

# Research Activity at ENITIAA

## National teaching and research institute in Food Science and Technology



### Introduction

ENITIAA is a teaching and research institute specialized in the field of food science and food process engineering. ENITIAA is affiliated to the French ministry of Agriculture and is member of the "Nantes Atlantic Universities" consortium. Research activity at ENITIAA represents 35 Prof. and Ass. Prof., 28 technicians and research engineers, 30 MSc students, 35 PhD students and around 15 post doc and research staff hired on specific industrial projects.



Hall of technology

### Teaching

Teaching at ENITIAA includes programs from under-graduated to Master level. PhD programs are also feasible with a registration at Nantes University. All teaching programs are focusing on food and agri food science and technology. Accessible teaching programs at ENITIAA are :

#### Professional Bachelor

- Responsible of production plant
- Food business - mass cons. products
- Central kitchen management
- Food refrigeration & equipment
- Maintenance of food equipments

#### Master of Engineering

Professional degree program :

- food process engineering
- food science
- food microbiology
- food biochemistry
- managing innovation in food
- control and statistics in food market

#### Master of Science in which ENITIAA is partner

- MSc - Food science and Nutrition
- MSc - Food Process Engineering and Environment
- MSc - Risk management in Food industry
- MSc - Quality management in the Food industry
- MSc - Biotechnology applied to sea resources

#### ENITIAA is also participating to the following MSc

- MSc - Chemistry applied to bio resources
- MSc - Management
- MSc - Biology, Biotechnology and Therapeutic Research
- MSc - Fundamental and applied microbiology U. Rennes)



Micro encapsulation

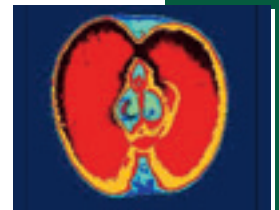


Image analysis

### Research strategy at ENITIAA

A Scientific Council gathers twice every year. This council (16 external experts) evaluates and steers research activity of ENITIAA. ENITIAA is involved in several national research projects and develops strong partnerships with National and European industries. ENITIAA is also involved in several EU funded projects and has a strong experience in managing and participating to such projects. Most research groups from ENITIAA are affiliated to National research institutes such as **CNRS** (National Research Council for Research) or **INRA** (National Institute for Research in Agronomy) through Joint Research Unit ( J.R.U or "UMR" = Unité Mixte de Recherche). Such Joint Research Unit gathers full researcher from the National Research Institutes concerned and Prof & Ass. Prof of the concerned research group. Research units of ENITIAA are :

- UMR " GEPEA " : food engineering and environment J.R.U. with CNRS since 2002
- UMR "Sensometry - Chimimetry" J.R.U. with INRA since 2000
- Research group on food aroma- biochemistry (affiliation to CNRS-GEPEA under process)
- Research group on food microbiology (affiliation to INRA under process)
- Research group "LARGEZIA" on food economics and industrial management



Crust flaking of bread



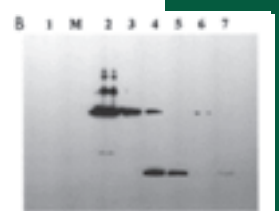
Aroma detection with GC

### West of France a land of opportunities for food research

West of France (Région "Pays de la Loire" where ENITIAA is located and Région "Bretagne" close by) gathers the highest concentration of agrifood business in the European Union. Research activity at ENITIAA is therefore oriented toward innovation with strong involvement of industrial partners in research projects.

### Research facilities at ENITIAA - Hall of technology

ENITIAA is equipped with a large Hall of Technology (2800 m<sup>2</sup> of productive area in total), which is among the largest one in France. It is fully equipped for unit operations. A 800 m<sup>2</sup> area is dedicated to pilot scale production (2 tons/day) in the area of bakery - pastry and ready to eat meal. This area has all veterinary agreement allowing the production of marketable production for market tests.



Tricine-SDS-PAGE products of CSF of *E. coli* Origami (DE3)(pLysS)

## Research on food and process Engineering

Two research groups are affiliated to CNRS (UMR "GEPEA"). Research activity of the two groups are :

### ● Product engineering - micro encapsulation ; Research themes :

Contact : Pr Denis PONCELET (poncelet@enitaa-nantes.fr)

- Micro encapsulation applied to food and non food materials
- Powder technology
- Formulation of foods
- Homogenisation process / emulsions and interfaces

### ● Refrigeration and thermo mechanical processes ; Research themes :

Contact : Pr Alain LE-BAIL (lebail@enitaa-nantes.fr)

- Coupled heat and mass transfer in porous material ; application to freezing and baking of bakery products
- Thermo mechanical aspects of phase change ; stress and strains during freezing
- Ultra High Pressure processing ; phase change, functional properties of food constituents,...
- Scrapped heat exchangers, extrusion,...
- Microwave thermal process ; application to thawing of foods, baking of bread...
- Process control; software sensor, evaluation of ice ratio, control of freezing - chilling steps

## Applied statistics - Sensometrics and Chemometrics

Contact : Pr E.M. Qannari (qannari@enitaa-nantes.fr)

The group working on applied statistics is affiliated to INRA (UMR "INRA"). Research activity focuses on :

- Statistics applied to food science
- Preference tests in food science
- Experimental design

## Research in Food Science - Aroma - Biochemistry

Contact : Pr Carole PROST (prost@enitaa-nantes.fr)

- Olfactometric analysis of food products and the influence on odour perception by mixing volatile molecules
- Influence of growing procedures, conservation, transformation, and diet on fish flesh aroma
- Study of texture-aroma interactions in food
- Influence of fabrication procedures and formulation on aroma of baked cereal products
- Aromatic development and deodorization of marine co-products and effluents
- Kinetic transfer of toxic volatile compounds

## Research in Food Science - Microbiology

Contact : Pr Hervé PREVOST (prevost@enitaa-nantes.fr)

- Engineering and industrial applications of anti microbial peptides
- Food protection, Bio preservation and Hurdle Technology - post genomic
- Microbial interactions and diversity within foodstuff such as sea food products anti microbial peptides
- Sourdough and lacto fermentation of agro-resources

## Research in Economy and Business (LARGEZIA-CRGNA)

Contact : Pr Daniel THIEL (thiel@enitaa-nantes.fr)

- Behaviour Analysis Of Food Supply Chains Economic Actors In Sanitary Crisis Situations
- Dynamics of the Biological Food Products Supply Chain
- Food Consumer Perceptions
- Knowledge Management and Information Systems
- Firm Performance Measurement
- Logistics, Traceability and new Integrated ERP Systems

