iata

Instituto de Agroquímica
y Tecnología de Alimentos

Scientific Report
2016-2017

CSIC
Consejo Superior de Investigaciones Científicas

Index

1. Director letter

Cristina Molina Rosell

Dear All,

In my capacity as Director it is my pleasure to share the activities of the Institute of Agrochemistry and Food Technology (IATA) with the scientific community and society at large. The IATA was founded in 1966 to promote research and training in Food Science and Technology to support the agricultural/food sector of the economy of the Valencian Community. The institute is notable for the multidisciplinary nature of its research programs within the area of Food Science and Technology, and since its inception its research lines have evolved in line with societal challenges related to food.

The IATA undertakes highly competitive research to generate scientific knowledge, developing and applying cutting-edge technologies and processes for obtaining both traditional and innovative high-quality, safe and healthy food products without forgetting consumer preferences. The range of abilities and resources in the different scientific disciplines within Food Science allows the institute to undertake basic and applied research.

The quality of the IATA's scientific staff is evidenced by their involvement in European and international committees, research projects and networks as well as their scientific production and the transfer of intellectual property to industrial enterprises. The IATA continually promotes the participation of its scientists in international collaborations and over the last few years has encouraged their involvement in the European H2020 programme, resulting in a diversification of funding sources for carrying out its research. In this regard, it is worth special mention that the IATA is hosting the first ERC Starting Grant awarded in the area of Food Science in Spain. The institute's scientific staff maintains a high success rate in obtaining competitive funding for the development of innovative projects and the results of this research activity is disseminated in a large number of scientific manuscripts published in high-quality peer-reviewed journals. In addition, results have been presented in international and national scientific congresses, as well as in communications made to industrial enterprises and society in general.

The IATA has not been without its share of difficulties over recent years due to falling human resources and the need to update facilities and infrastructure. The economic crisis coincided with the retirement of a considerable number of its staff, reducing the taskforce of IATA by one third. Amelioration of this loss was achieved through organizational changes, motivation of the IATA workforce and counting on the understanding of researchers and technicians who have been very supportive and helpful in these difficult years. The institute's 47 researchers are organized in three departments: Food Biotechnology, Food Science, and Technologies for Food Safety and Preservation. However, to better respond to societal challenges and demands their research activities are now distributed along four lines that comprise Innovation in Foods and Processes, Food Safety and Preservation, Food Biotechnology and Diet, and Microbiota and

Health. The sparsity of human technical resources has been tackled on the one hand by developing scientific/technical units that can provide support to numerous researchers, and on the other by the incorporation of young technicians within a programme to favor the employment of young people. Nevertheless, modernization of the IATA's facilities will remain a challenge over the forthcoming years.

Improvement of the visibility of the IATA in diverse academic, industrial and community forums has been one of our main goals. One tactic has been the renewal of the website in which communication of the latest activities is a priority. In this context, a major event has been the celebration of the 50th anniversary of IATA. This celebration started in February 2016 with an opening ceremony which counted on the participation of the Vice-president of the CSIC, the President of the Generalitat Valenciana, as well as numerous authorities from the scientific, political and economic sectors.

Over the last two years a series of special seminars took place in which relevant personalities from different research disciplines shared their knowledge and experiences. In addition, workshops focused on the oenology and bakery sectors were organized to promote innovation and transfer to industry. The annual 'Expociencia' event was also an opportunity to present our science to the general public, focusing especially on promoting the proximity of science to children and families. In this regard, training and technical education continue to be a priority for the IATA as they are principal pillars on which research is based. Indeed, hundreds of Spanish and foreign students from diverse organisations and universities have received training in the IATA.

Finally, it has to be said that all the achievements compiled in this report have been made possible by the effort, commitment, dedication and invaluable support of the researchers, technicians, and administrative and support staff, and of course my colleagues in the management tasks.

Thanks to everybody for contributing to the excellence of IATA.

MANAGEMENT EXECUTIVE TEAM

Director: Cristina Molina Rosell – mail: direccion.iata@csic.es

Scientific vice director: José Manuel Guillamón Navarro – mail: vicedireccion@iata.csic.es

Technical vice director: María Dolores Rodrigo Aliaga – mail: vicedirecciontecnica@iata.csic.es

Director's secretary: Estefanía Martí Honrado – mail: secredire@iata.csic.es

Manager: Luisa Ventura Montoliu – mail: gerencia.iata@csic.es

2. General information

Scientific production

Educational services provided

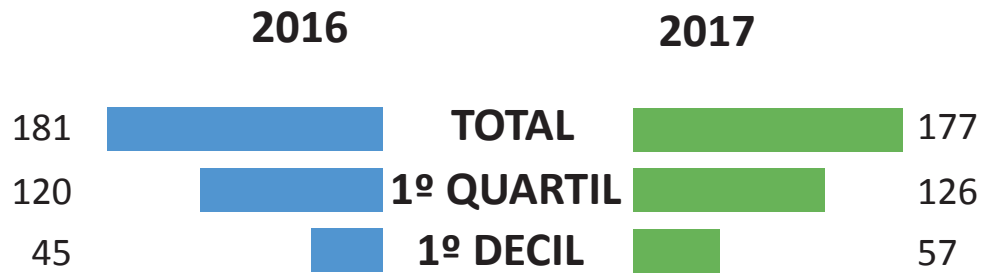
Funding

Origin of public funding

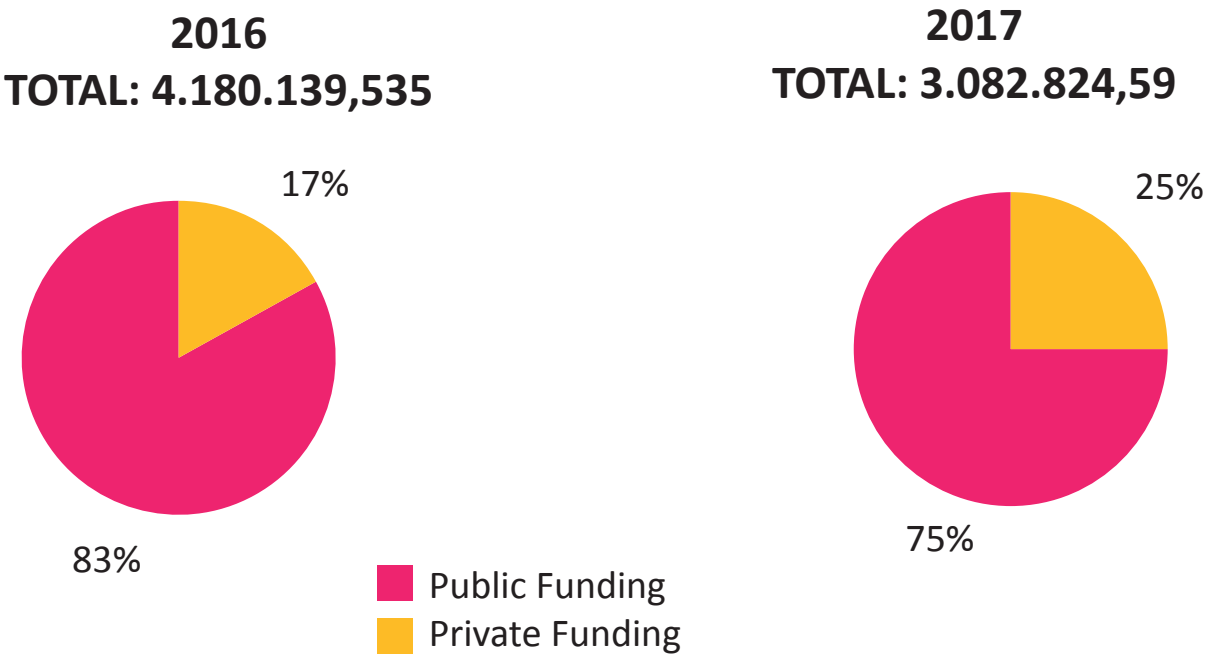
Staff

Dissemination

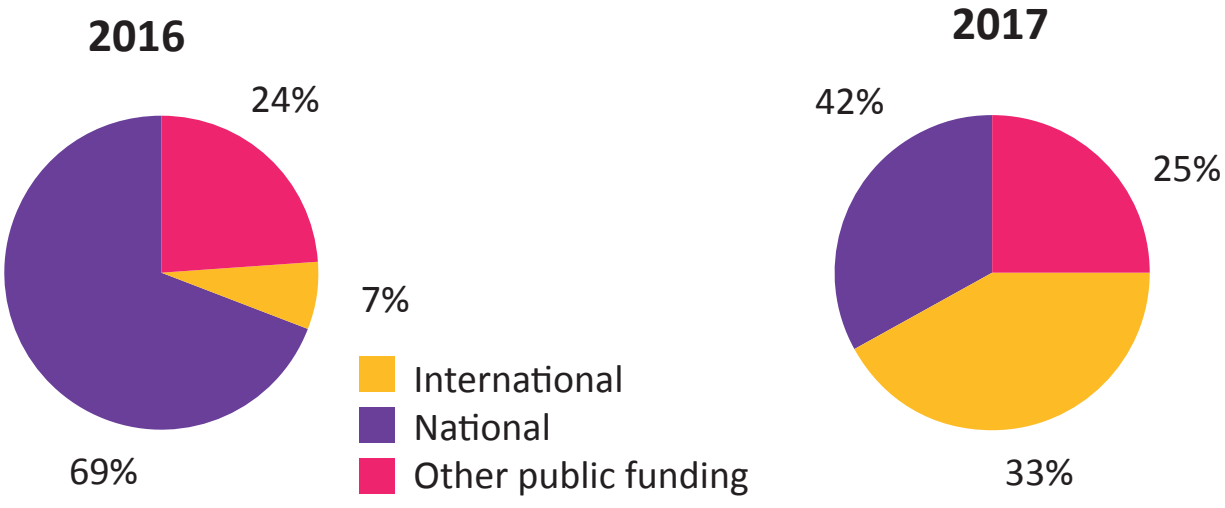
SCIENTIFIC PRODUCTION



FUNDING

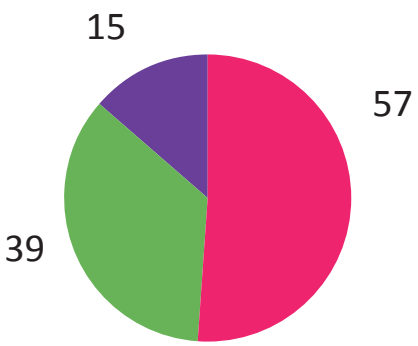


ORIGIN OF PUBLIC FUNDING

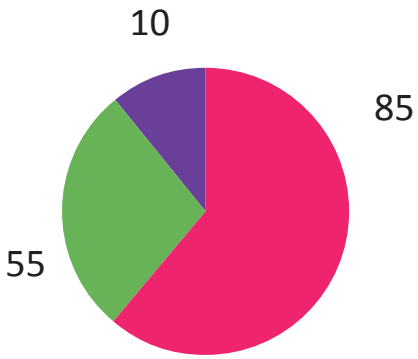


TRAINING

2016



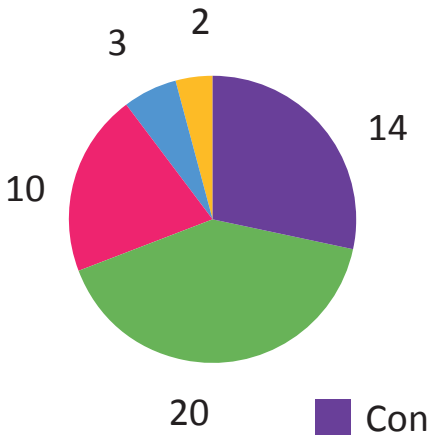
2017



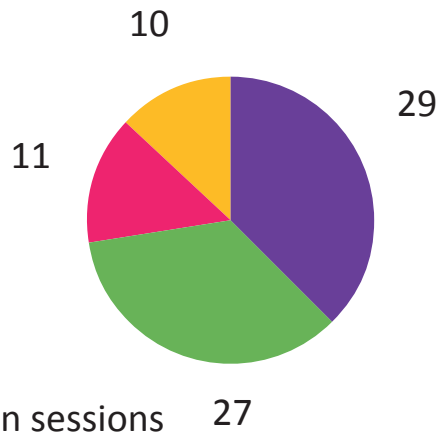
- Supervised PhD thesis
- Degree and masters dissertations
- Stays of external researchers

DISSEMINATION

2016



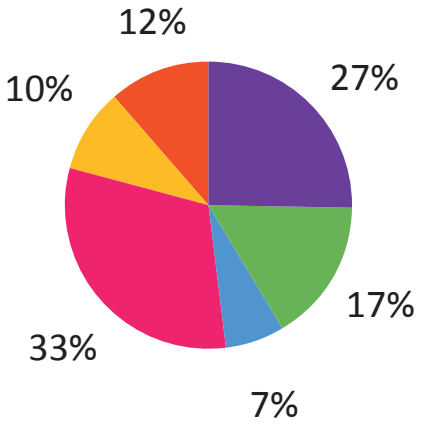
2017



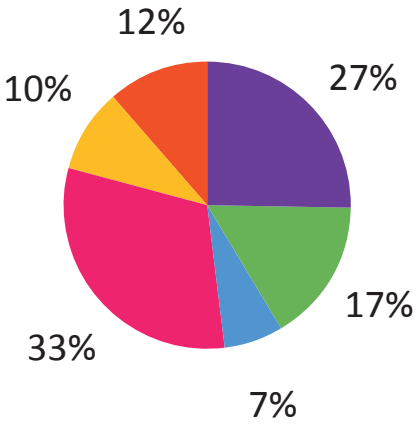
- Conferences and information sessions
- Guided visits to the center
- Activities on open days
- Collaboration with educational centres
- Collaboration with Mass Media

STAFF

2016
TOTAL: 162



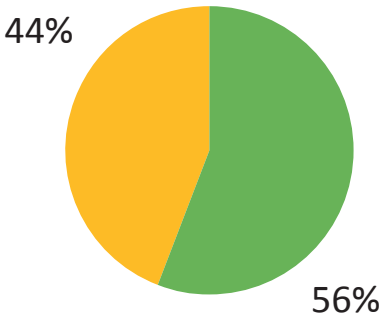
2017
TOTAL: 161



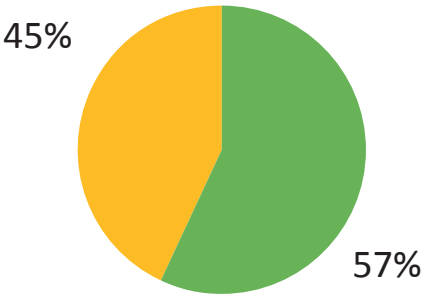
Researchers
R+D support staff
Hired
Scholarship holders
General services
Technical services

WOMEN/MEN

2016



2017



Women
Men

3. RESEARCH LINES AND SUBLINES

A. Line: Innovation in Foods and Processes

Study the mechanisms responsible for the function of different food components by a multidisciplinary approach. Investigate the processes that add value and sustainability, and which determine or modulate the physico-chemical, biochemical, nutritional and sensorial behaviour of complex food matrices by placing special emphasis on products from plants (cereals and other grain based products) and animals (meat and meat based products).

A-1.- Subline: Structure and functionality of components in food matrices

A-2.- Subline: Mechanisms to develop aroma, flavour and functional ingredients

A-3.- Subline: Sustainability in food processes

A-4.- Subline: Sensorial and consumer perceptions

B. Line: Food Safety and Preservation

Food safety is an essential requirement in a healthy food supply system that needs to be dealt with in different ways.

On the one hand, food preservation as a fundamental discipline of production processes that allows food safety and quality to be guaranteed in order to constantly supply food from farms to consumers.

On the other hand, studies that rapidly, sensitively and accurately detect and quantify microorganisms, residues and chemical contaminants are necessary to lower or eliminate the risk of exposure to these agents.

B-1.- Subline: preservation and packaging technologies

B-2.- Subline: Biopolymeric materials and nanotechnology

B-3.- Subline: Microbiological risks

B-4.- Subline: Pollutants and chemical waste

C. Line: Diet, Microbiota and Health

Certain food confers the organism with benefits that go beyond their nutritional input by helping to improve general well-being or reducing risk of disease. The digestive tract

is colonised by numerous microorganisms (microbiota), which have co-evolved with human beings for millions of years, and have struck a balance that is vital to maintain health. This research line features a true revolution thanks to modern molecular techniques, allowing a clear connection of health with components of diet and intestinal microbiota. This allows innovations and dietetic solutions to develop that can help prevent diseases and chronic disorders.

C-1.- Subline: Probiotics and prebiotics

C-2.- Subline: Microbiota and Microbiome

C-3.- Subline: Nutrients and bioactive components

D. Line: Food Biotechnology

The Food Biotechnology line aims to understand the physiological and molecular bases of the action of organisms and molecules in food production. This knowledge is used to develop new processes that improve food quality, safety and shelf life. Research conducted in this line spans from the selection of molecules and organisms with enhanced properties for food production to the design of new foods with improved functional properties. This line includes researchers with extensive expertise in the study of microorganisms and molecules of interest for food production as well as the ripening and conservation of fruits.

D-1.- Subline: Yeasts

D-2.- Subline: Lactic acid bacteria

D-3.- Subline: Filamentous fungi

D-4.- Subline: Protein engineering

D-5.- Subline: Postharvest and fruit quality

E. Line: Open science, open access and the lifecycle of research data

Open science is based on the openness of the research life cycle from its conception till its implementation, communication and preservation of its outputs, including research data.

4. Research Groups

Department of Food Science

Biochemistry of Meat and Meat Products

Biochemistry Technology and Innovation of Meat and Meat Products

Cereals and Cereal Based Products Microbial Ecology

Nutrition and Health

Physical and Sensory Properties of Food and Consumer Science

Biochemistry of Meat and Meat Products

Webpage of the group: https://www.iata.csic.es/en/research/biochemistry-meat-and-meat-products

Staff researchers

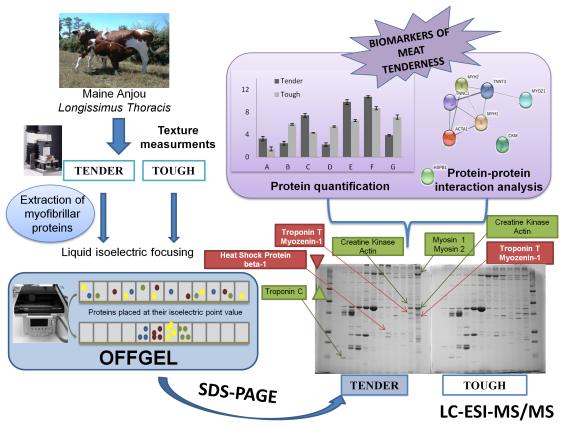
Dr. Miguel Ángel Sentandreu Vicente
Dr. José Luís Navarro Fabra

Other members of the group

Dr. Enrique Sentandreu Vicente
PhD. Student Claudia Fuente

Overwiew

Research area mainly concerns biochemistry of meat and meat-derived products, emphasizing the study of biochemical reactions involved in the transformation of muscle into edible foodstuffs. Then, the group is developing innovative techniques to study meat enzymology combined with identification and quantification of proteins and peptides from different farm animals commonly used by food industry. There is contemplated the use of different and complementary analytical strategies such as liquid chromatography, immunochemistry, gel electrophoresis, isoelectric focusing and enzyme reactions. Furthermore, high-throughput analysis powered by mass spectrometry approaches are also moved forward dealing with proteomics, peptidomics and metabolomics.



Objectives

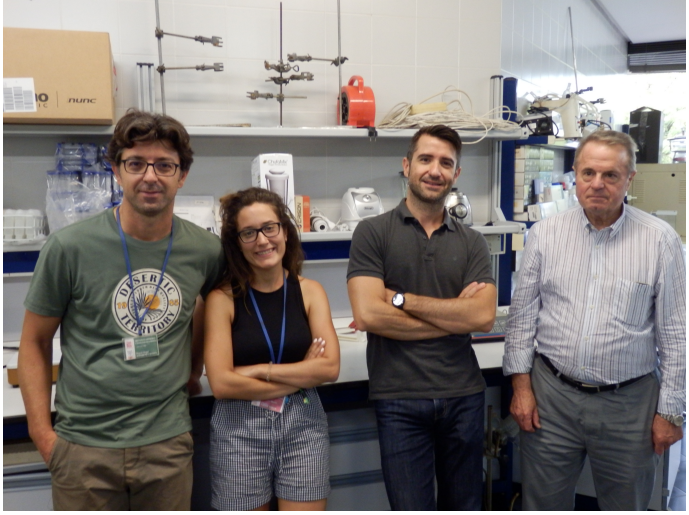
The main goal is to deepen into the knowledge of biochemical processes occurred in the post-mortem muscle after farm animal slaughter, affecting its conversion into meat and final organoleptic, nutritive and functional properties. Then, outlines are the following:

-Implementation of proteomic, interactomic and metabolomic approaches as a way to characterize skeletal proteins/peptides as well as, metabolites generated by chemical reactions in muscle. Moreover, discovering of reliable biomarkers enables the understanding and prediction of final quality of foodstuffs.

-Assessment of the organoleptic, nutritional and biological/functional properties of compounds found in muscle by traditional and emerging techniques.

-Implementation of cloning and expression techniques of muscle enzymes for quality evaluation of final products (obtained by meat ageing and dry-curing processes).

-Externalization of reliable proteomic/peptidomic strategies to assess authenticity of traded meat and meat products. From this, control of fraud in food composition can be addressed by the determination of biomarkers from specific animal species and/or tissues.



Selected publications

1. Boudida, Y.; Gagaoua, M.; Becila, S.; Picard, B.; Boudjellal, A.; Herrera-Mendez, C.H.; Sentandreu, M.A.; Ouali, A. Serine Protease Inhibitors as Good Predictors of Meat Tenderness: Which Are They and What Are Their Functions? (2016) Critical Reviews in Food Science and Nutrition, 56 (6), pp. 957-972.

2. Mirzapour, M.; Rezaei, K.; Sentandreu, M. A.; Moosavi-Movahedi, A. A. In vitro antioxidant activities of hydrolysates obtained from Iranian wild almond (Amygdalus scoparia) protein by several enzymes (2016) International Journal of Food Science and Technology, 51(3), 609-616.

3. Becila, S.; Boudida, Y.; Gagaoua, M.; Hafid, K.; Boudchicha, H.; Smili, H.; Belachehabe, R.; Herrera-Mendez, C.H.; Sentandreu, M.A.; Labas, R.; Astruc, T.; Boudjellal, A.; Picard, B.; Ouali, A. Cells shrinkage and phosphatidylserine externalization in post mortem muscle by fluorescence microscopy (2017) Springer Proceedings in Physics, 186, pp. 53-63.

4. Chikhoune, A.; Gagaoua, M.; Nanema, K. D.; Souleymane, A. S.; Hafid, K.; Aliane, K.; Hadjal, S.; Madani, K.; Sentandreu, E.; Sentandreu, M. A.; Boudjellal, A.; Krizman, M.; Vovk, I. Antioxidant Activity of Hibiscus sabdariffa Extracts Incorporated in an Emulsion System Containing Whey Proteins: Oxidative Stability and Polyphenol-Whey Proteins Interactions (2017) Arabian Journal for Science and Engineering, 42(6), 2247-2260.

5. Mirzapour, M.; Rezaei, K.; Sentandreu, M. A. Identification of Potent ACE Inhibitory Peptides from Wild Almond Proteins (2017) Journal of Food Science, 82(10), 2421-2431.

Projects and funding

-Title: “Identification of stress biomarkers in different autochthonous bovine breeds (IBERVAC) associated to meat quality: Influence of postmortem triggering of apoptosis as related to the tenderization process”
- Principal Investigator: Dr. Miguel A. Sentandreu
- Research participants: Prof. Joseé Luis Navarro, Dr. Enrique Sentandreu and Mrs Claudia Fuente.
- Funding body: Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria. RTA2014-00034-C04-04
- Amount: 96000 euros

Other remarkable achievements

-AWARDS: Prize for Young Researchers of XVII AIDA Conference 2017 to the best oral communication of the Product Quality section: "Study of postmortem ageing of bovine meat by the proteomic analysis of the myofibrillar fraction". Beldarrain,L.R., Aldai, N., Navarro, J.L. and Sentandreu, M.A.
-DISSEMINATION ACTIONS: Oral communication of Dr. J.L. Navarro about further chemical/nutrional composition of tiger nut and “horchata” in an event organized by the University of Valencia addressed to industrialists (May 18th 2017).
-MANAGEMENT POSITIONS: Dr. Miquel A. Sentandreu is the curent Head of the Department of Food Science at IATA-CSIC.

Biochemistry, Technology and Innovation of Meat and Meat Products

www.iata.csic.es/en/research/biochemistry_-technology-and-innovation-meat-and-meat-products

Staff researchers

Fidel Toldrá Vilardell
Mª Concepción Aristoy Albert
Mónica Flores Llovera
Leticia Mora Soler

Other members of the group

José Javier López Díez
Marta Gallego Ibáñez
Cécile Soltane
Laura Perea Sanz
Alireza Sadeghi Mahoonak
Nives Marusic
Leonardo Merino
Atefe Maqsoudlou
Rabeb Ban Slama Ben Salem
Luis Calvo
Clarissa Salafia
Alejandro Heres Gozálbes
Lodovica Mauri
Eylen Manuela Sánchez
Cecilia Recuero García
Milagro Arnal Salinas
Jaime Ballester Sánchez
Marta Salom Vendrell

Overview

The group has an extensive experience in the chemical, biochemical and instrumental analysis, especially on the study of the biochemical mechanisms involved in the processing of meat and meat products with a view to improving their sensory quality, safety and nutritional value. Worldwide pioneer in the purification and characterization of muscle enzymes and enzymes of lactic acid bacteria and yeasts as well as on proteolysis, and the generation, identification and characterization of bioactive peptides and its implication for health. Also the large experience on lipolysis and flavour of meat and meat products, especially in the study and identification of aroma compounds. The group has got numerous projects of the European Union, National Plan and contracts with companies.

Objectives

- Study of the mechanisms (chemical, enzymatic and microbiological) for the generation and perception of colour, aroma and flavour in meat products.
- Characterization of aroma compounds by olfactometry analysis.
- Proteomic characterization of proteins and peptides as markers of quality and bioactivity. - Development of rapid methodologies for monitoring and improving manufacturing processes and for detecting illegal substances.
- Metabolomic study of meat and meat products to establish the profile of compounds with functional activity, especially bioactive peptides, and development of enzymatic mechanisms to enhance their presence in these products and by-products.
- Development of high quality meat products with reduced salt and/or fat or improved lipid profile.

Selected publications

1. Gallego, Mora, L., M., Aristoy, M-C. & Toldrá, F.

(2016) The use of label-free mass spectrometry for the relative quantitation of sarcoplasmic proteins during the processing of dry-cured ham. Food Chemistry, 196, 437-444.

2. Mora, L., Gallego, M., Reig, M. & Toldrá, F. (2017)

Challenges in the quantitation of naturally generated bioactive peptides in processed meats. Trends in Food Science & Technology, 69, 306-314.

3. Mora, L., Bolumar, T., Heres, A. & Toldrá, F.

(2017) Effect of cooking and simulated gastrointestinal digestion of aged beef meat on the activity of generated bioactive peptides. Food & Function, 8, 4347 - 4355.

4. Sara Corral, Erich Leitner, Barbara Siegmund, Mónica Flores. (2016) Determination of sulphur and nitrogen compounds during dry fermented sausages processing and their relationship with amino acid generation. Food Chemistry, 190, 657-664.

5. Mónica Flores, Daniel Moncunill, Rebeca Montero, José Javier López-Díez, Carmela Belloch. (2017) Screening of Debaryomyces hansenii strains for flavour production under reduced concentration of nitrifying preservatives used in meat products. Journal of Agricultural and Food Chemistry, 65, 3900–3909.

Projects and funding

-"Beneficial effects of dietary bioactive peptides and polyphenols on cardiovascular health in humans" (BACCHUS) EU 7th FP, grant no. 312090, 2012-16.

-"Sustainable production of traditional and novel cured dried meat products" (DRY-MEAT) Norwegian Research Council, Noruega, grant no. 16Y062, 2013-17.

-“The Application of Modern Proteomic and Metabolomic Methodologies in the Assessment of High Added-Value Traditional Meat Products” (HIGHVALFOOD), PCIG13-GA-2013-614281, 2014-16.

-"Proteomic quantification of bioactive peptides and those affected by oxidation in dry-cured ham" AGL2014-57367-R, 2015-17

-“Use of yeasts as an strategy for the production of natural aromas for ripened meat products with lower nitrificants level”. AGL-2015-64673-R, 2016-18. FP7

Other remarkable achievements

F. Toldrá Editor of Trends in Food Science & Technology, Associate Editor of Meat Science and Editor of the book series Advances in Food & Nutrition Research, and Editorial Board member of Food Chemistry, Current Opinion in Food Science, Journal of Food Engineering, Food Analytical Methods, International Journal of Molecular Sciences, among other.

Cereal and cereal based products

Webpage of the group: https://www.iata.csic.es/en/research/cereals-and-cereal-based-products

Staff researchers

Concepción Collar Esteve
Susana Fiszman Do Santo
Claudia Monika Haros
Cristina Molina Rosell
Amparo Tárrega

Other members of the group

Maria Vicenta Saneustaquio
Raquel Garzón Lloria
Yaiza Eugenia Benavent Gil
Cristina Martínez García
Nicola Gasparre
Enrique Armero Ibáñez
Gemma Sanmartín Peris
Linda Ould Saadi
Jaime Ballester Sánchez
Karla Miranda Ramos
Johanna Marcano Rodriguez
Alejandra Agudelo Motato
Arantxa Rizo Párraga
Mónica González Velasco
Beatriz Villegas Pascual
Patricia Puerta Gil
Raquel Selma Gracia

Overview

Design, development and biochemical, physico-chemical and nutritional assessment of value-added cereal-based goods. Research is tackled by means of a basic approach for chemically understanding the functionality of cereal constituents in complex matrices. The fundamental information is focused/oriented to the achievement of end cereal products easily transferred and exploited by the related industry. This integrated global approach is devoted either to generate basic knowledge or to transfer obtained results efficiently to the industry.

Objectives

To study the interactions between ingredients, additives and processing aids in dough matrixes and their effect along the process stages on the quality of baked goods.

To determine functional and molecular parameters for predicting the quality and the keepability of final products.

To develop new strategies (novel formulations, bake off technology, non-thermal technology) aimed at producing added-value cereal based products.

To improve nutrient bioavailability in cereal baked goods.

LINCE Leading Innovation in Cereals

Selected publications

1. Benavent-Gil, Y., Rosell C. M. (2017) Morphological and physicochemical characterization of porous starches obtained from different botanical sources and amylolytic enzymes. International Journal of Biological Macromolecules. 103 (587–595).

2. Fiszman, S., Tarrega, A. (2017). Expectations of food satiation and satiety reviewed with special focus on food properties. Food and Function. 8(8), pp. 2686-2697.

3. Collar, C., Angioloni, A. (2017). High-legume wheat-based matrices: impact of high-pressure on starch hydrolysis and firming kinetics of composite breads. Food and Bioprocess Technology, 10, (11031112).

4. Pseudocereals: Chemistry and Technology, Eds. Claudia M. Haros and Regine Schönlechner, John Wiley & Sons, Ltd., Chichester – West Sussex, Inglaterra, ISBN: 978-1-118-93828-7 (2017).

5. Dura, A., Rose, D., Rosell C. M. (2017). Enzymatic modification of corn starch influences human fecal fermentation profiles. Journal of Agricultural and Food Chemistry. 65 (23), 4651–4657.

Projects and funding

- LINCE. Innovation, quality and development of cereals based foods. (Prometeo 2017/189). Coordinator: Cristina Molina-Rosell

- NUTRICELFOOD. Development of healthy gluten free baked foods. Understanding the role of starch and proteins as main structural and nutritional players.(AGL2014-52928-C2-1-R). IP. Cristina M. Rosell

- AHealth-promoting diluted breadmaking matrices with restricted functionality: engineering approaches leading to desirable functional performance in highly replaced unstructured gluten-forming systems. IP C. Collar. GL2015-63849-C2-1-R. CSIC-MINECO-FEDER.

-QuiSalhis-FOOD. Development of New Ingredients of Quinoa and Chia for Food Formulation. Nutritional Study and Healthy Property Assessment (AGL2016-75687-C2-1-R, MEIC-Spain). Coordinator: Claudia M. Haros.

-La estructura y textura de los alimentos como moduladores de los mecanismos de procesado oral y dinamica de su percepcion sensorial. IP A. Tárrega. AGL2016-75403-R

Other remarkable achievements

- President Spanish Association of Cereal Chemist.
- CM Rosell nominated Distinguished Professor by Tech Monterrey University.
- C.M.Haros, Coordinator of International Chia-Link Network, https://www.chialink.es/

Microbial Ecology, Nutrition and Health

Webpage of the group: https://www.iata.csic.es/es/investigacion/ecologia-microbiana-nutricion-y-salud

Staff researchers

Yolanda Sanz
Lorena Perales

Other members of the group

Alfonso Benítez Páez
Kevin Joseph Portune
María Carmen Cenit Laguna
Marina Romaní Pérez
Ana Agusté Feliu
Miguel Carda Diéguez
Eva María Gómez del Pulgar Villanueva
Inmaculada López Almela

Overwiew

The group investigates the role of the microbiota in the human nutritional and health status and the risk of developing disorders, affecting the immune and neuroendocrine systems. This information is used for the development of predictive and diagnostic tools and for the design of microbiome-based products and interventions with preventive purposes. The group has expertise in next generation sequencing and bioinformatics for microbiome profiling and functional pathway reconstruction. It also has expertise in cultivation of intestinal bacteria and identification of bioactive components in experimental models of metabolic and mental disorders and in humans to evaluate their efficacy and identify their molecular targets.

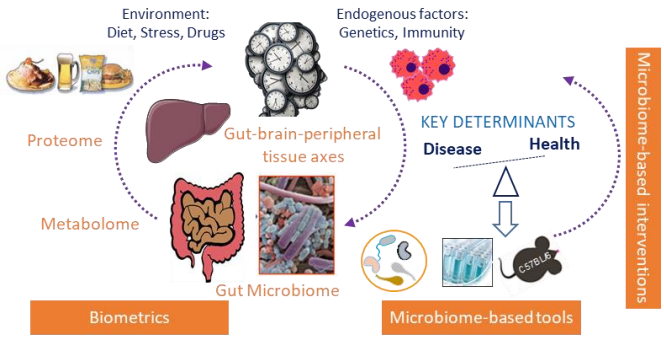
Objectives

-To provide a comprehensive understanding of environmental and host-microbiome interactions that determine the progress from health to disease through integration of multi-omics, lifestyle and clinical data.

- Select a next generation of probiotics and products thereof from the indigenous human microbiota and evaluation of their efficacy and mode of action.

-Design of dietary strategies to optimize the individual's microbiome functions to promote healthy living and prevent the development of diet and age-related disorders, progressing towards personalized nutrition.

-Develop predictive and diagnostic tools based on the individual's microbiome data.



Selected publications

1. Agusti A, Moya-Pérez A, Campillo I, Montserrat-de la Paz S, Cerrudo V, Perez-Villalba A, Sanz Y. Bifidobacterium pseudocatenulatum CECT 7765 Ameliorates Neuroendocrine Alterations Associated with an Exaggerated Stress Response and Anhedonia in Obese Mice. Mol Neurobiol. 2018 Jun;55(6):5337-5352.

2.Romaní-Pérez M, Agusti A, Sanz Y. Innovation in microbiome-based strategies for promoting metabolic health. Curr Opin Clin Nutr Metab Care. 2017;20:484-491.

3.Benítez-Páez A, Sanz Y. Multi-locus and long amplicon sequencing approach to study microbial diversity at species level using the MinION™ portable nanopore sequencer. Gigascience. 2017;6:1-12.

4. Beaumont M, Portune KJ, Steuer N, Lan A, Cerrudo V, Audebert M, Dumont F, Mancano G, Khodorova N, Andriamihaja M, Airinei G, Tomé D, Benamouzig R, Davila AM, Claus SP, Sanz Y, Blachier F. Quantity and source of dietary protein influence metabolite production by gut microbiota and rectal mucosa gene expression: a randomized, parallel, double-blind trial in overweight humans. Am J Clin Nutr. 2017 Oct;106(4):1005-1019.

5. Moya-Pérez A, Perez-Villalba A, Benítez-Páez A, Campillo I, Sanz Y. Bifidobacterium CECT 7765 modulates early stress-induced immune, neuroendocrine and behavioral alterations in mice. Brain Behav Immun. 2017 Oct;65:43-56

Projects and funding

Microbiome Influence on Energy Balance and Brain Development-Function Put into Action to Tackle Diet-Related Diseases and Behavior-MyNewGut. EU 7th FP (Grant Nº 613979). Coordinators.

Deciphering the roles of the intestinal microbiome in metabolic, behavioural and mental disorders at critical stages of life. Ministerio de Economía y Competitividad. AGL2014-52101-P

Other remarkable achievements

Members of international advisory bodies:
-Panel of Nutrition, Dietetic Products and Allergy (NDA) of the European Food Safety Authority (EFSA)
-Co-chair of the European Food for Life Platform.

Physical and sensory properties of food and consumer science

Webpage of the group: https://www.iata.csic.es/en/research/physical-and-sensory-properties-food-and-consumer-science

Staff researchers

Ana Salvador Alcaraz
Teresa Sanz Taberner

Other members of the group

María Espert Tortajada

Overwiew

Our group studies the physical and sensory properties of foods to find out how they are related to quality, perceptions and acceptability to consumers.
We try to develop new formulations through an understanding of the contribution that each ingredient/component makes to the food's rheological, thermal and mechanical properties and the relations between these and its structure.
We investigate the technological functionality of ingredients, the changes that take place during different types of processing, and storage, and their relation to sensory properties.
We study the means to create, modify and improve the physical properties of formulated foods to adapt them to different needs.
We analyse the changes in food structure during *in vitro* digestion to develop new foods with lower fat bioaccesibility.
We research the sensorial quality of foods and mechanisms of perception of sensorial attributes and their relations to choice and acceptability.

Objectives

- Investigating the rheological properties of foods under high and low deformation in order to discover the structure of the food and its potential repercussions on its quality.
- Researching thermal transitions in food components and their effects on the development of the food's structure and final food quality.
- Studying the textural characteristics of foods and their relation to food structure.
- Assessing and developing new sensory methods with trained and untrained panels of consumers.
- Developing targeted formulations through the knowledge of the technological functionality of foods and the interactions between ingredients. Studying the technological functionality of new ingredients, how they change when subjected to different processes and storage and their relation to sensory quality.
-Performing in vitro digestion processes and relating to structural changes with lipid digestibility.

Selected publications

1. M. Espert, A. Salvador, T. Sanz . In vitro digestibility of highly concentrated methylcellulose O/W emulsions. Rheological and structural changes. Food and Function 7, 3933-3942 (2016).
2. M. Espert, J. Borreani, I. Hernando, A. Quiles, A. Salvador, T. Sanz. Relationship Between Cellulose Chemical Substitution, Structure and Fat Digestion in o/w Emulsions. Food Hydrocolloids 69, 76-85 (2017).
3. J. Borreani, M. Espert, A. Salvador, T. Sanz, A. Quiles, I. Hernando. Oil-in-water emulsions stabilised by cellulose ethers: stability, structure and in vitro digestion. Food and Function 8, 1547-1557 (2017).
4. T. Sanz, A. Quiles, Ana Salvador, I. Hernando. Structural changes in biscuits made with cellulose emulsions as fat replacers. Food Science and Technology International 23 (6), 480-489 (2017
5. M. Espert, L. Constantinescu, T. Sanz, A. Salvador. Effect of xanthan gum on palm oil in vitro digestion. Application in starch-based filling creams. Food Hydrocolloids (2017) (https://doi.org/10.1016/j.foodhyd.2018.02.017)

Projects and funding

- Functionality of hydrocolloids in the reduction of *in vitro* lipid digestibility of food emulsions: rheology, structure and sensorial perception (AGL2015-68923-C2-1-R9. 2016-2018

Other remarkable achievements

- Solicitud de Patente P201730653. T. Sanz, A. Salvador, M. Espert, L. Wikings. Composición y proceso de obtención de emulsión baja en grasa untable y resistente a la digestión.
País de prioridad: España
Fecha de prioridad: 3 de mayo de 2017

Department of Food Biotechnology

Bioactive Proteins and Peptides

Biological Activity of Food Compounds

Development of Inducing Resistance of Plants Against Pathogens

Fermentation Biotechnology: Industrial Yeasts

Fungal Biotechnology

Lactic Bacteria and Probiotics

Molecular engineering of enzymes

Non-conventional Yeasts

Postharvest physiology and Pathology of Fruits

Postharvest Physiology and Fruit Quality

Systems biology in yeast of biotechnological interest

Bioactive Proteins and Peptides

Webpage of the group: https://www.iata.csic.es/en/research/bioactive-proteins-and-peptides

Staff researchers

Paloma Manzanares Mir
Jose F. Marcos López

Other members of the group

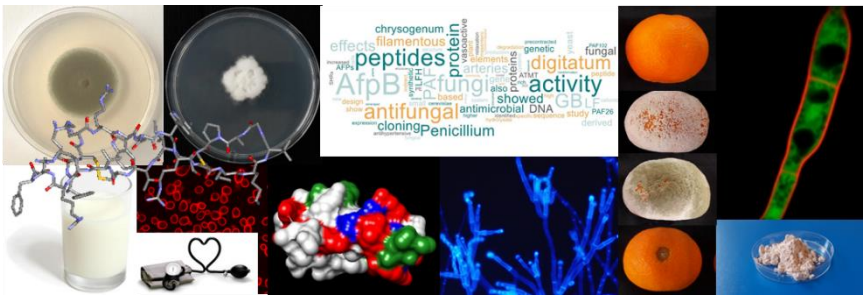
Mónica Gandía Gómez
Sandra Garrigues Cubells
Helena Orozco Valverde

Overview

Over the last years there has been a massive increase in the identification of short bioactive peptides and proteins with a wide variety of biologically useful activities, which reflects the huge chemical diversity of these molecules. Examples of these bioactive peptides include those with antibiotic, antioxidant, antihypertensive, anticancer, or immunomodulatory activities. In this context the main objective of the research team is the identification, rational design and production of small peptides and proteins with medical, food and agricultural applications, as well as the detailed study of their mechanism of action. To achieve this goal, we apply microbiological, biochemical, biotechnological, and molecular genetic techniques together with cell biology and functional genomic approaches.

Objectives

- Identification, design and characterization of small peptides with antimicrobial properties as alternatives to control microorganisms in food preservation or postharvest/crop protection.
- Identification, rational design and characterization of health-promoting peptides able to reduce the risk of chronic complications or age-related diseases.
- Identification and biotechnological production of fungal antifungal proteins (AFPs). Characterization of their biological function.
- Development of cost-effective biotechnological systems for the production of bioactive peptides and proteins.
- Structure-activity relationship between amino acid sequence/structure of bioactive proteins and peptides and their biological function.
- Study the mechanism of action of peptides and proteins through cell biology, molecular genetics and omics approaches.
-Development of Synthetic Biology tools for the biotechnological exploitation of filamentous fungi.



Selected publications

1. Garrigues, S., Gandía, M., Popa, C., Borics, A., Marx, F., Coca, M., Marcos, J. F., Manzanares, P. (2017). Efficient production and characterization of the novel and highly active antifungal protein AfpB from *Penicillium digitatum*. **Sci. Rep.** 7:14663.

Garrigues, S., Gandía, M., Borics, A., Marx, F., Manzanares,
2. P., Marcos, J. F. (2017). Mapping and identification of antifungal peptides in the putative antifungal protein AfpB from the filamentous fungus *Penicillium digitatum.* **Front. Microbiol.** 8:592.

3. García-Tejedor, A., Manzanares, P., Castelló-Ruiz, M., Moscardó, A., Marcos, J. F., Salom J. B. (2017). Vasoactive properties of antihypertensive lactoferrin-derived peptides in resistance vessels: effects in small mesenteric arteries from spontaneously hypertensive rats. **Life Sci.** 186, 118-124

4. Sonderegger, C., Galgóczy, L., Garrigues, S., Fizil, A., Borics, A., Manzanares, P., Hegedüs, N., Huber, A., Marcos, J. F., Batta, G., y Marx, F. (2016). A *Penicillium chrysogenum*-based expression system for the production of small, cysteine-rich antifungal proteins for structural and functional analyses. **Microb. Cell Fact.** 15:192

5. Garrigues, S., Gandía, M., y Marcos, J. F. (2016). Occurrence and function of fungal antifungal proteins: the case study of the citrus postharvest pathogen *Penicillium digitatum*. **Appl. Microbiol. Biotechnol.** 100, 2243-2256.

Projects and funding

-AGL2014-58205-REDC. Alimentos funcionales para una nutrición personalizada Fun-C-Food Net. Red Consolider.

-BIO2015-68790-C2-1-R. Nuevas proteínas antifúngicas de hongos: producción en hongos filamentosos y caracterización de su mecanismo de acción.

Biological Activity of food Compounds

Webpage of the group: https://www.iata.csic.es/es/investigacion/actividad-biologica-de-compuestos-alimentarios

Staff researchers

Mª Teresa Fernández-Espinar García
Jose Vicente Gil Ponce
Patricia Roig Montoya

Overwiew

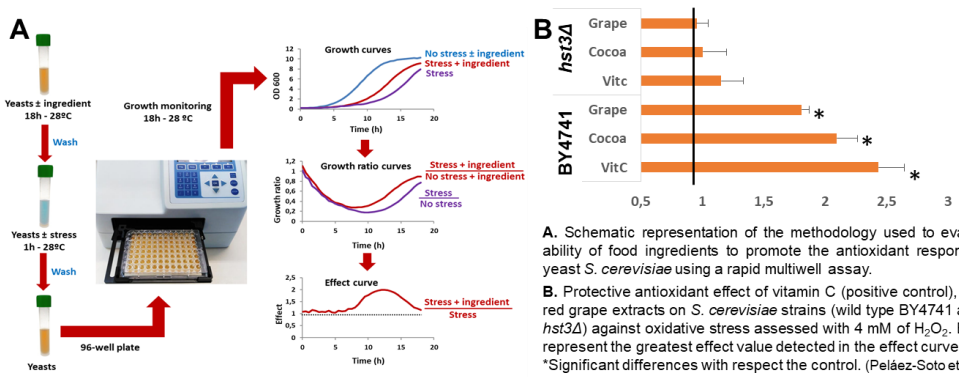
The main mission of the group is to identify vegetable sources rich in polyphenols and to improve the understanding of functional properties of food ingredients.

Many studies address the possible functional effects of polyphenol extracts from various sources, but there is little information about what compound or compound combination is the most relevant, which of them may have adverse effects or which molecular mechanisms are involved.

Our research focuses on setting up and using *in vivo* methodologies based on simple organisms in which responses to oxidative stress and/or longevity have strong similarities with those in human.

Objectives

1. To identify vegetable sources rich in polyphenols as potentially health-promoting ingredients and their inclusion in food matrices.
2. To develop and implement fast methodologies for screening extracts and compounds, based on the use of the yeast *Saccharomyces cerevisiae* and the nematode *Caenorhabditis elegans* as models for oxidative stress response and/or longevity.
3. To inquire about which genes or metabolic pathways are affected in model organisms as a result of exposure to studied ingredients, using high-throughput "omic" technologies and mutant strains and to identify new therapeutic targets. Thus, the gathered information may help substantiate certain health claims and lay down the scientific basis for follow-up preclinical and clinical trials.



A. Schematic representation of the methodology used to evaluate the ability of food ingredients to promote the antioxidant response in the yeast *S. cerevisiae* using a rapid multiwell assay.

B. Protective antioxidant effect of vitamin C (positive control), cocoa and red grape extracts on *S. cerevisiae* strains (wild type BY4741 and mutant *hst3Δ*) against oxidative stress assessed with 4 mM of H_2O_2. Bar graphs represent the greatest effect value detected in the effect curves. *Significant differences with respect the control. (Peláez-Soto et al., 2017).

Selected publications

1. Peláez-soto, A.; Fernández-Espinar, M.T.; Roig, P.; Gil, J.V. (2017). Evaluation of the ability of polyphenol extracts of cocoa and red grape to promote the antioxidant response in yeast using a rapid multiwell assay. Journal of Food Research. 82: 324-332. (Doi: 10.1111/1750-3841.13602).

Projects and funding

- AGL2016-75687-C2-1-R (MINECO).

- CIBENA (CDTI) (Programa CIEN).

- i-link0923 (CSIC).

- Programa de Cooperación Bilateral - nivel II (pcb-II) (CONICET-CSIC).

- CEAL-ALI 2015-27 (Proyectos de Cooperación Interuniversitaria UAM-Banco Santander con América Latina)

Other remarkable achievements

- Tesis Doctoral. Ana Peláez Soto. 2016. "Functional validation of cocoa polyphenolic extracts by *in vivo* assays with model organisms"

Development of inducing resistance of plants against pathogens

Webpage of the group: https://www.iata.csic.es/en/investigacion/development-inducing-resistance-plants-against-pathogens

Staff researchers

Carmen González Bosch

Other members of the group

Jaime López Cruz
Óscar Crespo Salvador
Mónica Escamilla Aguilar

Overwiew

We have been working on plant responses to pathogens to identify specific biomarkers for biotic stresses. We have also developed treatments based on natural compounds as an alternative to the massive use of synthetic fungicides and pesticidals. Hexanoic acid acts by means of a priming mechanism with a wide-spectrum of action. It protected tomato and Arabidopsis plants against *Botrytis cinerea* and *Pseudomonas syringae.* In addition, it prevented the systemic movement of the MNSV virus in melon plants. The transcriptomic, proteomic and metabolomic analysis showed that it promotes stronger and faster responses to stress by modulating the oxidative environment, and interacting with signalling pathways. Currently, we are characterizing redox-sensitive genes involved in the priming effect and their epigenetic modifications.
The histone modifications involved in priming that affect the transcription of defence-related genes are also discussed.

Objectives

1. Characterization of plant responses to pathogens for biotechnological applications
2. Identification of biomolecules profiles that could provide general and specific markers for several biotic stresses
3. Development of treatments based on natural compounds acting by a priming mechanism
4. Characterization of redox-sensitive genes as potential targets of natural inducers and the associated epigenetic marks
5. Incorporation of natural inducers in integrated pest management (IPM) strategies

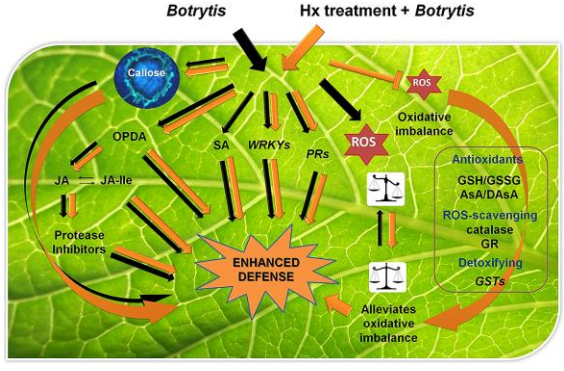


FIGURE 1 Model for the Hx priming effect on plant defense mechanisms against *Botrytis cinerea*. Black arrows indicate responses in untreated plants upon *Botrytis* infection. Orange arrows indicate induced responses in Hx-treated plants upon *Botrytis* infection. Hx-treatment increases *Botrytis*-induced responses enhancing callose, OPDA, JA and JA-Ile accumulation; potentiating transcript accumulation of genes like *WRKYs*, protease inhibitors and *PRs*, and inducing anti-oxidant, ROS-scavenging and detoxifying mechanisms. Hx, by counteracting the massive ROS accumulation induced by the fungus, alleviates the oxidative imbalance associated with *Botrytis* infection. Abbreviations: JA-Ile, jasmonoyl-isoleucine; GSH/GSSG, reduced/oxidized glutathione ratio; AsA/DAsA, reduced/oxidized ascorbate ratio; GR, glutathione reductase; GSTs, glutathione-S-transferases (Aranega et al., 2014)

Selected publications

López-Cruz J, Crespo-Salvador O, Frenández-Crespo E García-Agustín P, González-Bosch C. **(2017)** Absence of Cu–Zn superoxide dismutase BCSOD1 reduces *Botrytis cinerea* virulence in Arabidopsis and tomato plants, revealing interplay among reactive oxygen species, callose and signalling pathways. ***Molecular Plant Pathology*** 18(1), 16–31

Fernández-Crespo E, Navarro JA, Serra-Soriano M, Finiti I, García-Agustín P, Pallás V, González-Bosch C **(2017)** Hexanoic Acid Treatment Prevents Systemic MNSV Movement in Cucumis melo Plants by Priming Callose Deposition Correlating SA and OPDA Accumulation. ***Frontiers in Plant Science*.** 8:1793.

López-Galiano, M.J., Ruiz-Arroyo, V.M., Fernández-Crespo, E., Rausell, C., Real, M.D., García-Agustín, P., González-

Bosch, C., García-Robles, I. **(2017).** Oxylipin mediated stress response of a miraculin-like protease inhibitor in Hexanoic acid primed eggplant plants infested by Colorado potato beetle. ***Journal of Plant Physiology***, 215, 59-64.

López-Cruz J, Crespo-Salvador O, Frenández- Crespo E, García-Agustín P, González- Bosch C. **(2016)** Fungal contribution to reactive oxygen species (ROS) production exploits the host oxidative burst on its own benefit.

Free Radical Biology and Medicine 96. S61

Projects and funding

AGL2013-49023-C3-1.

IP Carmen González Bosch **(2014-2018)**

Ministerio de Economía y Competitividad

"Determinación de proteínas, marcadores de estrés oxidativo y modificaciones epigenéticas como potenciales biomarcadores para la detección temprana de estreses en cultivos económicamente importantes"

OTR2015-152571NVES. Contrato para la realización de un estudio para la Empresa Servalesa SA. **(2016)** Ensayo de la eficacia frente a estrés biótico y abiótico de cinco compuestos proporcionados por la empresa.

Other remarkable achievements

Tesis Doctoral Jaime López Cruz **(2017)**

Universidad de Valencia

Directora: Carmen González Bosch

"Análisis de la señalización mediada por la pared celular y el estrés oxidativo en la interacción planta-patógeno"

Excelente cum laude

Fermentation biotechnology: industrial yeast

Webpage of the group: https://www.iata.csic.es/en/research/fermentation-biotechnology-industrial-yeasts

Staff researchers

Jose Antonio Prieto Alaman
Francisca Randez Gil

Other members of the group

Francisco Estruch (UV)
Isabel Sánchez Adriá
Alejandro Rodriguez Puchades

Overwiew

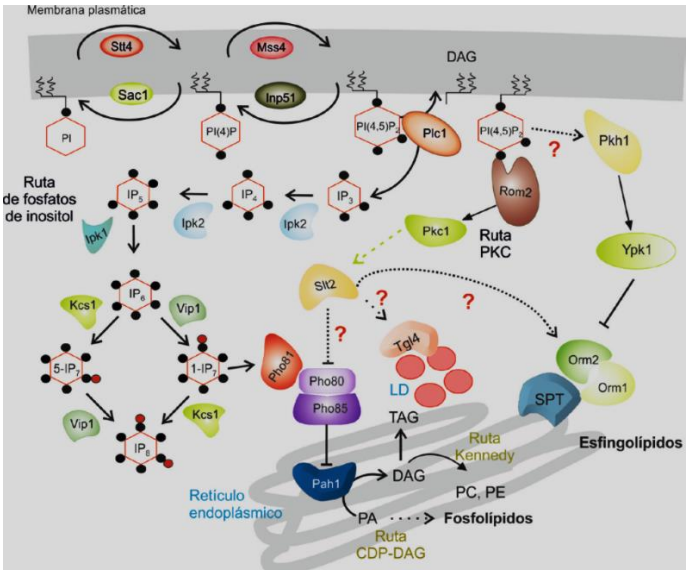
Lipid composition of the plasma membrane is key for a number of essential cellular processes that depend on its functionality, as well as, for the response and adaptation to ambient perturbations. Hence, the knowledge of lipid regulatory pathways and effectors is of great interest from basic to applied point of views. Indeed, the possibility to regulate the lipid content and composition would allow to obtaining yeast strains with increased stress tolerance and new products and ingredients based in yeast biomass or its fractions according to the challenges of the food industry. Given the parallelism between lipid metabolism in yeasts and higher eukaryotes, the identification of molecules capable of inhibiting key regulators of lipid homeostasis could allow a pharmacological action to alleviate pathologies associated with lipid disorders.

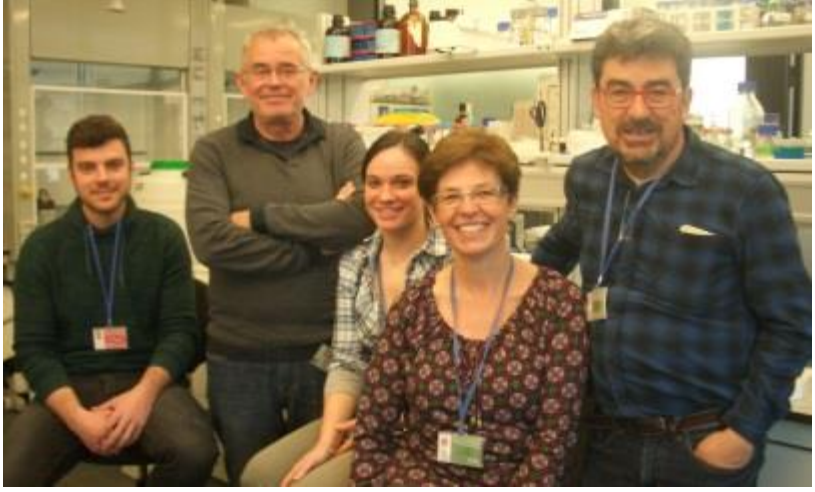
Objectives

1. Increase our knowledge about the cold signalling mechanisms that control the lipid homeostasis.

2. Apply adaptive evolution strategies for stress resistance improvement of industrial strains and/or the production of metabolites governing organoleptic characteristics of foods.

3. Isolate and characterize non-*Saccharomyces* yeasts with potential application in fermentation processes at low temperature.





Selected publications

1. Ballester-Tomás, L., Perez-Torrado, R., Rodriguez-Vargas, S., Prieto, J.A., Randez-Gil, F. (2016) Near-freezing effects on the proteome of industrial yeast strains of *Saccharomyces cerevisiae*. J Biotech. 221:70-7.

2. Córcoles-Sáez, I., Hernández, M.L., Martínez-Rivas, J.M., Prieto, J.A., Randez-Gil, F. (2016) Characterization of the *S. cerevisiae inp51* mutant links phosphatidylinositol 4,5-bisphosphate levels with lipid content, membrana fluidity and cold growth. Biochim Biophys Acta-Molecular and Cell Biology of lipids.1861:213-26.

3. García-Marqués S, Randez-Gil F, Dupont S, Garre E, Prieto JA. (2016) Sng1 associates with Nce102 to regulate the yeast Pkh-Ypk signalling module in response to sphingolipid status. Biochim Biophys Acta. 1863:1319-33.

4. Ballester-Tomás L, Prieto JA, Alepuz P, González A, Garre E, Randez-Gil F. (2017) Inappropriate translation inhibition and P-body formation cause cold-sensitivity in tryptophan-auxotroph yeast mutants. Biochim Biophys Acta.1864:314-323

5. Ballester-Tomás L, Prieto JA, Gil JV, Baeza M, Randez-Gil F. (2017) The Antarctic yeast *Candida sake*: Understanding cold metabolism impact on wine. Int J Food Microbiol. 245:59-65.

Projects and funding

- Bio2015-71059: Mecanismos de regulación del metabolismo lipídico y su relación con la respuesta a estrés en *S. cerevisiae* (IATA-UV)

- CSIC i-LINK1109: In search of new targets for neurodegenerative disease therapy: the yeast lipid metabolism approach (IATA-IQAC_KU Leuven)

Other remarkable achievements

- Professor invited at Sony Brook University, NY (USA)

Fungal Biotechnology

Webpage of the group: https://www.iata.csic.es/en/research/fungi-biotechnology

Staff researchers

Margarita Orejas Suárez
Andrew P. MacCabe

Other members of the group

Gemma Sanmartín Peris

Overview

Building on our extensive background in filamentous fungal gene regulation in the model saprophyte *Aspergillus nidulans* our research is directed towards the identification and characterisation of novel activators and repressors involved in the utilisation of pectin and pectin-related sugars as well as the components of their corresponding regulons. This is being tackled within the framework of a coordinated project in which we are undertaking a genome-wide high-throughput analysis (RNAseq) of pectin-acting/responsive activities in *A. nidulans*. The findings will be used to identify orthologues in the phytopathogenic fungi *F. oxysporum* and *B. cinerea* that could offer potential targets for new antifungal compounds of agricultural interest.

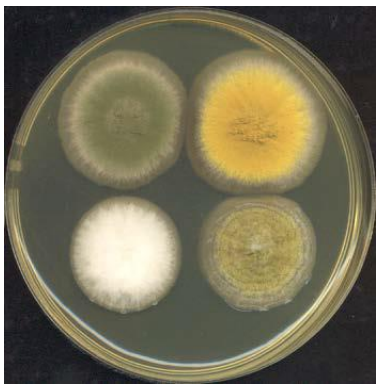
Objectives

Identify, clone and functionally characterise the genes encoding the transcriptional activators (RhaR and PecR) that mediate induction by rhamnose and pectin, as well as those encoding transporters and enzymes involved in the uptake and catabolism of pectic sugars.

Establish the transcription profiles of genes encoding CAZy family enzymes involved in pectin deconstruction.

Characterise the regulatory phenomena involved in the CreA-independent carbon catabolite repression of rhamnosidases and pectin-acting genes.

Optimise pectin-acting enzyme production by manipulation of the genes studied in the previous objectives.



An agar plate of *Aspergillus nidulans* conidial colour mutants

Selected publications

1. Comparative genomics reveals high biological diversity and specific adaptations in the industrially and medically important fungal genus Aspergillus. (2017) Genome Biology 18:28 de Vries R.P. *et al*.

2. Expansion of signal transduction pathways in fungi by extensive genome duplication. (2016) Current Biology 26 1577-1584. Corrochano *et al*.

3. Recombinant expression of a GH12 β-glucanase carrying its own signal peptide from *Stachybotrys atra* in yeast and filamentous fungi. (2016) World J. Microbiol. Biotech. 32:123. Picart P *et al*.

Projects and funding

Funcion señalizadora y utilizacion de pectina y sus monosacaridos constituyentes en hongos filamentosos saprofiticos.
CICYT AGL2015-66131-C2-2-R

Lactic Acid Bacteria and Probiotics Laboratory

Webpage of the group: https://www.iata.csic.es/es/investigacion/bacterias-lacticas-y-probioticos

Staff researchers

Gaspar Pérez Martínez
María Carmen Collado Amores
Vicente Monedero García
María Jesús Yebra Yebra
Manuel Zúñiga Cabrera

Other members of the group

José María Coll Marqués
José Vicente Gimeno
Cristina Alcántara
Christine Bäuerl
Izaskun Garcia Mantrana
Carlos Zafra Ramirez
Marta Selma Royo
Alba Boix-Amoros
Majda Dzidic

Overwiew

Our main interest is the study of physiology, genetics and ecology of lactic acid bacteria in the gastrointestinal and food environments, with the aim of establishing and optimizing their role in human health, industrial processes and food quality.

Objectives

-The use of global gene expression analysis in the study of metabolism regulation and comparative genomics of probiotic strains.

-Study of the mechanisms involved in probiotic activity and in the host-microbiota interaction through molecular techniques, such as differential expression in tissues and bacteria (nutrigenomics)

-Defining the role of the microbiota in infant health and development: role of breast milk

-Study of the role of two-component signal transduction systems in the metabolism and physiology of Lactobacillus casei

-Design of recombinant lactobacilli strains with improved technological and probiotic qualities

-To study microbial-host interactions, microbiome and its role in human health and diseases and the influence of diet (lactation) and other factors.

Selected publications

1. Rodríguez-Díaz J, García-Mantrana I, Vila-Vicent S, Gozalbo-Rovira R, Buesa J, **Monedero V, Collado MC**. 2017. Relevance of secretor status genotype and microbiota composition in susceptibility to rotavirus and norovirus infections in humans. Sci Rep. 30;7:45559. doi: 10.1038/srep45559.

2. Bidart N.G., Rodríguez-Díaz J., Palomino-Schätzlein M., **Monedero V. and Yebra, M.J**. 2017. Human milk and mucosal lacto- and galacto-N-biose synthesis by transgalactosylation and their prebiotic potential in *Lactobacillus* species. Appl Microbiol Biotechnol 101:205-215

3. Garcia-Mantrana I, **Collado MC**. Obesity and overweight: Impact on maternal and milk microbiome and their role for infant health and nutrition. Mol Nutr Food Res. 2016 Aug;60(8):1865-75.

4. Cernada M, Bäuerl C, Serna E, **Collado MC, Martínez GP**, Vento M.Sepsis in preterm infants causes alterations in mucosal gene expression and microbiota profiles compared to non-septic twins.

Sci Rep. 2016 May 16;6:25497

5. Miguel-Romero, L, Casino, P, Landete, JM, **Monedero, V, Zúñiga, M**, Marina, A. 2017. The malate sensing two-component system MaeKR is a non-canonical class of sensory complex for C4-dicarboxylates. Sci Rep 7:2708.

Projects and funding

1- Probióticos y componentes alimentarios para reducir la biodisponibilidad oral de arsénico y mercurio. Ministerio de Economía y Competitividad, AGL2015-68920-R

2- Modulación de la microbiota gastrointestinal de niños lactantes por oligosacáridos de la leche humana en un modelo animal humanizado. AGL2017-84165-C2-1-R

3- The Power of Maternal Microbes on Infant Health (MAMI) European Research Council (ERC)-ERC Starting Grant Ref. ERC-2014-StG – 639226

4- Explotación de los mecanismos de comunicación bidireccional microbiota /huésped en el intestino para el desarrollo de nuevas estrategias dietéticas con probiótico AGL2015_70487-P

5- METAMORPHOSIS- enhanced insect protein for aquaculture. EIT Food, Project ID 18157.

Other remarkable achievements

Two Scientists of the group (Dr. Gaspar Pérez Martínez and Dr. Manuel Zúñiga Cabrera) have coordinated the Spanish Network of Lactic Acid Bacteria for 12 years (2004 to 2016).

Dr. Gaspar Pérez has been (2013-2017) member of the Scientific Advisory Board of the Spanish Authority for Food Safety and Nutrition (AECOSAN).

Dr. Gaspar Pérez is at present Vice president of the Spanish Society for Probiotics and Prebiotics (SEPyP).

Dr. MC Collado is Chair of the working group 'Immune Competence Across Lifespan: Impact Of Nutrition On Immune Competence And Its Consequences Later In Life'- ILSI nutrition, immunity and inflammation task force

Dr. MC Collado is member of the Expert Panel BIO4: Applied Biological Sciences, FWO Research Foundation, Flanders Belgium and expert panel of EUROSTARS-EU Program

Molecular engineering of enzymes

Web: www.iata.csic.es/jpolaina

Staff researchers

Julio Polaina Molina

Other members of the group

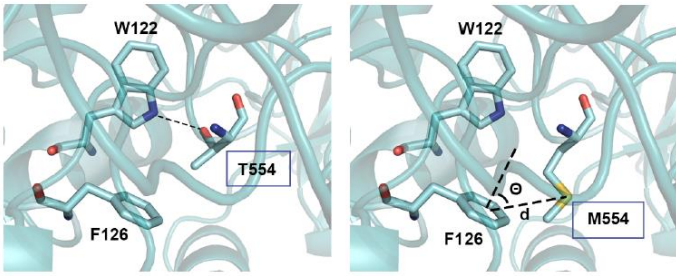
Julia Marín Navarro
David Talens Perales
Mary Casa Villegas
Eric Marqués García
Benito Alarcón Hernandis

Overwiew

Our research deals with structural and functional studies of biotechnologically relevant enzymes. We are interested in protein structure features that determine important physicochemical properties such as resistance to extreme conditions of temperature or pH, or functional properties like enzyme specificity or promiscuity. Many of the enzymes that we have studied are glycoside hydrolases involved in the hydrolysis of industrially important sugars like lactose, sucrose or cellobiose. We have engineered some of these enzymes to produce variants able to act efficiently as glycoside transferases able to synthesize oligosaccharides such as kestose, panose or isomaltose.

Objectives

Our objectives are framed in the area of green chemistry. They involve the production enzymes with novel and enhanced and properties and the production of catalytic and bioactive materials based on enzymes and enzyme components. Some specific goals of our research are the enzymatic synthesis of oligosaccharides with prebiotic or other functional properties; new technologies for the production of lactose-free milk products; new materials for food packaging and preservation and the use of the brine shrimp Artemia as a vector for delivery of bioactive compounds in aquaculture.



Selected publications

Casa-Villegas M, Marín-Navarro J, Polaina J (2017) Synthesis of isomaltooligosaccharides by Saccharomyces cerevisiae cells expressing Aspergillus niger ⍰-glucosidases. ACS Omega 2,8062-8068

Talens-Perales D, Marín-Navarro J, Garrido D, Almansa E, Polaina J (2017) Fixation of bioactive compounds to the cuticle of Artemia. Aquaculture 474: 95-100

Talens-Perales D, Górska A, Huson DH, Polaina J, Marín-Navarro J (2016) Analysis of domain architecture and phylogenetics of family 2 glycoside hydrolases (GH2). PLoS One 11(12):e0168035

Ramírez-Escudero M, Del Pozo MV, Marín-Navarro J, González B, Golyshin PN, Polaina J, Ferrer M, Sanz-Aparicio J (2016) Structural and functional characterization of a ruminal β-glycosidase defines a novel subfamily of glycosyl hydrolase family 3 with permuted domain topology. Journal of Biological Chemistry 291:24200-24214

Talens-Perales D, Polaina J, Marín-Navarro J (2016) Structural dissection of the active site of Thermotoga marítima ß-galactosidase identifies key residues for transglycosylating activity. Journal of Agricultural and Food Chemistry. 64:2917-2924

Projects and funding

2015-2019. "Industrial Applications of Marine Enzymes: Innovative screening and expressionplatforms to discover and use the functional protein diversity from the sea" 'Research and Innovation Action', del Programa 'Horizon 2020' de la Unión Europea (EU proposal - 634486 - INMARE).

2016-2019. Proyecto titulado: "Producción de nuevos enzimas, conjugados enzimáticos y compuestos bioactivos para aplicaciones alimentarias mediante biología sintética". Subvencionado por la Secretaría de Estado de Investigación, Desarrollo e Innovación del Ministerio de Economía y Competitividad (AGL2016-75245-R)

2014-2016. Proyecto titulado "Obtención de enzimas de última generación para aplicaciones alimentarias mediante ingeniería de proteínas". Subvencionado por la Secretaría de Estado de Investigación, Desarrollo e Innovación del Ministerio de Economía y Competitividad (BIO2013-48779-C4-3-R)

Non-conventional yeasts

Webpage of the group: https://www.iata.csic.es/en/research/non-conventional-yeasts

Staff researchers

Carmela Belloch

Other members of the group

Alba Yepez
Chantal Renau

Overwiew

Our research focuses on biotechnological and genetic characterization of food-relevant non-Saccharomyces yeasts. Yeast ecology and evolution along food production processes is a strong theme or research in our group as well as the study of genes and enzymes involved in aroma production for selection of yeasts as starter cultures.

Objectives

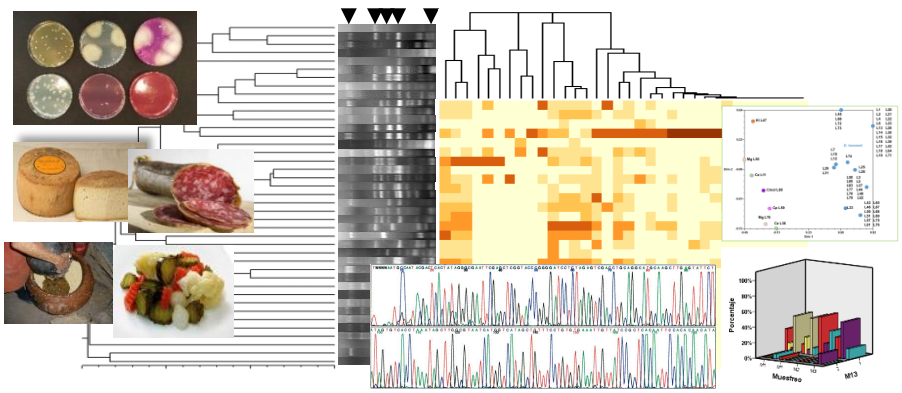
Study of the yeast microbiota, mainly non-Saccharomyces species, in fermented foods by means of microbiological and molecular methods.

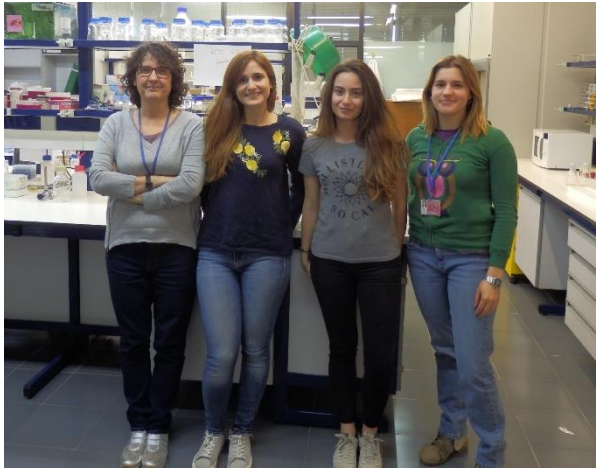
Yeast ecology and distribution along the fermentative process applying culture based and next generation sequencing (NGS) methods.

Aroma generation profile of non-Saccharomyces yeasts and its relevance in food production. Genes involved in aroma generation: metatranscriptomics.

Physiological characterization of non-Saccharomyces yeasts. Tolerance and adaptation to physicochemical changes along the fermentative process.

Design of starter cultures of non-Saccharomyces yeasts. Determination of virulence factors and antagonistic activities.





Selected publications

1. Multilocus analysis reveals large genetic diversity in Kluyveromyces marxianus strains isolated from Parmigiano Reggiano and Pecorino di Farindola cheeses. 2016. International Journal of Food Microbiology 233, 1-10.

2. Yeast inoculation as a strategy to improve the physico-chemical and sensory properties of reduced salt fermented sausages produced with entire male fat. 2017. Meat Science 123, 1-7.

3. Yeast diversity during the fermentation of Andean chicha: A comparison of high-throughput sequencing and culture-dependent approaches. 2017. Food Microbiology 67, 1-10.

4. Screening of Debaryomyces hansenii Strains for Flavor Production under a Reduced Concentration of Nitrifying Preservatives Used in Meat Products. 2017. Journal of Agricultural and Food Chemistry 65, 3900-3909.

5. Mitochondrial introgression suggests extensive ancestral hybridization events among Saccharomyces species. 2017. Molecular Phylogenetics and Evolution 108, 49-60.

Projects and funding

- Empleo de levaduras como estrategia de producción de aromas naturales para productos cárnicos madurados con menores niveles de nitrificantes. 2016-2018. PN2015 - PROY I+D+I - PROGRAMA ESTATAL DE I+D+I ORIENTADA A LOS RETOS DE LA SOCIEDAD - PLAN ESTATAL DE INVESTIGACIÓN CIENTÍFICA Y TÉCNICA Y DE INNOVACIÓN 2013-2016

- Evaluación de la actividad antimicrobiana de nuevos conservantes naturales con el fin de determinar su eficacia. 2017. CONTRATO DE APOYO TECNOLÓGICO 20175458. MANUFACTURAS CEYLAN, S.L.

Other remarkable achievements

- Editorial Board of Food Research International 2017-2019

- Editorial Board of Food Microbiology 2017-2019.

- Evaluator of peoples' positions for the MFP-COFUND (Martí-Franquès COFUND) 2017

- Evaluator of scientific projects and peoples' positions for the MINECO-ANEP 2012-2016

- CSIC Representative on the Scientific Committee of the Spanish Type Culture Collection (CECT) 2012-2018

Postharvest physiology and pathology of fruits

Webpage of the group: https://www.iata.csic.es/en/research/postharvest-physiology-pathology-and-biotechnology

Staff researchers

María Teresa Lafuente Rodríguez
Luis González Candelas

Other members of the group

Ana-Rosa Ballester Frutos
Francisco Romero Gascón
Cecilia Lutz
Cristina Selma Lázaro
Ana Izquierdo Pascual
Tania Campos Navarro
Amparo Picazo Roig
Jordi Cerveró Moreno

Overwiew

We focus on the study of the mechanisms underlying fruit-pathogen interaction, considering both sides, the fruit and the pathogen; as well as on the tolerance of citrus fruits to different abiotic stresses causing postharvest disorders that affect fruit quality.

We are addressing both fruit defense responses against different fungi and the mechanisms and determinants of pathogenicity and virulence of the fungus, as well as on the mycotoxins that they produce.

In our studies, we use physiological and structural analyses as well as molecular genetics, genomics, transcriptomics and metabolomics strategies, with the aim to understand the basis of the mechanisms involved in the different processes.

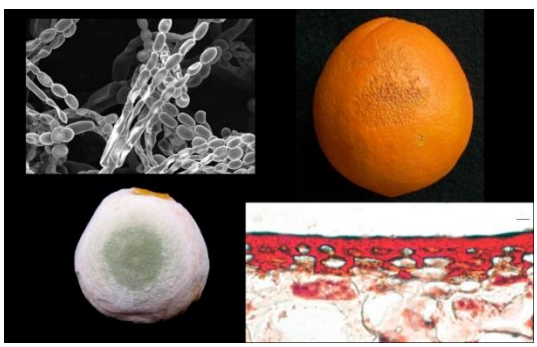
Objectives

To determine the mechanisms regulating pathogen's virulence and pathogenicity, with special focus on putative effectors and metal homeostasis.

To determine the role of plant hormones in the tolerance/susceptibility of fruits to both biotic and abiotic stresses.

To develop alternative strategies to control postharvest fungal pathogens based on either induced fruit resistance or new antifungal compounds/treatments.

To analyze the involvement of the cuticle's structure and metabolism in the tolerance of fruits to dehydration and its relationship with physiological disorders.



Selected publications

1. Tian, S., Torres, R., Ballester, A.R., Li, B., Vilanova, L., González-Candelas, L. (2016). Molecular aspects in pathogen-fruit interactions: Virulence and resistance. Postharvest Biology and Technology 122:11-21

2. Lafuente, M.T., Establés-Ortiz, B., González-Candelas, L. (2017) Insights into physiological and molecular events controlling heat-induced chilling tolerance in citrus fruits. Frontiers in Plant Science 8, article 1113

3. Ballester, A.-R., Norelli, J., Burchard, E., Abdelfattah, A., Levin, E., González-Candelas, L., Droby, S., Wisniewski, M. (2017). Transcriptomic response of resistant (PI613981–*Malus sieversii*) and susceptible ("Royal Gala") genotypes of apple to blue mold (*Penicillium expansum*) infection. Frontiers in Plant Science 8: 1981

4. Ballester, A.R., Lafuente, M.T. (2017) LED blue light-induced changes in phenolics and ethylene in citrus fruit: Implication in elicited resistance against *Penicillium digitatum* infection. Food Chemistry 218:575-583.

5. Establés-Ortiz, B., Romero, P., Ballester, A.R., González-Candelas, L., Lafuente, M.T. (2016) Inhibiting ethylene perception with 1-methylcyclopropene triggers molecular responses aimed to cope with cell toxicity and increased respiration in citrus fruits. Plant Physiology and Biochemistry 103: 154-166.

Projects and funding

-AGL2014-55802-R (217.800 €; MINECO)

-PROMETEOII/2014/027 (228.035 €; Generalitat Valenciana)

-H2020-MSCA/0066 (239.191,20 €; European Union)

-AGL2014-52648-REDT (9.474,30 €; MINECO)

Other remarkable achievements

-M.T. Lafuente is member of the editorial board of the journal Postharvest Biology and Technology

Postharvest Physiology and Fruit Quality

Webpage of the group: https://www.iata.csic.es/en/research/postharvest-physiology-pathology-and-biotechnology

Staff researchers

Lorenzo Zacarías García
Mª Jesús Rodrigo Esteve

Other members of the group

Florencia Rey (Becaria predoctoral, ANII, Uruguay)
Inmaculada Carbonell (Titulado Superior CSIC)
Mª Carmen Gurrea (Técnico contratado)
Marcelo Paes de Barros (Profesor visitante, FAPESP Brasil)

Overwiew

Fruit color and absence of external defects are important factors of fruit quality, consumer acceptance and marketing of fresh fruits. Our research projects are aimed to investigate metabolic pathways of fruit quality components and how these metabolites are regulated during fruit ripening, and modified by different environmental and postharvest conditions. Our work is mainly focused, but not exclusively, on citrus fruits due to the relevance of this crop and the high consumption both as fresh fruit or juice products. In our research, we use multidisciplinary approaches and experimental strategies (physiology and biochemistry, genetic diversity and functional genomics) to obtain a global understanding of mechanisms regulating fruit quality and its postharvest performance. Carotenoids (pigments responsible of fruit color and with important nutritional properties) and ascorbic acid (important vitamin in Citrus) biosynthesis and accumulation are key compounds under investigation in our team.

Objectives

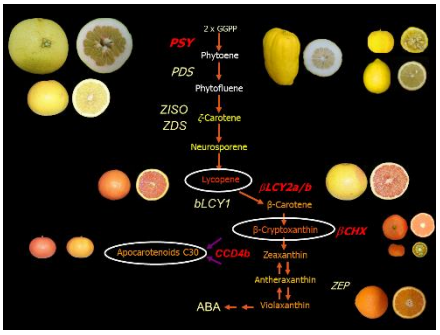
Our research objectives can be summarized as:

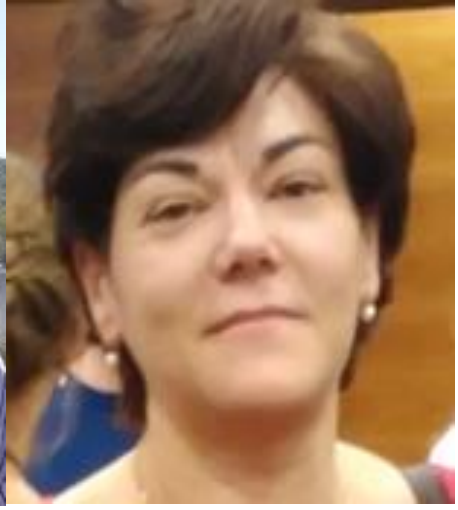
Understand the genetic and molecular basis of carotenoid biosynthesis and accumulation, and colour diversity in the genus Citrus.

Understanding the genetic and molecular basis of ascorbic acid accumulation and its diversity in Citrus fruits.

Physiological and molecular responses of citrus fruits to postharvest stress conditions depreciating fruit quality.

Changes in fruit quality components (carotenoids, ascorbic acid, volatiles, etc.) during postharvest storage and their involvement in physiological disorders.





Selected publications

1. Lado J., Rodrigo M.J., Zacarias L. Implication of the antioxidant system in chilling injury tolerance in the red peel of grapefruit. **Postharvest Biology and Technology** 111: 214-226 (2016).
2. Cronjé P.J.R., Zacarías, L. and Alferez, F. Susceptibility to postharvest peel pitting in Citrus fruits as related to albedo thickness, water loss and phospholipase activity. **Postharvest Biology and Technology** 112: 77-82 (2017)
3. Alós, E., Fuertes, A., Reig, C., Mesejo, C., Rodrigo, M.J., Agusti, M. and Zacarias, L. Ethylene biosynthesis and perception during ripening of loquat fruits (*Eriobotrya japonica* Lindl). **J. Plant Physiol**. 210: 64-71 (2017)
4. Lado, J., Zacarias L. and Rodrigo, M.J. Regulation of Carotenoid Biosynthesis during Fruit Development. In "**Carotenoids in Nature, Biosynthesis, Regulation and Function**". Ed. C. Stange, Chapter 6, 161-198 (2016), Springer Int. Pub. (DOI 10.1007/978-3-319-39126-7_12)
5. Lado, J., Cuellar, F., Rodrigo, M.J., Zacarías L. Nutritional composition of Mandarins. In"**Nutritional compositions of fruit cultivars**". Eds. M.S.J. Simmonds and V.P. Preedy, Chapter 18, 418-444 (2016). Academic Press (ISBN: 978-0-12-408117-8)

Projects and funding

- AGL2015-70218-R (MINECO, España)

- PROMETEOII/2014/027 (Generalitat Valenciana)

- Industrial Contract "Citricos Covadonga"

Other remarkable achievements

- Carotenoid Network: from microbia and plants to food and health (CaRed) (BIO2015-71703). Programa Estatal Redes de Excelencia. MINECO, España.

- European network to advance carotenoid research and applications in agro-food and health (EUROCAROTEN). COST Action CA15136) (EU)

- Organizers: "Reunión Nacional sobre Carotenoides en microorganismos, plantas, alimentación y salud". Valencia, 16 y 17 Noviembre 2017.

- L. Zacarias. Visiting Professor, Dep. Horticultural Sciences, University of Stellenbosch, South Africa.

- L. Zacarias. Editorial board "Food Science and Technology International".

- Industrial Contract "AIMPLAST"

Systems biology in yeast of biotechnological interest

Webpage of the group: https://www.iata.csic.es/en/research/systems-biology-yeast-biotechnological-interest

Staff researchers

Amparo Querol Simón
Eladio Barrio Esparducer
José Manuel Guillamón Navarro
Sergi Puig Todolí

Other members of the group

Antonio Ruiz López
David Lázaro Mansilla
David Perís Navarro
Desamparados Andres Borderia
Estéfani García Ríos
Javier Alonso Del Real Arias
Laura Gutiérrez Macías
Laura Pérez Través
Lucía Ramos Alonso
Maite Martinez Pastor
Maria Lairón Peris
María Pilar Miró Pardo
Miguel Morard Pedrouzo
Ricardo Bisquert Alcaraz
Roberto Pérez Torrado
Romain Minebois
Sara Muñiz Calvo
Ying Su

Overwiew

Industrial yeasts responsible for biotechnological processes are highly specialized organisms that have evolved under restrictive conditions in different environments manipulated by man. Our group is interested in understanding the mechanisms involved in adaptation that have shaped the yeast genome conferring properties of biotechnological interest. Different Omic as well as evolutionary analysis are used to understand the mechanisms of adaptation of yeasts of industrial interest to environmental and nutritional changes (temperature, availability of nitrogen and iron, etc.). This research is applicable to the selection and breeding of new strains of yeasts of interest in industrial fermentations (wine, beer, cider, etc.) and to the development of dietary supplements (iron-enriched yeast) by different techniques such as adaptive evolution, hybridization, or the development of GMOs.

Objectives

Regulatory and metabolic studies of gene expression in wine yeasts.
Interspecific hybridization in generating yeasts better adapted to fermentation
Study of the interaction of parental genomes present in the hybrids.
Interactions between yeast species during industrial fermentations.
The study of genetic basis (QTLs) responsible for the phenotypic traits of yeasts of industrial interest.
The characterization of the mechanisms of response to iron deficiency by utilizing the yeast S. cerevisiae as a model eukaryotic organism.
Molecular systematics and evolution of yeasts of biotechnological interest
The study of food yeasts as potential emerging pathogens.

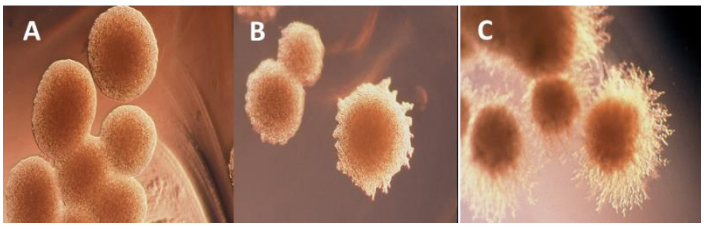


Figure. Morphology of different yeast colonies of the species Saccharomyces cerevisiae according to their origin: (A) vines (B) Brewery (C) Clinical sample

Selected publications

1. N. Sanvisens, A. M. Romero, C. Zhang, X. Wu, X. An, M. Huang and S. Puig (2016) Yeast Dun1 kinase regulates ribonucleotide reductase small subunit localization in response to iron deficiency. J. Biol. Chem., 291: 1807-1817
2. Alonso-Del-Real J, Contreras-Ruiz A, Castiglioni GL, Barrio E, Querol A (2017) The Use of Mixed Populations of Saccharomyces cerevisiae and S. kudriavzevii to Reduce Ethanol Content in Wine: Limited Aeration, Inoculum Proportions, and Sequential Inoculation. Front Microbiol. 25;8:2087
3. Peris D, Arias A, Orlić S, Belloch C, Pérez-Través L, Querol A, Barrio E (2017) Mitochondrial introgression suggests extensive ancestral hybridization events among Saccharomyces species. Mol Phylogenet Evol. 108:49-60
4. García-Ríos E, Querol A, Guillamón JM (2016) iTRAQ-based proteome profiling of *Saccharomyces cerevisiae* and cryotolerant species *Saccharomyces uvarum* and *Saccharomyces kudriavzevii* during low-temperature wine fermentation. J Proteomics. 146:70-79
5. Tronchoni J, García-Ríos E, Guillamón JM, Querol A, Pérez-Torrado R. Transcriptomic analysis of Saccharomyces cerevisiae x Saccharomyces kudriavzevii hybrids during low temperature winemaking. F1000Res. 2017 May 15;6:679

Projects and funding

- Caracterización y utilización biotecnológica de factores reguladores de la respuesta a la deficiencia de hierro en levadura y plantas (BIO2014-56298-P). **IP: Sergi Puig**
- Understanding the mechanisms of non-conventional Saccharomyces species adaptation to wine fermentations: A multi-scale system biology approach to non-GMO yeasts improvement (AGL2015-67504-C3-1-R). **IP: Amparo Querol**
- Tailoring thermotolerant yeasts for more sustainable, eco-efficient and competitive industrial fermentations (ERA-IB-15-105). **IP: José M. Guillamón**
- Generation of new yeast strains for improved flavours and aromas in beer and wine (AROMAGENESIS). Marie Curie, Initial Training Networks, Collaborative Project. H2020-MSCA-ITN-2017. Funding scheme: MSCA-ITN-ETN. Proposal number: 764364. **IP: Amparo Querol**
- Estudio de las interacciones genómicas en híbridos del género Saccharomyces de interés enológico (AGL2012-39937-C02-02). **IP: Eladio Barrio**

Department of Preservation & Food Safety Technologies

Food Analytical Immunotechnology (FAIG)

Molecular Taxonomy

Packaging

Preservation processes and risk assessment in food

Trace elements

Novel Materials and Nanotechnology for Food Applications

Open science, open access and the lifecycle of research data

Food Analytical Immunotechnology

Webpage of the group: http://www.haptens-antibodies.com/en/

Staff researchers

Antonio Abad Fuentes
Josep Vicent Mercader Badia

Collaborators

Antonio Abad Somovilla (UVEG)
Consuelo Agulló Blanes (UVEG)

Other members of the group

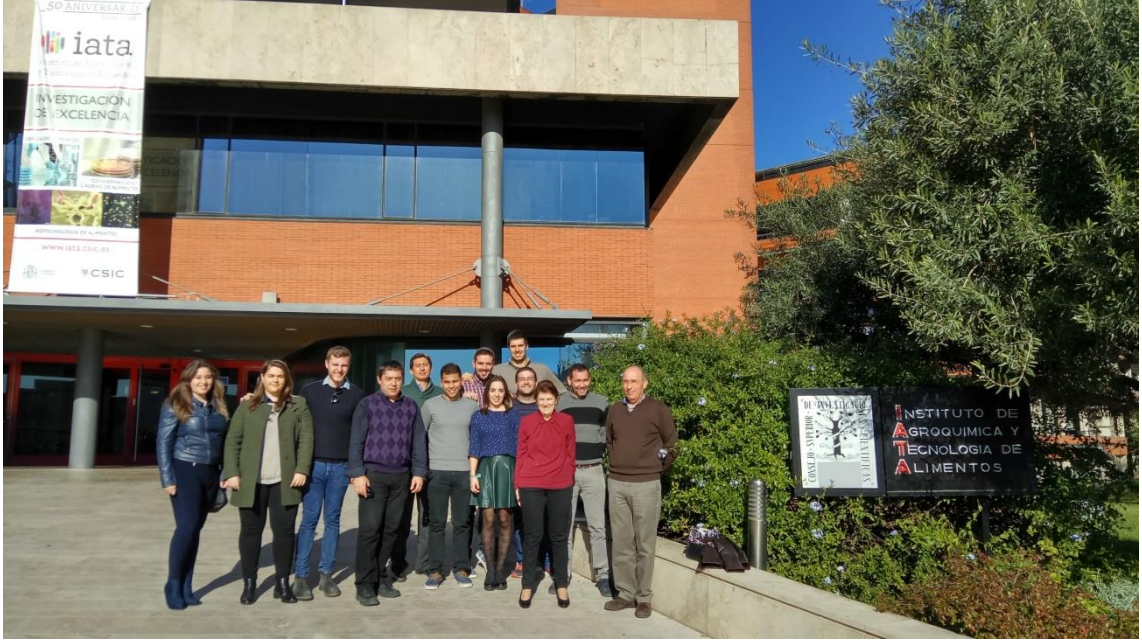
Eric Ceballos Alcantarilla
Daniel López Puertollano
Ramón Eudoro Cevallos Cedeño
Hadyn Duncan
Luís Guillermo Addante Moya
Paula Peña Murgui
Jenifer Cascales Pérez
Javier Marzo Bargues

Overview

The Food Analytical Immunotechnology group is comprised by two senior researchers from CSIC who work in coordination with two professors from the Organic Chemistry Department of the University of Valencia. The team is also made up by two laboratory technicians as well as Spanish and international PhD scholars. Moreover, we regularly host graduate and master students for experimental training. We are located at an important academic and technological environment constituted by the University's Scientific Park which houses large facilities and exclusive services for R&D, including services for proteome analysis and experimental animal production. Our laboratories are fully equipped, and a cell culture unit is available for hybridoma generation and monoclonal antibody production.

Objectives

The objective of our scientific activity is the development of rapid and economic analytical systems for food safety and quality purposes. We study the development of user-friendly bioanalytical methods for the determination of chemical residues and contaminants (pesticides, hormones, additives, antibiotics, mycotoxins, phycotoxins, etc.) in food samples. Synthetic functionalized derivatives and bioconjugates of small organic molecules (haptens) are prepared, and high-affinity polyclonal and monoclonal antibodies specific of the target compound are generated in our lab. Moreover, alternative immunochemical methods, such as microplate-based immunoassays, affinity columns, immunochromatographic strips, or bioactive nanoparticles, are evaluated and validated.



Selected publications

1. Mercader JV, Abad-Somovilla A, Agulló C, Abad-Fuentes A. Fluxapyroxad haptens and antibodies for highly sensitive immunoanalysis of food samples. *Journal of Agricultural and Food Chemistry 65* (**2017**) 9333–9341.

2. Ceballos-Alcantarilla E, Abad-Somovilla A, Agulló C, Abad-Fuentes A, Mercader JV. Protein-free hapten-carbon nanotube constructs induce the secondary immune response. *Bioconjugate Chemistry 28* (**2017**) 1630–1638.

3. Esteve-Turrillas FA, Mercader JV, Agulló C, Abad-Somovilla A, Abad-Fuentes A. A class-selective immunoassay for simultaneous analysis of anilinopyrimidine fungicides using a rationally designed hapten. *Analyst 142* (**2017**) 3975–3985.

4. Kolosova A, Maximova K, Eremin SA, Zherdev AV, Mercader JV, Abad-Fuentes A, Dzantiev BB. Fluorescence polarisation immunoassays for strobilurin fungicides kresoxim-methyl, trifloxystrobin and picoxystrobin. *Talanta 162* (**2017**) 495–504.

5. Esteve-Turrillas FA, Agulló C, Abad-Somovilla A, Mercader JV, Abad-Fuentes A. Fungicide multiresidue monitoring in international wines by immunoassay. *Food Chemistry 196* (**2016**) 1279–1286.

Projects and funding

- Production of antibodies and generation of immunochemical methodologies for biotoxin detection (AGL2015-64488-C2-1-R). Program “Retos de la Sociedad 2015”. Term: 2016-2018.
- Development of a portable and low-cost system based on microfluidics for the detection of contaminants in food (RTC-2015-3348-2). Program “Retos-Colaboración 2015”. Term: 2015-2018.
- Co-ownership contract and patent license. Citrosol SA. Term: 2017-2047.
- Co-ownership contract and patent license. Abraxis LLC. Term 2015-2045.

Other remarkable achievements

- Preparation of novel bioconjugates and antibodies for the immunodetection of ochratoxin A. Patent PCT/ES2017/070759 (2017).
- Preparation of bioconjugates and antibodies for the immunodetection of anatoxin-a. Patent PCT/ES2016/070656 (2016).

Molecular taxonomy

Webpage of the group: https://www.iata.csic.es/en/research/molecular-taxonomy

Staff researchers

Rosa Aznar Novella
Gloria Sánchez Moragas

Other members of the group

Walter Randazzo
Alba Yepez Latorre
Irene Falcó Ferrando

Overwiew

The group focuses its research on improving microbiological safety and food quality as well as functionality. In the first field the group investigates the development of rapid methods, based on PCR, for the identification, detection and quantification of pathogenic bacteria and enteric viruses and their adaptation to routine food analysis. In the second field, research focuses on lactic acid bacteria (LAB) in fermented foods using i) next generation sequencing (NGS) for population analysis and genome sequencing, and ii) culture-based approaches for the isolation and identification of strains and their biotechnological characterization aiming at potential food applications i.e. rivoflavin and/or folates production and / or antimicrobial activity.

Objectives

Development of rapid methods based on real-time PCR for the quantitative detection of pathogens of interest in food (bacteria and enteric viruses), as well as viable / infectious forms.
Validation of PCR procedures for the detection of pathogens in different food matrices and their adaptation to routine food analysis.
Evaluation of food industry technologies (e.g. high pressure, active packaging, ultrasounds, etc.) effectiveness for the elimination of pathogens (viruses and bacteria).
Isolation and characterization of lactic acid bacteria from traditionally fermented products.
Application of LAB in food: biopreservation, fortification and development of new vegetal-based functional food.

Selected publications

1. W. Randazzo, I. Falcó, R. Aznar, G. Sánchez. Effect of green tea extract on enteric viruses and its application as natural sanitizer. Food Microbiology 66:150-156 (2017).

2. I. Falcó, W. Randazzo, L. Gómez-Mascaraque, R. Aznar, A. López-Rubio, G. Sánchez. Effect of (-)-epigallocatechin gallate at different pH conditions on enteric viruses. LWT - Food Science and Technology 81:250-257 (2017).

3. W. Randazzo, F. López-Gálvez, A. Allende, R. Aznar, G. Sánchez. Evaluation of viability PCR performance for assessing norovirus infectivity in fresh-cut vegetables and irrigation water. International Journal of Food Microbiology 229:1-6 (2016).

4. A. Yepez, C. Luz, G. Meca, G. Vignolo, J. Mañes, R. Aznar. Biopreservation potential of lactic acid bacteria from Andean fermented food of vegetal origin. Food Control, 78: 393-400. (2017).

5. M. Nácher-Vázquez, I. Iturria I, K. Zarour, M.L. Mohedano, R. Aznar, M.A. Pardo, P. López. (2017) Dextran production by *Lactobacillus sakei* MN1 coincides with reduced autoagglutination, biofilm formation and epithelial cell adhesion. Carbohydr Polym. 168:22-31.

Projects and funding

- Alimentos vegetales con funcionalidad probiótica para poblaciones infantiles desnutridas (ProInfant). CYTED P916PTE0233 y PCIN-2017-003. 2016-2019.

- Desarrollo de métodos rápidos en PCR para detección cuantitativa patógenos de interés en alimentos. PEJ-2014-A-21766. 2016-2017.

- Análisis y control integrado de Toxoplasma gondii y virus entéricos en vegetales de IV gama. RTA2014-00024-C04-03. 2016-2017.

- Desarrollo de una biblioteca de perfiles MALDI-TOF para la identificación de cepas bacterianas presentes en aguas de consumo (DRINKING WATER LIBRARY). RTC-2015-4496-2. 2015-2018.

- Conservación sostenible de recursos microbianos españoles bajo estándares de calidad mediante una aproximación integradora y potenciando su visibilidad RMP2015-00001-00-00. 2017-2020.

Other remarkable achievements

Finalist of the Archimedes 2016 Award. Master's thesis titled "Improvements for the detection of infectious forms of the hepatitis A virus through the viability PCR technique"

Award for the best poster "Effect of the pH on the antiviral activity of the (-) - epigallocatechin gallate" in the area of Food Microbiology granted by the Spanish Society of Microbiology at the International Congress FEMS2017.

Packaging

Webpage of the group: https://www.iata.csic.es/es/investigacion/envases

Staff researchers

Ramón Catalá Moragrega
Rafael José Gavara Clemente
Pilar Hernández Muñoz
María de los Desamparados López Rubio

Other members of the group

José Pascual Cerisuelo Ferriols
María José Fabra Rovira
Raquel Heras Mozos
Laura Higueras Contreras
Gracia M. López Carballo
Marta Martínez Sanz
Laura Settier Ramirez
Isaac Benito González
Cynthia Fontes Candia

Overview

Development of new materials, mixtures, structures and coatings for packaging applications that improve food stability and reduce environmental impact. Characterization of the functional properties of packaging materials with especial attention to food/package interaction issues (permeation, sorption, scalping, migration, release). Study, development and design of new packaging technologies including Modified atmosphere packaging (MAP) and active and intelligent packaging (smart packaging).

Objectives

The packaging group studies food packaging and packaging materials to improve food quality and safety and increase shelf life. The present research lines include:

Development and improvement of packaging materials including blends, composites and biomaterials

Characterization of the properties of materials for packaging design

Study and development of new packaging technologies. MAP and Active and intelligent packaging

Study and development of edible coatings and microencapsulation of food systems or food components to improve stability and bioavailability

Selected publications

1. Gómez-Estaca, J.; Balaguer, M.P.; López-Carballo, G.; Gavara, R.; Hernández-Muñoz, P. (2017). Improving antioxidant and antimicrobial properties of curcumin by means of encapsulation in gelatin through electrohydrodynamic atomization. Food Hydrocolloids 70, 313 - 320

2. Higueras, L.; López-Carballo, G.; Gavara, R.; Hernández-Muñoz, P. (2016). Effect of hydroxypropyl-β-cyclodextrin and coadjuvants on the sorption capacity of hydrophilic polymer films for monoterpene alcohols. Carbohydrate Polymers 151, 1193 - 1202

3. Domínguez, I.; Lafuente, M.T.; Hernández-Muñoz, P.; Gavara, R. (2016). Influence of modified atmosphere and ethylene levels on quality attributes of fresh tomatoes (Lycopersicon esculentum Mill.). Food Chemistry 209, 211 - 219

4. A. López-Rubio, P. Tarancón, L.G. Gómez-Mascaraque, M. Martínez-Sanz, M.J. Fabra, J.C. Martínez, S. Fiszman (2016). Development of glucomannan-chitosan interpenetrating hydrocolloid networks (IHNs) as a tool for creating satiating ingredients. Food Hydrocolloids, 60, 533-542.

5. M.J. Fabra, M. Martinez-Sanz, L.G. Gómez-Mascaraque, J.M. Coll, J.C. Martínez, A. López-Rubio (2017). Development and characterization of hybrid corn starch-microalgae films: effect of US pre-treatment on structural, barrier and mechanical performance. Algal Research 28, 80-87.

Projects and funding

“NANOSAK - Nanocellulose–sakacin A conjugates for food packaging purposes”. Fundazione Cariplo (Italy). From 2016 to 2019. IP: Manuella Rollini (Univ. Milan), Pilar Hernandez (CSIC)

ENVASES PARA ALIMENTOS BASADOS EN MATERIALES ANTIMICROBIANOS AVANZADOS: POLIMEROS DINAMICOS, AUTOHIGIENIZANTES Y "VIVOS"". MINECO (AGL2015-64595-R), From 2016 to 2018. IP: Rafael Gavara

"Etiquetas Inteligentes con nanoparticulas para la detección del deterioro de los alimentos envasados "SAFETAG”. MINECO Retos Colaboracion RTC-2016-5197-2. From 12/2016 to 4/2019. IP: Rafael Gavara

“Revalorización y aprovechamiento de especies nativas del noroeste argentino en el diseño de alimentos funcionales y fitoterapicos: desarrollo y caracterización de nano- y microencapsulados de polifenoles” EMHE-CSIC, MHE-200038. From 2017 to 2019. IP. A. López-Rubio

“FITNESS: Food PackagIng open courseware for higher Education and Staff of companieS” European Union (Erasmus+ Programme). FROM: 9/2017 TO: 8/2020. IP: M.J. Fabra (for IATA)

Other remarkable achievements

- Edición del Special issue ““Biopolymer-Based Coatings and Packaging Structures for Improved Food Quality” en el Journal of Food Quality, Vol. 2017. Editors: A. López-Rubio, M.J. Fabra, M. Martínez-Sanz, S. Mendoza & Quan V. Vuong.
- Keynote Presentation (A. López-Rubio): “Encapsulación de bioactivos vegetales para el desarrollo de alimentos funcionales”. En: XIII Jornadas de Comunicaciones Facultad de Ciencias Naturales e I.M.L., U.N.T., Tucumán (Argentina), 6-7 Diciembre 2017.

Preservation and Risk Assessment of Foods

Webpage of the group: https://www.iata.csic.es/es/investigacion/procesos-de-conservacion-y-evaluacion-de-riesgos-en-alimentos

Staff researchers

María Dolores Rodrigo
Antonio Martinez

Other members of the group

Gema Garcia
Diana Ibañez
Temo Marin

Overwiew

The group has extensive experience in the development of preservation processes using thermal and non-thermal technologies, as well as in the area of microbiological risk assessment, mathematical modelling and its impact on food safety.

The research carried out in the last decade has been developed fundamentally in the area of non-thermal preservation technologies, mainly Pulsed Electric Fields (PEF), High Hydrostatic Pressures (HHP) and the use of natural antimicrobials, applied to various foods in order to obtain safe products from the microbiological point of view, preserving the physical, chemical, nutritional and sensory properties of the fresh product to a greater extent.

Objectives

Evaluation of the effect of thermal and non-thermal food preservation technologies, alone or in combination (hurdle technology), on the inactivation of microorganisms and enzymes present in food.

Development of predictive mathematical models of inactivation and growth of microorganisms and enzymes as a fundamental tool to carry out an exposure assessment within a risk assessment system.

Validation of thermal and non-thermal food preservation processes:

- Development of time-temperature integrators.
- Sublethal damage studies, generation of resistances and change of virulence in microorganisms as a consequence of processing using *C. elegans* as test organism.

Selected publications

1. M. SANZ-PUIG; P. MORENO; M.C. PINA-PÉREZ; D. RODRIGO; A. MARTÍNEZ. Combined effect of high hydrostatic pressure (HHP) and antimicrobials from agro-industrial by-products against S. Typhimurium. Food Science and Technology-LWT. 77,126-133. 2017.

2. S. SANSANO; A. RIVAS; M.C. PINA-PÉREZ; A. MARTÍNEZ; D. RODRIGO. Stevia rebaudiana Bertoni effect on the hemolytic potential of Listeria monocytogenes. International Journal of Food Microbiology. 250, 7-11. 2017. DOI: 10.1016/j.ijfoodmicro.2017.03.006

3. M. SANZ-PUIG, E. LÁZARO, C. ARMERO, D. ALVARES, A. MARTÍNEZ, D. RODRIGO. S. Typhimurium virulence changes caused by exposure to different non-thermal preservation treatments using C. elegans. International Journal of Food Microbiology. 262, 49-54. 2017. https://doi.org/10.1016/j.ijfoodmicro.2017.09.006

4. MARIA SANZ-PUIG; LEONOR SANTOS-CARVALHO; LUÍS MIGUEL CUNHA; M. CONSUELO PINA-PÉREZ; ANTONIO MARTÍNEZ; DOLORES RODRIGO. Effect of pulsed electric fields (PEF) combined with natural antimicrobial by-products against S. Typhimurium. Innovative Food Science & Emerging Technologies. 37, 322 - 328. 2016.

5. M. SANZ-PUIG; M.C. PINA-PÉREZ; A. MARTÍNEZ; D. RODRIGO. Escherichia coli O157:H7 and Salmonella Typhimurium inactivation by the effect of mandarin, lemon, and orange by-products in reference medium and in oat-fruit juice mixed beverage. LWT-Food Science and Technology.66, 7-14. 2016.

Projects and funding

COST ACTION CA15118: Mathematical and Computer Science Methods for Food Science and Industry (FoodMC). https://www6.inra.fr/foodmc
Fecha de inicio-fin: 11/04/2016 - 11/04/2020

COST ACTION TD1104: European network for development of electroporation-based technologies (EP4Bio2Med). www.electroporation.net
Fecha de inicio-fin: 10/04/2012 - 10/04/2016

AGL2013-48993-C2-2-R Validación de tecnologías no térmicas de conservación de alimentos: establecimiento de la seguridad microbiológica
Entidad de realización: Instituto de Agroquímica y Tecnología de Alimentos

Estudios científicos sobre la *Listeria monocytogenes* del jamón curado. PA14/83 INIA.
Entidad de realización: Instituto de Agroquímica y Tecnología de Alimentos.

Other remarkable achievements

TESIS DOCTORALES DIRIGIDAS EN EL GRUPO
Fabián Torres Bello. Efecto del tratamiento por altas presiones hidrostáticas (HHP) en la calidad de queso fresco y en las proteínas de suero de quesería.
Clara Miracle Belda Galbis. Aplicación conjunta de ingredientes naturales y tecnologías no térmicas para la conservación de alimentos mínimamente procesados.
María Sanz Puig: Valorización de subproductos de la industria agroalimentaria como antimicrobianos naturales frente a patógenos humanos y vegetales: efectividad, validación y aplicaciones.

Trace Elements

Webpage of the group: https://www.iata.csic.es/es/investigacion/elementos-traza

Staff researchers

Dinoraz Vélez Pacios
Vicenta Devesa I Pérez

Other members of the group

Gabriela Matuoka Chiocchetti
Carlos Jadán Piedra
María Jesús Clemente Peiró

Overwiew

The Trace Elements group has a former background related to the development of analytical methodology to determine toxic trace elements and its species in food products. These methodologies have been applied to evaluate the food safety with emphasis in metal/metalloid speciation and human exposure. Some of the developed methods are international standards. The aim of the group has been extended in the last decade in order to evaluate the risk associated with the intake of these elements considering aspects such as bioaccessibility, bioavailability and intestinal toxicity.

As a part of the collaboration with the industrial sector, the group has also investigated the risk linked to the exposure to metals in the workplace using innovative methods of speciation.

Objectives

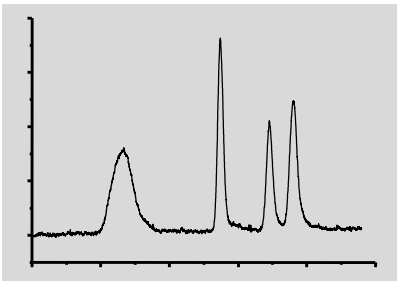
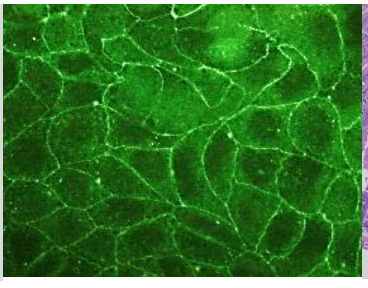
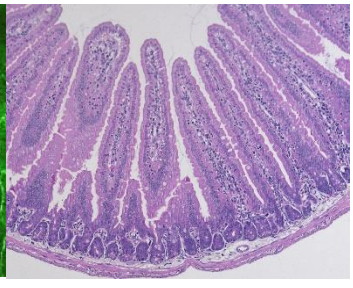
The research of our group in the last years has been focused in the evaluation of the influence of the gastrointestinal passage on the risk associated to the presence of arsenic and mercury in food. These have been our main objectives:

- Identification of the **factors** that influence the rate of **absorption** and the **transformations** of arsenic and mercury at gastrointestinal level.

- Evaluation of the **bioavailability** of arsenic and mercury in food and drinking water using *in vitro* and *in vivo* approaches.

- Evaluation of the **intestinal toxicity** of arsenic and mercury using cellular models and experimental animals.

- The search of **dietary strategies** capable of reducing the bioavailability and toxicity of arsenic and mercury.

Selected publications

1. Clemente, M.J., Devesa, V., Vélez, D. Dietary strategies to reduce the bioaccessibility of arsenic from food matrices. Journal of Agricultural and Food Chemistry, 2016, 64, 923-931.

2. Jadán-Piedra, C., Alcántara, C., Monedero, V., Zúñiga, M., Vélez, D., Devesa, V. The use of lactic acid bacteria to reduce mercury bioaccessibility. Food Chemistry, 2017, 228, 158-166.

3. Jadán-Piedra, C., Chiocchetti, G.M., Clemente, M.J., Vélez, D., Devesa, V. Dietary compounds as modulators of metals and metalloids toxicity. Critical Reviews in Food Science and Nutrition, 2017, 1-13.

4. Metal(loid) contamination in seafood products, Critical Reviews in Food Science and Nutrition, 2017, 57, 3715-3728.

5. De la Calle, M.B., Devesa, V., Fiamegos, Y., Vélez, D. Determination of inorganic arsenic in a wide range of food matrices using hydride generation – atomic absorption spectrometry. Journal of Visualized Experiments, 2017, e55953.

Projects and funding

- "Study of inorganic arsenic metabolites in populations exposed at the workplace: Risk evaluation". Private funding, 2016-2018.

- "Probiotics and dietary compounds to reduce the oral bioavailability of arsenic and mercury": Project funded by the Spanish Ministry of Economy and Competitiveness 2016-2018.

- "Biomonitoring human population exposed to fluoride". Private funding, 2016-2017.

Other remarkable achievements

During the period 2016-2017, three doctoral theses were supervised in the Trace Elements Group:

- "Dietary strategies to reduce mercury species bioavailability from food". Carlos Jadán Piedra, 2013-2017.

- "Effect of arsenic on the structure and function of the intestinal epithelium". Gabriela Matuoka Chiocchetti, 2014-2018.

- "Dietary strategies to reduce arsenic species bioavailability from food". María Jesús Clemente Peiró, 2013-2018.

Novel Materials and Nanotechnology for Food Applications

Webpage of the group: https://www.iata.csic.es/en/research/new-materials-and-nanotechnology-food-applications

Staff researchers

Jose María Lagarón

Collaborators

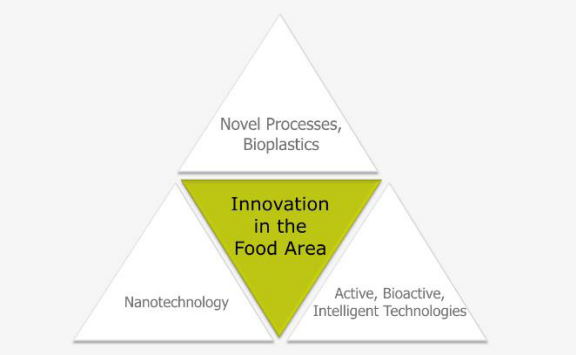
Luis Cabedo (UA-UJI)
José Gámez (UA-UJI)
Aziz Adbul (UA-UJI)

Other members of the group

Sergio Torres-Giner
Cristina Prieto
María Pardo
Beatriz Meléndez
Adriane Cherpinski
Kelly Figueroa
Carmen Arnal
Alberto Rodríguez

Overwiew

Our group works in the development of materials, biomaterials, nanotechnologies, processes and circular bioeconomy strategies for the design of novel high barrier, active, bioactive and intelligent packaging and for the protection of added value food ingredients or bioactives by means of micro, submicro and nanoencapsulation. The group works as an Associated Unit (UA) in Polymers Technology with the group of Material Science of the University Jaume I of Castellón.



Objectives

Development and characterization of biopolymers and bioblends with enhanced performance leveraging on circular bioeconomy strategies of application interest in food packaging and coatings.

Development of multifunctional active nanotechnologies such as nanometals, nanoclays, nanocarbons and nanocelluloses with passive gas and vapour barrier, antimicrobial, oxygen scavenging, antioxidant, superamphiphobic, temperature buffering and sensorial properties to be applied as fillers and coatings in active packaging strategies.

Development and characterization of micro and nanoencapsulation of bioactive ingredients for the design of both reinforced foods and bioactive packaging strategies.

Development of application to the food area of electrohydrodynamic (electrospinning and electrospraying) and aerodynamic high throughput processes.

Selected publications

1. J.L. Castro-Mayorga, F. Freitas, M. Reis, A. Prieto, J.M. Lagaron; Int J Biol Macromol, 108, 426, 2017.

2. Castro-Mayorga, Jinneth Lorena ; Fabra, María José ; Lagarón, José María
Innovative Food Science and Emerging Technologies February 2016 ; 33 : 524-533

3. Librán, C.M.; Castro, S. ; Lagarón, José María
Innovative Food Science and Emerging Technologies February 2017 ; 39 : 216-222

4. Castro-Mayorga, Jinneth Lorena; Fabra, María José; Cabedo, Luis ; Lagarón, José María
Nanomaterials January 2017 ; 7 (1): art nº 4

5. Torres-Giner, Sergio ; Wilkanowicz, S. ; Melendez-Rodriguez, B. ; Lagarón, José María
Journal of Agricultural and Food Chemistry June 2017 ; 65 (22) : 4439-4448

Projects and funding

- NEW AND INNOVATIVE PROCESSES FOR RADICAL CHANGES IN THE EUROPEAN PULP AND PAPER INDUSTRY; EU REFERENCE NUMBER FP6-500311-1, Acronym SUSTAINPACK; 2003-2008

-NEW SOLUTIONS FOR IMPROVING REFRIGERATION TECHNOLOGIES ALONG THE COLD CHAIN (Call FP7-KBBE-2009-3); EU REFERENCE NUMBER FP7-245288, Acronym FRISBEE; 2010-2014

-ECOEFFICIENT BIODEGRADABLE COMPOSITE ADVANCED PACKAGING (Call FP7-KBBE-2010-4); EU REFERENCE NUMBER FP7-265669, Acronym ECOBIOCAP; 2010-2014

-DEVELOPMENT AND CHARACTERIZATION OF A BIO-BASED HIGH BARRIER MULTILAYER CONCEPT WITH ACTIVE AND BIOACTIVE PROPERTIES FOR FOOD PACKAGING"; MINECO, AGL2015-63855-C2-1-R; 2016-2018

-FOODS FOR DIABETES AND COGNITION; acronym FODIAC; (EU H2020) H2020-MSCA-RISE-2017-778388-FODIAC; 2017-2021

Other remarkable achievements

Coordinator of the H2020 Innovation Action in Circular Bioeconomy YPACK Project (www.ypack.eu)

Our Spin-off company Bioinicia S.L. received in 2017 the award CEEI-Impiva to the best performing tech company in the Valencia Region.

Open science, open access and the lifecycle of research data

Webpage of the group: https://www.iata.csic.es/es/investigacion/publicacion-cientifica-repositorios-digitales-y-politicas-open-access

Staff researchers

Remedios Melero Melero

Overwiew

Open Science is the practice of science in such a way that others can collaborate and contribute, where research data, lab notes and other research processes are freely available, under terms that enable reuse, redistribution and reproduction of the research and its underlying data and methodsThe Open science is based on opening the research process from conception (ideas) to its execution, communication and preservation of its results, including data. It is a new paradigm shift in the way of sharing and communicating science, in which transparency, responsibility, and ethics open up more to the scientific community. This open conception allows a more efficient reuse of the contents and research data, recovering part of the investment made in funding research.

Objectives

Analyze the situation of open access in Spain through scientific journals, institutional repositories and open access policies.

Establish a map of Spanish scientific journals and their editorial policies regarding copyright

Establish evaluation indicators for open access institutional repositories

Analyze national and international policies regarding open science

Analyze editorial policies regarding research data, its management and preservation

Selected publications

1. R. Serrano-Vicente, R. Melero y E. Abadal (2016). Open Access Awareness and Perceptions in an Institutional Landscape. The journal of Academic Librarianship 42(5): 595–603. http://dx.doi.org/doi:10.1016/j.acalib.2016.07.00

2. Melero, R. Laakso M., Navas-Fernández, M. (2017). Openness of Spanish scholarly journals as measured by access and rights. Learned Publishing 30: 143–155. doi:10.1002/leap.1092017

3. Remedios Melero (2017). El perfil de las revistas científicas españolas respecto al acceso, derechos de explotación y reutilización de sus contenidos. En: Revistas científicas: situación actual y retos de futuro. Universitat de Barcelona. Editor: Ernest Abadal. ISBN 978-84-9168-004-8 http://diposit.ub.edu/dspace/handle/2445/11737

4. Remedios Melero Melero, Ernest Abadal Falgueras. MAREDATA, UNA INICIATIVA PARA EL FLUJO DE DATOS COMPARTIDOS. Revista ORL 8(4) DOI: https://doi.org/10.14201/orl.16988

Projects and funding

TÍTULO DEL PROYECTO: FOSTER (FACILITATE OPEN SCIENCE TRAINING FOR EUROPEAN RESEARCH)
Grant agreement no: 612425
ENTIDAD FINANCIADORA: European Commission
DURACIÓN DESDE: febrero 2014 *HASTA*: Julio 216
INVESTIGADOR PRINCIPAL (partner): Remedios Melero. IATA, CSIC.
COORDINADOR: Eloy Rodrigues, Universidade do Minho

TÍTULO DEL PROYECTO: El acceso abierto a la ciencia en España: Evaluación de su impacto en el sistema de comunicación científica (Ref. CSO2014-52830-P)
ENTIDAD FINANCIADORA: Ministerio de Innovación y Competitividad
DURACIÓN DESDE: enero 2016 *HASTA*: diciembre 2019
INVESTIGADOR PRINCIPAL: Ernest Abadal Falgueras. Universitat de Barcelona

TÍTULO DEL PROYECTO: Redes de Excelencia 2015. Red española sobre datos de investigación en abierto (red temática, ref. CSO2015-71867-REDT)
ENTIDAD FINANCIADORA: Ministerio de Innovación y Competitividad
DURACIÓN DESDE: enero 2016 *HASTA*: diciembre 2017
INVESTIGADOR PRINCIPAL: Ernest Abadal Falgueras. Universitat de Barcelona

TÍTULO DEL PROYECTO: FOSTER Plus (FACILITATE OPEN SCIENCE TRAINING FOR EUROPEAN RESEARCH Plus)
Grant agreement no: 741839
ENTIDAD FINANCIADORA: European Commission
DURACIÓN DESDE: 1 de mayo de 2017 *HASTA*: 1 de mayo de 2019
INVESTIGADOR PRINCIPAL (partner): Remedios Melero. IATA, CSIC.
COORDINADOR: Eloy Rodrigues, Universidade do Minho

5. Scientific-Technical Services

1. **Analytical.** Analytical service developed to provide basic tools for the identification of different types of metabolites and their quantification for any researcher in the institute that needs this information for their research.

   Head Technician: María Dolores Abolafio Martínez – mail: abolafio@iata.csic.es

2. **Cellular Cultures.** Scientific-technical support service for eukaryotic cell culture for IATA research groups and external users

   Head Technician: José Vicente Gimeno Alcañiz – mail: jgimeno@iata.csic.es

3. **Sensory analysis.** Service that collaborates and helps in conducting high quality sensory assessments and assessments to researchers or companies.

   Head Technician: María Inmaculada Carbonell Talón – mail: micarbonell@iata.csic.es

4. **Genomics Support.** Service for IATA research groups that wish to use techniques for the overall study of gene expression

   Head Technician: Benito Alarcón Hernandis – mail: balarcon@iata.csic.es

5. **Proteomics.** Support service to any institute's researcher who wishes to apply this technique to his research

   Head Technician: Benito Alarcón Hernandis – mail: balarcon@iata.csic.es

6. **Microscopy.** The Microscopy Service allows the different research groups of the IATA, as well as the research centers and companies that request it, the microscopic observation and the digital microfotography of different types of samples using different techniques of optical microscopy.

   Head Technician: José María Coll Marqués – mail: btcoll@iata.csic.es

7. **Pilot Plant.** It offers the possibility of small industrial scales of the agri-food industry, thanks to its equipment and supplies, becoming a technological support to the scientific research that is carried out at the institute and also offering service for any industry of the agro-food and biotechnology sector interested.

   Head Technician: José Javier López Díaz and Antonio Ruiz López – mail: jjlopez@iata.csic.es, aruiz@iata.csic.es

Scientific-Technical Services Group

General Services Group

6. General Services

Manager: Luisa Ventura Montoliu - mail: gerencia.iata@csic.es

Secretary of Direction: Estefanía Martí Honrado - mail: secredire@iata.csic.es

ADMINISTRATION

Paymaster: Mariano Rodríguez Moya

mail: habilitadorpagador@iata.csic.es

Management Reception Students and Stays: Pilar Redondo Cañada

mail: personal@local.iata.csic.es

Human resources: Teresa Calzada de la Iglesia

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Travel Management: Francisco Javier Reina López

mail: fjreina@iata.csic.es

Billing management: Juana González Díaz

email-facturas@iata.csic.es

Project Management: Sonia Rodriguez Vargas

mail: soniarv@iata.csic.es

Contracted Investigation Management: Oscar Salgado López

mail: oscar.salgado@iata.csic.es

Management Unit of Knowledge Transfer: Mª Jesús Añon Marín, Francisco Cuenca Alonso

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Multiple Management and Patrimony: Tomas García Ulloa, María Luz Ibáñez Cabello, Vicente López Pérez

mail: tgarcia@iata.csic.es

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mail: batas@local.iata.csic.es

PROCUREMENT: Daniel Alberto Gómez, José Antonio Perpiñá Vidal

mail: entradalmacen@local.iata.csic.es

IT: Fernando López Santoveña, Ana Barroso De San Felipe, Antonio Navarro Tomas

mail: informatica@local.iata.csic.es

MAINTENANCE: Nacho Galdeano Richart, Fernando Camisón Garrido

mail: mantenimiento@local.iata.csic.es

SCIENTIFIC DOCUMENTATION AND LIBRARY: Ana Veyrat Ferrer

mail: biblio@iata.csic.es

DISSEMINATION / GUIDED VISITS: Ángela Molina Ruiz

mail: divulgacion@iata.csic.es

List of research projects started in 2016 and 2017

DPT. FOOD BIOTECNOLOGY:

Función señalizadora y utilización de pectina y sus monosacáridos constituyentes en hongos filamentosos saprofíticos.
Orejas Suarez, Margarita
AGL2015-66131-C2-2-R

Aplicación y mejora de las especies de Saccharomyces no convencionales para resolver los nuevos retos de la industria del vino.
Querol Simón, Amparo
AGL2015-67504-C3-1-R

Nuevas aproximaciones al estudio de la síntesis y acumulación de carotenoides, y su papel en la calidad y conservacion de los frutos cítricos.
Zacarías García, Lorenzo
AGL2015-70218-R

Explotación de los mecanismos de comunicación bidireccional microbiota /huésped en el intestino para el desarrollo de nuevas estrategias dietéticas con prebióticos.
Pérez Martínez, Gaspar
AGL2015-70487-P

Nuevas proteínas antifúngicas de hongos: producción en hongos filamentosos y caracterización de su mecanismo de acción.
Marcos López, José Francisco
BIO2015-68790-C2-1-R

Mecanismos de regulación del metabolismo lipídico y su relación con la respuesta a estrés en *Saccharomyces cerevisiae.*
Prieto Alamán, José Antonio
BIO2015-71059-R

Producción de nuevos enzimas, conjugados enzimaticos y compuestos bioactivos para aplicaciones alimentarias mediante biología sintética.
Polaina Molina, Julio
AGL2016-75245-R

Análisis de los determinantes moleculares y fisiológicos en la síntesis de compuestos indólicos por parte de S. cerevisiae.
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DPT. FOOD SCIENCE

Matrices panarias diluidas de carácter saludable y funcionalidad restringida: estrategias de potenciación del carácter funcional en sistemas de trigo desestructurados
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Flores Llovera, Monica
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Molina Rosell, M.Cristina
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Mechanisms of iron sensing and regulation in the yeast Saccharomyces cerevisiae
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List of theses and master's degree projects in 2016 and 2017

THESIS

2016

Péptidos derivados de la lactoferrina bovina contra la hipertensión arterial: inhibición de los sitemas angiotensina y endotelina. Ricardo Fernández Musoles, Universidad de Valencia. Fecha de lectura: 29-01-2016

Directora: Paloma Manzanares Mir

Comparative genomics and transcriptomics in Saccharomyces. Clara Ibáñez Martínez, Universidad de Valencia. Fecha de lectura: 05-02-2016

Directora: Amparo Querol Simón

Creating value-added cereal-based baked products: marketplace offer, laboratory-designed goods, and revisited local products.. Paola Conte, Università degli Studi di Sassari (Italia). Fecha de lectura: 12-02-2016

Directora: Concepción Collar Esteve

Estudio de la adaptación a estrés por etanol en cepas de Saccharomyces cerevisiae. Elisabet Navarro Tapia, Universidad de Valencia. Fecha de lectura: 07-03-2016

Directores: Amparo Querol Simón y Roberto Pérez Torrado

Síntesis de haptenos y bioconjugados de anatoxina-a para el desarrollo de métodos inmunoquímicos. Guillermo Quiñones Reyes, Universidad de Valencia. Fecha de lectura: 08-03-2016

Director: Antonio Abad Fuentes

Study of glicerol and respiro-fermentative metabolism diversity among Saccharomyces yeasts. Bruno Motta Oliveira, Universidad de Valencia. Fecha de lectura: 11-03-2016

Directores: Roberto Pérez Torrado y Amparo Querol Simón

Genetic and molecular basis of the aroma production in S. kudriavzevii, S. uvarum and S. cerevisiae. Jiri Stribny, Universidad de Valencia. Fecha de lectura: 20-05-2016

Directores: Amparo Querol Simón y Roberto Pérez Torrado

Metabolismo y síntesis de oligosacáridos de la leche humana mediante la utilización de enzimas glicosil hidrolasas de Lactobacillus casei. Gonzalo Nahuel Bidart Costoya, Universidad Politécnica de Valencia. Fecha de lectura: 25-07-2016

Directora: Mª Jesús Yebra Yebra

Caracterización molecular de la resistencia a estrés oxidativo de levaduras vínicas de los géneros Saccharomyces y no-Saccharomyces para la mejora de su producción como levadura seca activa mediante el uso de aceite de argán como antioxidante natural. Esther Gamero Sandemetrio, Universidad de Valencia. Fecha de lectura: 20-09-2016

Directoras: Emilia Matallana Redondo y Rocío Gómez Pastor

Caracterización de compuestos solubles en piensos para los animales domésticos. Cécile Soltane, Universidad de Valencia. Fecha de lectura: 22-09-2016

Directores: Mónica Flores Llovera, Mª Concepción Aristoy Albert y Fidel Toldrá Vilardell

Efecto del tratamiento por altas presiones hidrostáticas (HHP) en la calidad de queso fresco y en las proteínas de suero de queserías. Edwin Fabián Torres Bello, Universidad Politécnica de Valencia. Fecha de lectura: 26-09-2016

Director: Antonio Martínez López

Study of Thermotoga maritima ß-galactosidase: immobilization, engineering and phylogenetic analysis. David Talens Perales, Universidad de Valencia. Fecha de lectura: 27-10-2016

Directores: Julio Polaina Molina y Julia Marín Navarro

Síntesis de fucosil-oligosacáridos, evaluación de sus propiedades bioactivas y caracterización de sus rutas metabólicas en Lactobacillus. Jimmy Everth Becerra Enríquez, Universidad de Valencia. Fecha de lectura: 17-11-2016

Directores: Mª Jesús Yebra Yebra y Vicente Monedero García

Validación funcional de extractos polifenólicos de cacao mediante ensayos in vivo con organismos modelo. Ana Peláez Soto, Universidad de Valencia. Fecha de lectura: 15-12-2016

Directores: José Vicente Gil Ponce y Patricia Roig Montoya

Unraveling the complex trait of low temperature adaptation in the wine yeast Saccharomyces cerevisiae. Estéfani García Ríos, Universidad Politécnica de Valencia. Fecha de lectura: 21-12-2016

Director: José Manuel Guillamón Navarro

2017

Effect of enzymatic treatments on carbohydrate matrices towards healthy gluten free foods applications. Ángela Durá de Miguel, Universidad Politécnica de Valencia. Fecha de lectura: 03-03-2017

Directora: Cristina Molina Rosell

Aplicación conjunta de ingredientes naturales y tecnologías no térmicas para la conservación de alimentos mínimamente procesados. Clara Miracle Belda Galbis, Universidad Politécnica de Valencia. Fecha de lectura: 10-05-2017

Directores: Antonio Martínez López y Dolores Rodrigo Aliaga

Biotechnological routes for the development of antimicrobial nano-metal based polyhydroxyalkanoates for active food packaging materials. Jinneth Lorena Castro Mayorga, Universidad Politécnica de Valencia. Fecha de lectura: 19-06-2017

Directores: José María Lagarón Cabello y Mª José Fabra Rovira

Análisis de nitrato y nitrito en alimentos: desarrollo de métodos, contenido, reglamentación, aspectos metrológicos y exposición. LeonardoMerino, Universidad de Valencia. Fecha de lectura: 13-07-2017

Directores: FidelToldrá, Roger Andersson y Ulla Edberg

Integración de mecanismos de control redox y de señalización de nutrientes en la longevidad cronológica de levaduras vínicas. Cecilia Picazo Campos, Universidad de Valencia. Fecha de lectura: 24-07-2017

Directores: Emilia Matallana y Agustín Aranda

Desarrollo de métodos inmunoquímicos para el análisis en alimentos de fungicidas inhibidores de la succinato deshidrogenasa. Eric Cevallos Alcantarilla, Universidad de Valencia. Fecha de lectura: 28-07-2017

Directores: Antonio Abad Fuentes y Josep Vicent Mercader Badia

Diseño de alimentos lácteos con capacidad saciante. Relación entre estructura, procesamiento oral y percepción. Pere Morell Esteve, Universidad Politécnica de Valencia. Fecha de lectura: 08-09-2017

Directores: Susana Fiszman dal Santo y Isabel Hernando Hernando

Valorización de subproductos de la industria alimentaria como antimicrobianos naturales frente a microorganismos patógenos mediante tecnologías no térmicas de conservación. María Sanz Puig, Universidad Politécnica de Valencia. Fecha de lectura: 22-09-2017

Directores: Antonio Martínez López y Dolores Rodrigo Aliaga

Estrategias dietéticas para disminuir la biodisponibilidad de mercurio desde alimentos. Carlos Alberto Jadán Piedra, Universidad Politécnica de Valencia. Fecha de lectura: 29-09-2017

Directoras: Dinoraz Vélez Pacios y Vicenta Devesa Pérez

Desarrollo y caracterización de sistemas de microencapsulación de ingredientes bioactivos de interés en el desarrollo de alimentos funcionales. María Sanz Puig, Universidad Politécnica de Valencia. Fecha de lectura: 14-11-2017

Directora: Amparo López Rubio

Análisis de la señalización mediada por la pared celular y el estrés oxidativo en la interacción planta-patógeno. María Sanz Puig, Universidad de Valencia. Fecha de lectura: 22-12-2017

Directora: Carmen González Bosch

MASTER'S DEGREE PROJECTS

2016

Estudio de los cambios de virulencia en Salmonella typhimurium tratada con extracto de coliflor mediante el uso de Caenorhabditis elegans como microorganismo modelo. Alejandra Arana Lozano, Universidad Politécnica de Valencia. Fecha de lectura: Febrero 2016

Directora: Mª Dolores Rodrigo Aliaga

Influencia de las mezclas de hidrocolides en la reología dela masa panaria libre de gluten. Jehannara Calle Domínguez, Universidad de La Habana. Fecha de lectura: Abril 2016

Directora: Cristina Molina Rosell

Análisis molecular y funcional de genes de Lactobacillus implicados en el metabolismo de oligosacáridos de la leche humana. Celia Ruiz Minuesa, Universidad de Valencia. Fecha de lectura: Junio 2016

Directora: Mª Jesús Yebra Yebra

Estudio de la microbiota oral en personas de la tercera edad de la Comunidad Valenciana y su relación con edad, deficiencia cognitiva y dieta. Marta Selma Royo, Universidad de Valencia. Fecha de lectura: Julio 2016

Directora: Mª Carmen Collado Amores

Aplicación del programa SQRMAV2 para caracterizar el riesgo de Listeria monocytogenes en productos cárnicos listos para su consumo. Isabel Maria Bascón Villegas, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2016

Directora: Mª Dolores Rodrigo Aliaga

Hidrólisis de proteínas sarcoplásmicas y generación de péptidos antioxidantes en jamón curado. Jaime Ballester Sánchez, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2016

Directores: Fidel Toldrá Vilardell, Leticia Mora Soler y Mª Concepción Aristoy Albert

Cambios estructurales en emulsiones aceite/agua durante la digestión in vitro. Estrategias para disminuir la bioaccesibilidad de la grasa. Alicia Pino Fernández, Universidad de Valencia. Fecha de lectura: Julio 2016

Directora: Mª Teresa Sanz Taberner

Evaluación de diferentes tipos de celulosa como emulsionante en emulsiones aceite/agua. Andrea Rubio Villalba, Universidad de Valencia. Fecha de lectura: Julio 2016

Directora: Ana Salvador Alcaraz

Estudio in vivo de la capacidad antioxidante de la chía (Salvia hispánica L.) en Saccharomyces cerevisiae. Itziar Molina Llopis, Universidad de Valencia. Fecha de lectura: Septiembre 2016

Directora: Teresa Fernández-Espinar García

Efectos ambientales y mecanismos fisiológicos responsables de la síntesis de melatonina en la levadura vínica Saccharomyces cerevisiae. Ricardo Bisquert Alcaraz, Universidad de Valencia. Fecha de lectura: Septiembre 2016

Director: José Manuel Guillamón Navarro

Estudio de la reducción de nitrificantes en la producción de compuestos aromáticos relacionados con la calidad organolépticas por levaduras seleccionadas. Daniel Moncunill Felipe, Universidad de Valencia. Fecha de lectura: Septiembre 2016

Directora: Mónica Flores Llovera

Estudio comparativo del comportamiento durante la fermentación y cocción de distintas harinas: trigo, arroz y maíz. Alba Hernández Beltrán,

Universidad Politécnica de Valencia. Fecha de lectura: Septiembre 2016

Directora: Cristina Molina Rosell

Efecto de emulgentes sobre la distribución de partículas de gas en masa y pan. Cristina Martínez González, Universidad Politécnica de Valencia. Fecha de lectura: Septiembre 2016

Directora: Cristina Molina Rosell

Uso de emulsiones sustitutas de grasa para el desarrollo de cremas de relleno. Evaluación de la digestibilidad de las grasas y de la estructura tras la digestión in vitro. Desamparados Embuena, Universidad Politécnica de Valencia. Fecha de lectura: Septiembre 2016

Directora: Ana Salvador Alcaraz

Estudio de la introducción de nanopartículas de grafeno en EVOH. Roberto Utrilla Ocaña, Universidad de Valencia. Fecha de lectura: Noviembre 2016

Directores: Rafael Gavara Clemente y Josep Pascual Cerisuelo Ferriols

Sistema de envasado inteligente para la indicacion de fin de vida de alimentos frescos. Jesús Clemente Villalba, Universidad Politécnica de Valencia. Fecha de lectura: Diciembre 2016

Directores: Pilar Hernández Muñoz y Josep Pascual Cerisuelo Ferriols

2017

Desarrollo de metodologías alternativas para la evaluación de proteínas precursoras de péptidos bioactivos. Manuela Sánchez Chica, Universidad Politécnica de Valencia. Fecha de lectura: Marzo 2017

Directores: Fidel Toldrá Vilardell y Leticia Mora Soler

Biodisponibilidad de péptidos bioactivos en carne de ternera. Alejandro Heres Gonzálbes, Universidad de Valencia. Fecha de lectura: Junio 2017

Directores: Fidel Toldrá Vilardell y Leticia Mora Soler

aracterización funcional del operon chb implicado en el metabolismo de la N,N¿-diacetilquitobiosa en Lactobacillus casei. Jennifer Espinal Ramirez, Universidad de Valencia. Fecha de lectura: Julio 2017

Directora: Mª Jesús Yebra Yebra

Valorization of Posidonia oceanica for the extraction of compounds with applications in the development of biomaterials for active food packaging. Isaac Benito González, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2017

Directora: Mª Desamparados López Rubio

Antiviral activity of Green Tea Extract and potential applications in the food industry. Irene Falcó Ferrando, Universidad e Valencia. Fecha de lectura: Julio 2017

Directora: Gloria Sánchez Moragas

Efecto antimicrobiano del compuesto bioactivo fucoidan frente a Listeria monocytogenes. Gabriela del Carmen Poveda Castillo, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2017

Directores: Mª Dolores Rodrigo Aliaga y Antonio Martínez López

Efecto del uso de diferentes materias primas en la calidad sensorial de productos cárnicos ibéricos de larga maduración. Diana Alejandra Cobeña Toala,

Universidad de Valencia. Fecha de lectura: Julio 2017

Directora: Mónica Flores Llovera

Evaluación de la digestibilidad lipídica y de las propiedades reológicas y de textura de cremas alimentarias basadas en hidrocoloides tras el proceso de digestión in vitro. Laurentiu Constantinescu, Universidad de Valencia. Fecha de lectura: Julio 2017

Directora: Ana Salvador Alcaraz

Evaluación de la infección de Caenorhabditis elegans por Salmonella Typhimurium mediante la alimentación con una infusión de Brassica oleracea botrytis. Maria Camila Cardozo Guzman, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2017

Directores: Mª Dolores Rodrigo Aliaga y Antonio Martínez López

Inactivación de microorganismos contaminantes naturales y Salmonella Typhimurium en larvas de moscas soldado negra mediante tratamientos de alta presión hidrostática HHP. Pedro Emilio Salvatierra Contreras, Universidad Politécnica de Valencia. Fecha de lectura: Julio 2017

Directores: Mª Dolores Rodrigo Aliaga y Antonio Martínez López

Relación entre los carotenoides y las susceptibilidad a los daños por frio durante la conservación postcosecha de frutos cítricos. Florencia Amelia Rey Robaina, Universidad de Valencia. Fecha de lectura: Julio 2017

Directores: Mª Jesús Rodrigo Esteve y Lorenzo Zacarías García

Efecto de la Reducción de Nitrificantes en la microbiota presente en productos cárnicos curados madurados. Rebeca Montero Gómez, Universidad de Valencia. Fecha de lectura: Julio 2017

Directoras: Mónica Flores Llovera y Carmela Belloch Trinidad

Caracterización funcional de la histidina quinasa PrcK de Lactobacillus casei BL23. Ana Belén García Lorenzo, Universidad de Valencia. Fecha de lectura: Julio 2017

Director: Manuel Zúñiga Cabrera

Aproximación sintética unificada para la preparación de ambos enantiómeros de las cianotoxinas anatoxina-A y homoanatoxina-A. Luis Guillermo Addante Moya, Universidad de Valencia. Fecha de lectura: Septiembre 2017

Director: Antonio Abad Fuentes

Estudio de la capacidad antioxidante de panes enriquecidos con quinoa. Paula Almela Seller, Universidad de Valencia. Fecha de lectura: Septiembre 2017

Directora: Mª Teresa Rodríguez- Espinar Fernández

Genómica funcional en el hongo Penicillium digitatum para estudiar genes implicados en patogenicidad sobre frutos cítricos. Victor Silva Alejandre, Universidad de Valencia. Fecha de lectura: Septiembre 2017

Directores: Ana Rosa Ballester Frutos y Luis González Candelas

Preparación de haptenos heterólogos y bioconjugados de biotoxinas. Vlad Marian Bejenaru, Universidad de Valencia. Fecha de lectura: Septiembre 2017

Directores: Josep Vicent Mercader Badia

Desarrollo de materiales enzimáticamente activos basados en una versión recombinante de la ß-galactosidasa obtenida a partir de Thermotoga marítima inmovilizada en membranas de celulosa bacteriana. Nuria Samaniego Santos, Universidad Politécnica de Valencia. Fecha de lectura: Septiembre 2017

Directoras: Mª José Fabra Rovira y Julia Victoria Marín Navarro