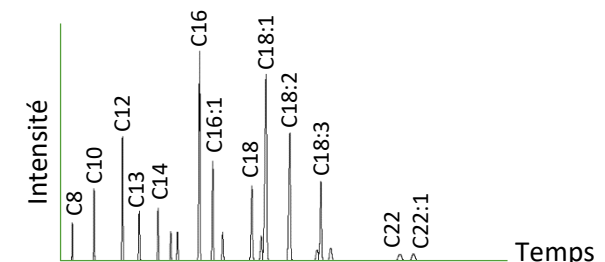
Assay and identification of proteins, lipids, carbohydrates, antioxidants: multi-detection HPLC (UV-Vis, fluo, ELSD)

Molecular weight of polymers: SEC-MALS

Preparation and purification: semi-preparative

HPLC

Purification of peptides: FPLC

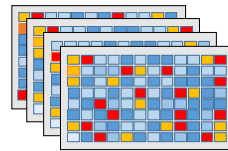


Échelle moléculaire

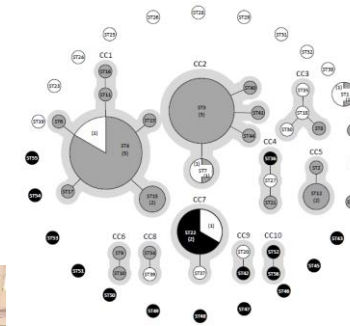
Tools for the study of living organisms

MICROBIOLOGY

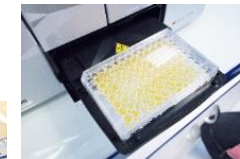
- Screening and study of ecological and molecular interactions (high throughput subculturing and pipetting robot)



- Genomics, population genetics, strain typing



- Study of level 2 pathogens (*Listeria monocytogenes*, *Staphylococcus aureus*, *Salmonella*...)

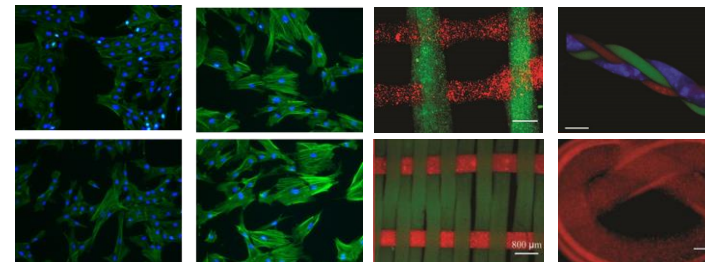


- Heterologous expression (*Escherichia coli* and *Lactococcus lactis*)

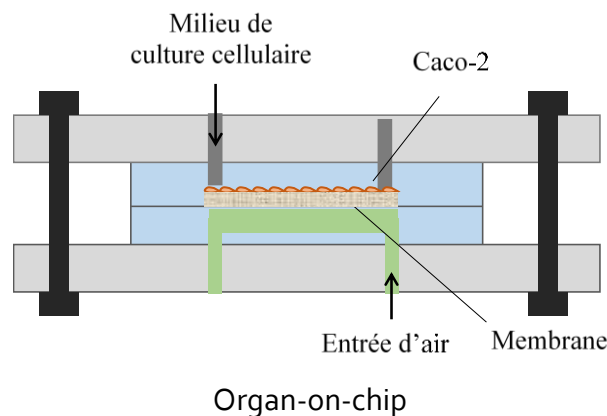


CELL CULTURE

- Biocompatibility and cytotoxicity**
(Mitochondrial respiration, cell proliferation, LDH assay)
- Simulation of cell environments**
(Microfluidic organs-on-chips)



Cell cultures on plates and matrices



- Interactions:**

- Vector – cells
- Matrix – cells
- Encapsulated active molecules - cells