

Departamento de Industrias
Facultad de Ciencias Exactas
y Naturales
Universidad de Buenos Aires

Universidad de Buenos Aires (www.uba.ar)

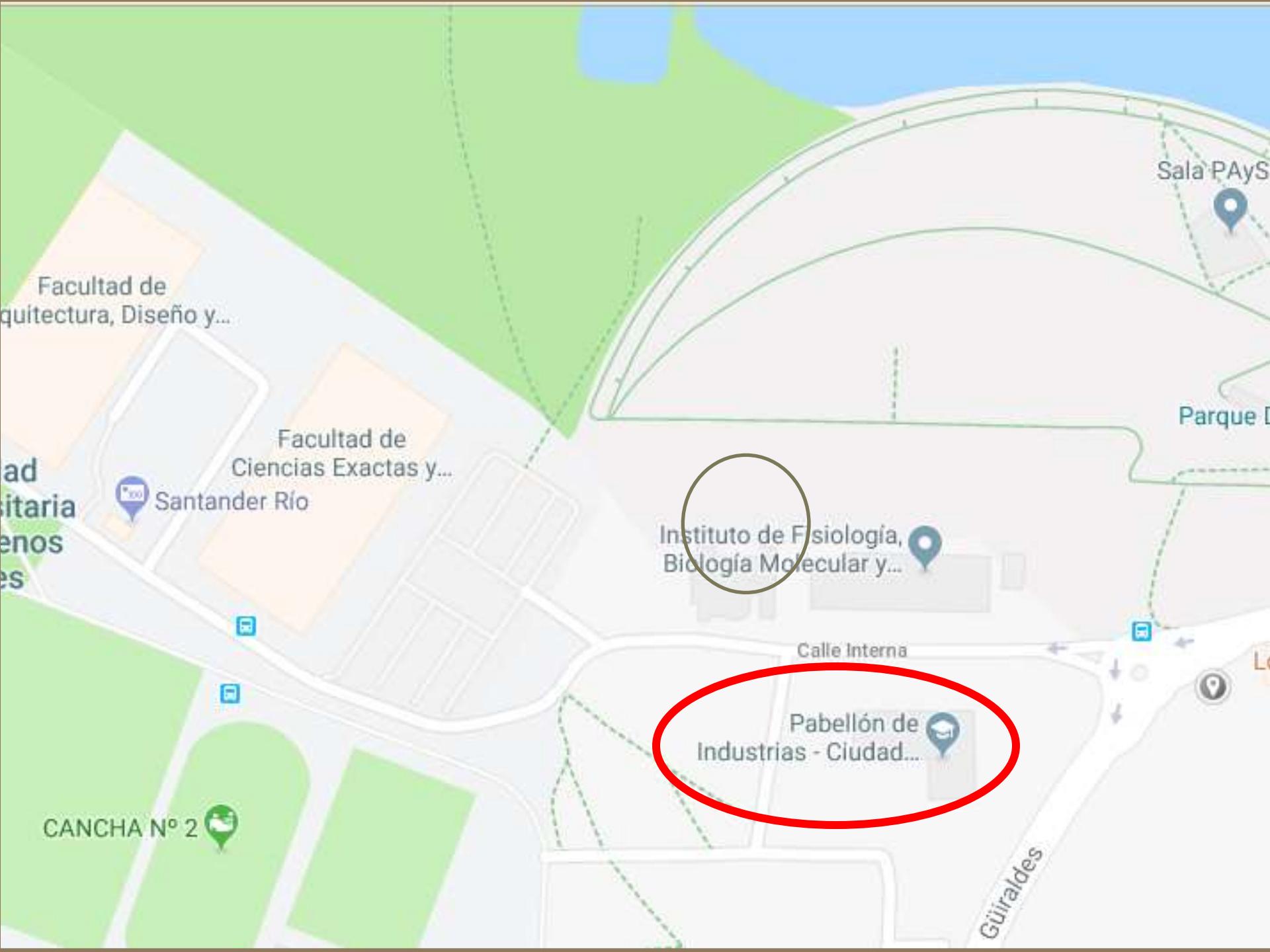
Created in 1821

13 schools distributed around the city

> 300000 undergraduate students

> 25000 graduate students

61 Research Institutes





Universidad de Buenos Aires

School of Science (Facultad de Ciencias Exactas y Naturales)

School of Engineering (Facultad de Ingeniería)

Department of Industries (Industrias)

Department of Chemical Engineering (Ingeniería Química)

ITAPROQ
(Institute of Food Technology and Chemical Processes)

ITHES
(Institute of Hydrogen and Renewable Energy)

Department of Industries

Undergraduate

and

Graduate
Programs

Chemical Science

Food Science and Technology

Food Engineering

PhD of the University of Buenos Aires, in
the area of Industrial Chemistry

Master in Bromatology and Technology
of Food Industrialization

Specialization degrees:

- Bromatology and Food Technology
- Industrial Biotechnology

Department of Industries

Research lines

Food technology

- ❖ Emerging technologies of food production and preservation for optimizing the quality
- ❖ Design of functional foods, with bioactive properties

Advanced materials

- ❖ Nanomaterials
- ❖ Biomaterials

Sustainable development

- ❖ Alternative energies
- ❖ Environmental remediation
- ❖ Process intensification
- ❖ Bioprocesses

Food technology & Materials

LABORATORIO DE OPTIMIZACION DE LA CALIDAD DE ALIMENTOS PRESERVADOS – LOPAC (Optimization of the quality of preserved foods)

- ❖ Vegetable products, regular, modified and nutrients enriched
- ❖ Biopolimeric matrices for antimicrobial products support
- ❖ Valorization of vegetables industrialization residues

Research Group for Harnessing Vegetables as Raw Materials

Lía Gerschenson, Silvia Flores, Eliana Fissore, Marina de Escalada Pla, Florencia Basanta,
Jhon Nieto-Calvache, Carlos Otálora, Adriana Castellanos, Enzo Zukowski

- ❖ Stability and antioxidant ability – relation with reological properties and structure
- ❖ Valorization of fruits and vegetable residues for obtaining food antioxidants and polysaccharides

Research Group for Upgrading Discarded Fruits and Vegetables

Ana María Rojas, María Florencia Basanta, Eliana Fissore, María Dolores De'Nobili,
Alondra Indrovo Encalada, Natalia Ehrenhaus, Ricardo Higuera

- ❖ Development of bio-preservation products
- ❖ Interaction between additives, ingredients and preservation factors
- ❖ Preservation of high moisture foods

Research Group for Optimization of Food Preserving Products

Carmen A Campos, María F Gliemmo, Laura I Schelegueda, Aldana L Zalazar, Malena González,
Sofía Delcarlo, Virginia Lara

Regular, modified and nutrients enriched vegetable products. Biopolymers matrices for antimicrobial products support. Valorization of residues arising from vegetables and fruits industrialization



Calabaza
(*Cucurbita moschata* Duch.
ex Poiret)



Remolacha
(*Beta vulgaris*
L.var conditiva)



Membrillo
(*Cydonia oblonga* Miller)



Durazno
(*Prunus persica* L.)



Papaya
(*Carica papaya* L.)



Functional food
ingredient, enriched
in soluble fiber and
with probiotics
(*Lactobacillus*)



Successfully incorporated
in beverages of acid pH



Biopolymeric
matrices



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Valorization of fruits and vegetable residues for obtaining food antioxidants and polysaccharides. Antioxidant preservation at food interfaces.



PEEL
MESOCARP



Microparticles

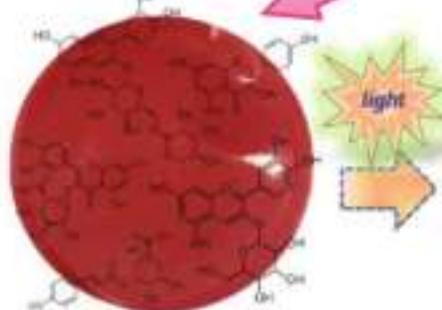
PLUM
(*Prunus salicina L.*)



functionality as antioxidant additive in chicken hamburgers



CHERRY
(*Prunus avium*)

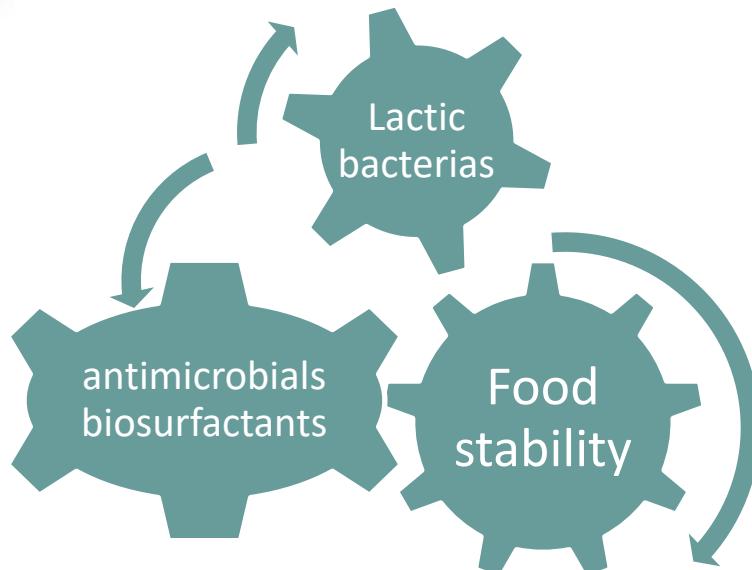


Bio-Materials : active edible films carrying natural antioxidants (phenolics)

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Bio-preservation products: interaction between additives, ingredients and preservation factors. Preservation of high moisture foods



Research Group for Optimization of Food Preserving Products

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Food technology & Materials

- ❖ Multifactorial preservation technologies to obtain minimally processed foods
- ❖ Inhibition and inactivation of microorganisms by combining traditional and emerging methods of food preservation
- ❖ Development of functional foods

Research Group for Emerging and Traditional food preserving processes

Stella M. Alzamora, Andrea B. Nieto, Paula Gómez, Lucas González, M. Bernarda Coronel, Eunice Contigiani, Silvia Raffellini, Gabriela Jaramillo

- ❖ Emerging technologies to preserve turbid juices. Revalorization of Yerba Mate tea.
- ❖ Development of extracts with high content of bioactive compounds
- ❖ Optimization of sensorial features of preserved food and beverage

Group for Development of Assisted Intervention Technologies for Food Preservation

Sandra Guerrero, Marcela Schenk, Mariana Ferrario, Mercedes Garcia Carrillo, Daniela Fenoglio

- ❖ Wet and dry grinding processes. Characterization of the obtained products.
- ❖ Hydrothermal processing of grains. Traditional and alternative parboiling.
- ❖ Development of gluten free bread and pasta

Group for Optimization of grinding and grains hydrothermal processes

Marcela Tolaba, María Ana Loubes, Rosa Baeza

Development of extracts with high content of bioactive compounds for beverages and foods. Revalorization of Yerba Mate tea



Development of extracts with high content of bioactive compounds for beverages and foods. Use of short-wave ultraviolet light (UV-C) to preserve turbid juices.



Group for Development of Assisted Intervention Technologies for Food Preservation
Sandra Guerrero, Marcela Schenk, Mariana Ferrario, Mercedes Garcia Carrillo, Daniela Fenoglio

Food technology & Materials

LABORATORIO DE INVESTIGACION DE PROPIEDADES FÍSICO-QUÍMICAS Y CONSERVACIÓN DE BIOMOLÉCULAS – PROCBIO (Biomolecules Physicochemical properties and conservation)

- ❖ Encapsulation of natural ingredients
- ❖ Biomolecules conservation in freezing and dehydrated systems
- ❖ Improving safety of processed and stored food
- ❖ Enzimes crio and dehydroprotection and proteins stabilization

Research Group for Biomolecules Stabilization in Nano and Micro-Confining Systems

Pilar Buera, Carolina Schebor, María Florencia Mazzobre, Beatriz Elizalde, Patricio Santagapita, Cristina dos Santos, Abel Farroni, Mario Cueto, Leonardo Favre

LABORATORIO DE BIOPOLÍMEROS, NANOPARTÍCULAS y COLOIDES ALIMENTARIOS (biopolymer, nanoparticles and food colloids)

- ❖ Emulsion structures for improving delivery of bioactive oils and control the rate and extent of lipolysis
- ❖ Study of peptides and proteins self-assembly

Ana Pilosof, Karina Martínez, Victor Pizones Ruíz-Henestrosa, María Julia Martínez, Mariana von Staszewski, Federico Jara, Carolina Arzeni , Paula Zema, Fernando Bellesi, Julieta Naso, Rocío Morales

Study of emulsion structure for: improving delivery of bioactive oils and control of the rate and extent of lipolysis

IN VITRO (STATIC) GASTROINTESTINAL DIGESTION (o/w EMULSIONS BEHAVIOUR)

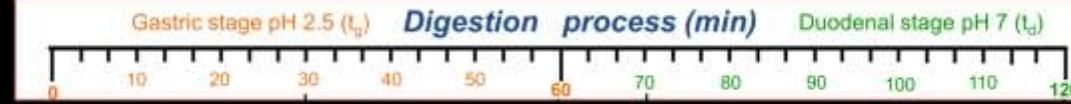


Lipolysis:
FFA released
(titration
method)

- ✓ O/W Emulsion (10:90, HIUS).
- ✓ Emulsifiers: β -lactoglobulin, soy protein isolate and HPMC derivates: E5LV and E4M (2% w/w).
- ✓ Commercial sunflower oil.

Mastersizer 2000:
particle size
distribution

Microstructure



Sampling: t_0 (original emulsion) t_{g0}^\downarrow t_{g10}^\downarrow t_{g30} t_{g60}^\downarrow t_{d10} t_{d60}^\downarrow

LABORATORIO DE BIOPOLÍMEROS, NANOPARTÍCULAS y COLOIDES ALIMENTARIOS
(biopolymer, nanoparticles and food colloids)

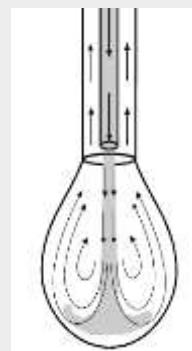
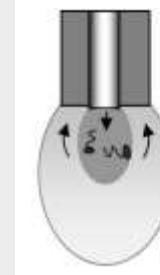
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INTERFACIAL PROPERTIES (o/w)



TENSIOMETER PAT-1
(SINTERFACE)

*Subphase exchange technique
(sequential adsorption of
the compounds)*



LABORATORIO DE BIOPOLÍMEROS,
NANOPARTÍCULAS y COLOIDES ALIMENTARIOS
(biopolymer, nanoparticles and food colloids)

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Mariana von Staszewski, Federico Jara, Carolina Arzeni , Paula Zema, Fernando Bellesi,
Julieta Naso, Rocío Morales

Chemical Processes and Materials

PROGRAMA DE INVESTIGACIÓN EN FUENTES ALTERNATIVAS DE MATERIAS PRIMAS Y ENERGÍA – PINMATE (alternative sources of raw materials and energy)

- ❖ Thermochemical processes for valorization of agroindustrial, forestal and urban residues to get alternative products and energy
- ❖ Development of advanced materials based on carbon, for biomedical and monitoring applications
- ❖ Development of products and processes for remediation of liquid and gaseous effluents

Ana Lea Cukierman, Pablo R. Bonelli, Hector Prado, Gisel Nunell, Luciano Gurevich, Mi Ra Kim, Edward Gomez, Alex Schwenberg

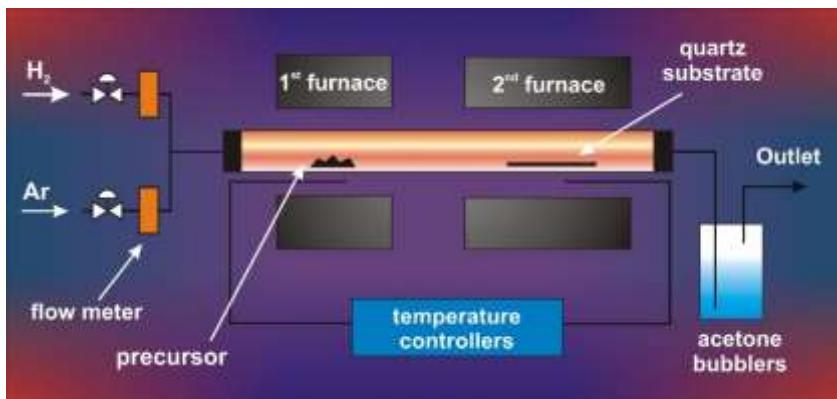
LABORATORIO DE REACTORES Y SISTEMAS PARA LA INDUSTRIA – LARSI (reactors and systems for the industry)

- ❖ Mixing and motion of solids and liquid in pilot scale vessels using non-invasive techniques (densitometry, tomography and particle tracking)
- ❖ Monitoring and fault diagnosis of industrial processes and equipment
- ❖ Process intensification of remediation technologies

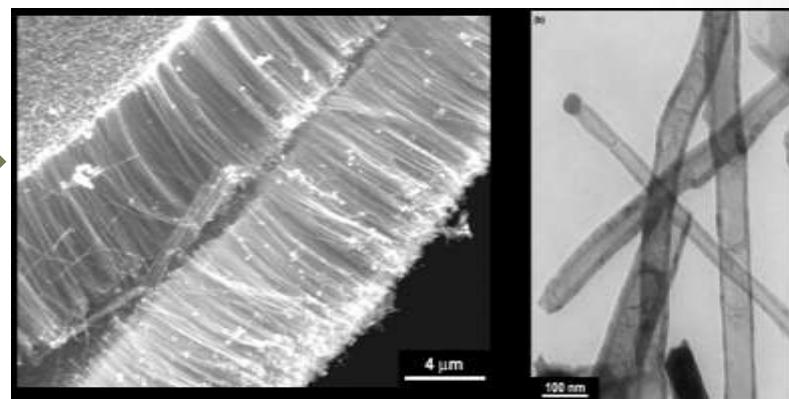
Miryan Cassanello, Gabriel Horowitz, Mauricio Maestri, Stella Piovano, Santiago Fleite, Julia Picabea, Verónica Martínez

Development and applications of carbon nanostructures: Carbon Nanotubes and Graphene Oxide Nanosheets

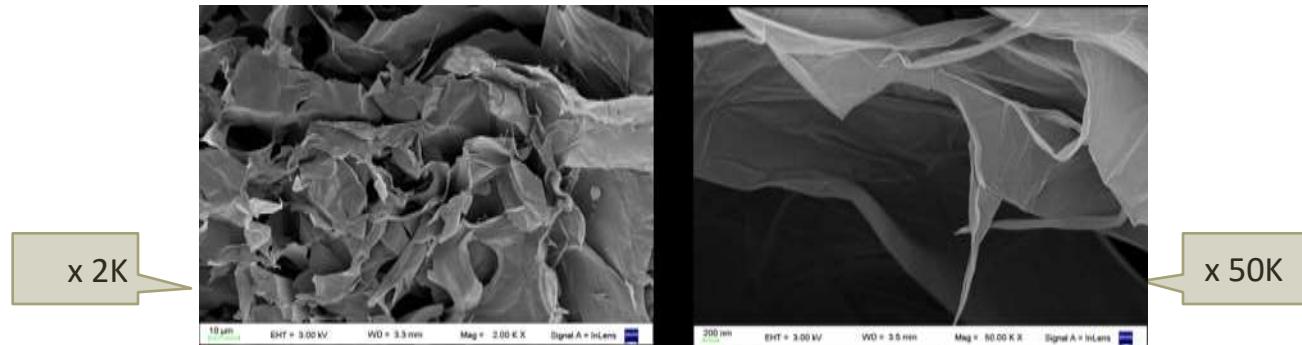
Synthesis of carbon nanotubes (CNTs) arrays by catalytic chemical vapor deposition



SEM and TEM images of CNTs arrays synthesized at 895°C



SEM images of graphene oxide nanosheets synthesized by modified Hummers' method



PROGRAMA DE INVESTIGACIÓN EN FUENTES ALTERNATIVAS DE MATERIAS PRIMAS Y ENERGÍA – PINMATE (alternative sources of raw materials and energy)

Ana Lea Cukierman, Pablo R. Bonelli, Hector Prado, Gisel Nunell, Luciano Gurevich, Mi Ra Kim, Edward Gomez, Alex Schwenberg

Production and characterization of biofuels (bio-oils) obtained from lignocellulosic and plastic residues

Bio-oils from Vinal (abundant bush in the NW of the country)



FT-IR

Bio-oils from plastic residues



$$\neq T(^\circ\text{C})$$

Bio-oils from Vinal-pastic mixtures



C,H,O,N,S
elemental
analysis



TG
DTA

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Chemical Processes and Materials

PROGRAMA DE INVESTIGACIÓN EN FUENTES ALTERNATIVAS DE MATERIAS PRIMAS Y ENERGÍA – PINMATE (alternative sources of raw materials and energy)

- ❖ Thermochemical processes for valorization of agroindustrial, forestal and urban residues to get alternative products and energy
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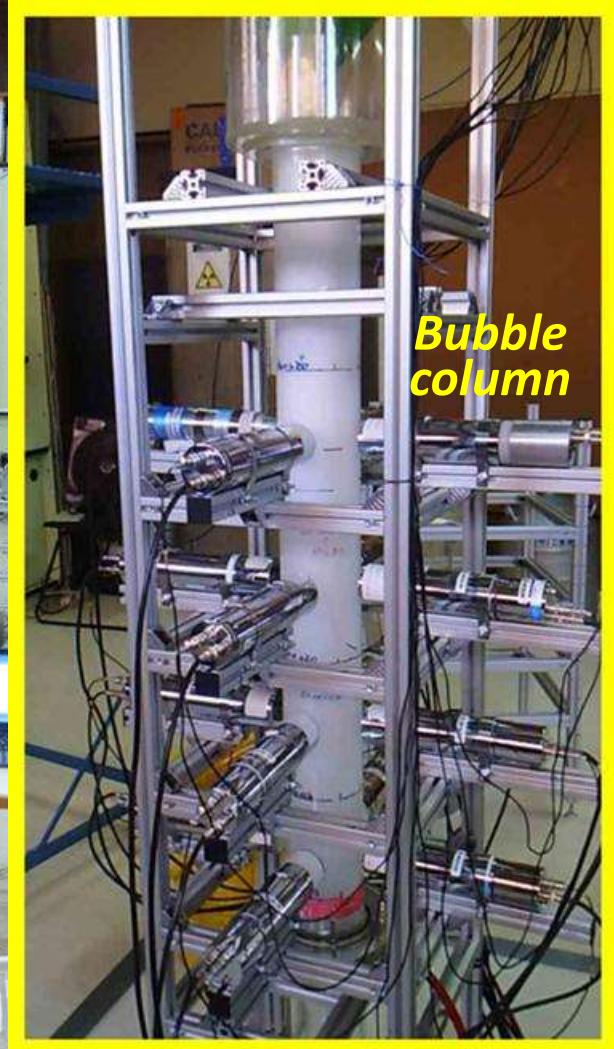
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LABORATORIO DE REACTORES Y SISTEMAS PARA LA INDUSTRIA – LARSI (reactors and systems for the industry)

- ❖ Mixing and motion of solids and liquid in pilot scale vessels using non-invasive techniques (densitometry, tomography and particle tracking)
- ❖ Monitoring and fault diagnosis of industrial processes and equipment
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Miryan Cassanello, Gabriel Horowitz, Mauricio Maestri, Stella Piovano, Santiago Fleite, Julia Picabea, Verónica Martínez

Mixing and motion of solids and liquid in pilot scale vessels using non-invasive velocimetry and distribution techniques (densitometry, tomography and particle tracking)



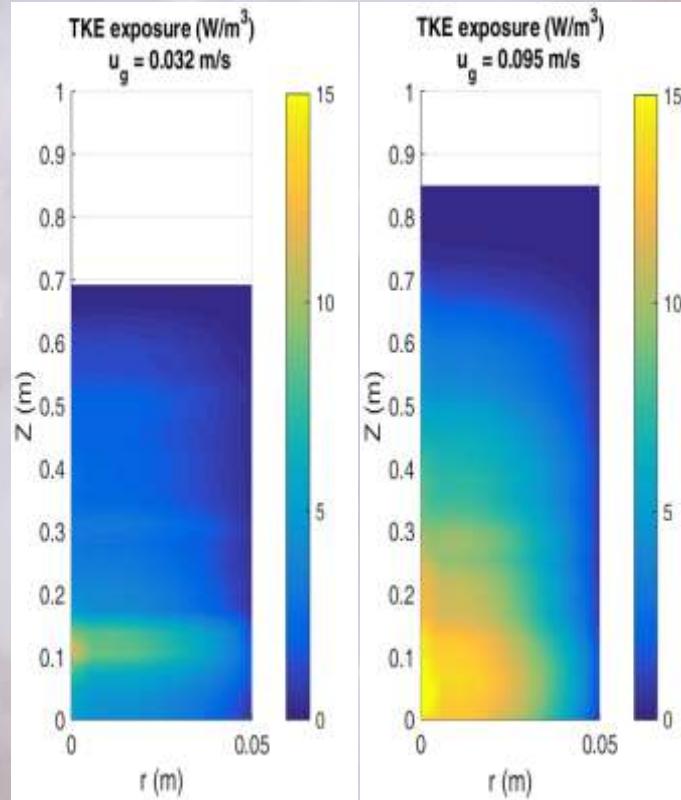
**LABORATORIO DE REACTORES Y SISTEMAS PARA LA
INDUSTRIA – Larsi (reactors and systems for the industry)**

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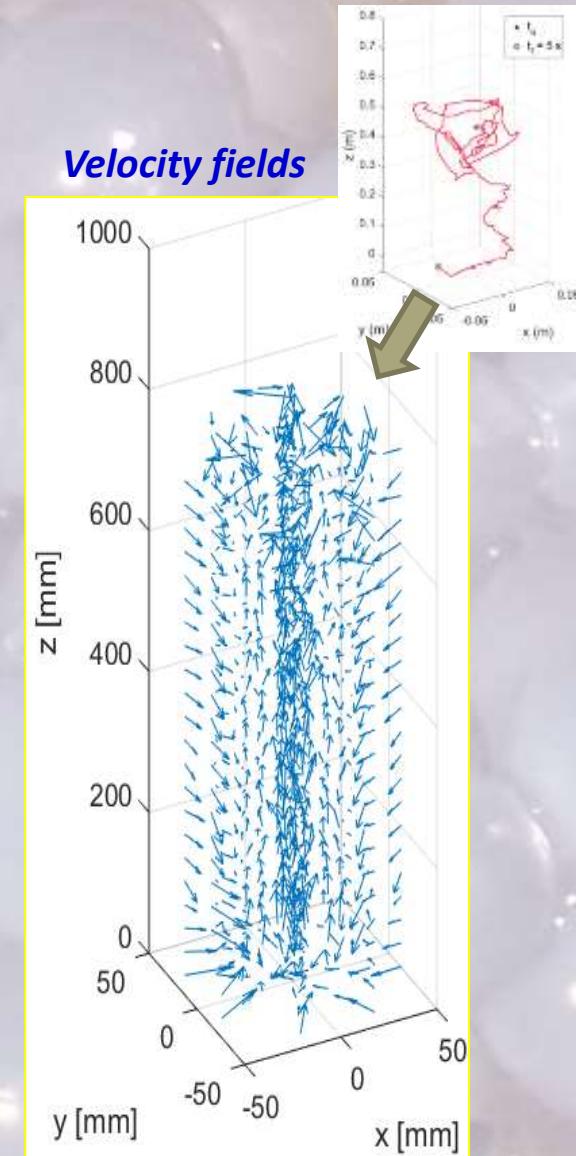
Mixing and motion of solids and liquid in pilot scale vessels using non-invasive techniques (densitometry, tomography and particle tracking)



Maps of normal and shear stresses



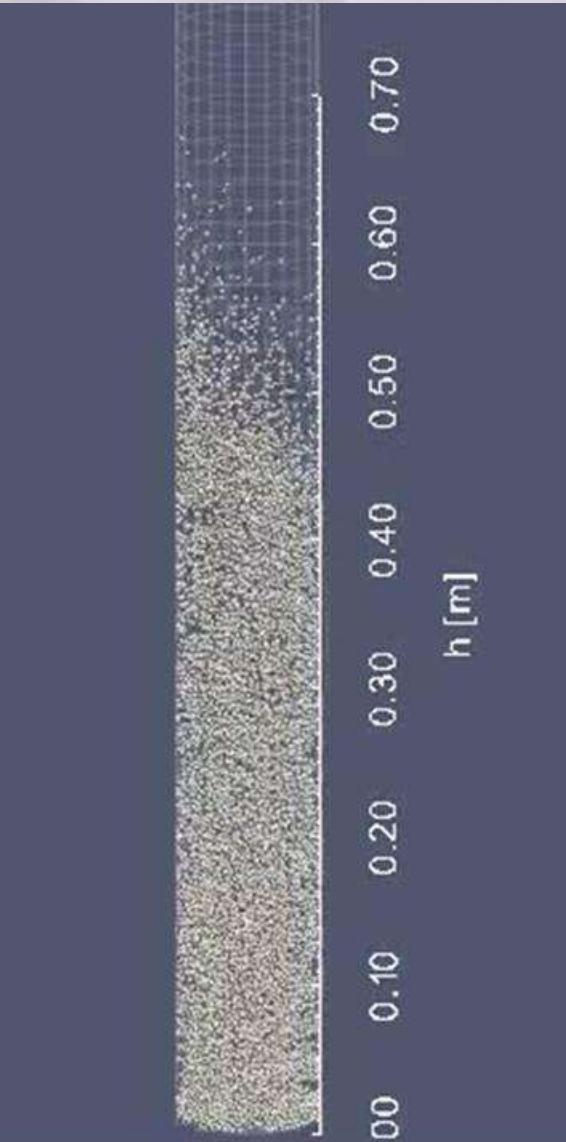
Velocity fields



**LABORATORIO DE REACTORES Y SISTEMAS PARA LA INDUSTRIA –
LARSI (reactors and systems for the industry)**

Miryan Cassanello, Gabriel Horowitz, Mauricio Maestri, Stella Piovano, Gabriel Salierno
Santiago Fleite, Julia Picabea, Verónica Martínez

CFD-DEM modeling of the solid motion validated by Radioactive Particle Tracking



LABORATORIO DE REACTORES Y SISTEMAS PARA LA INDUSTRIA–LARSI (reactors & systems for the industry)

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