



Proceedings of the

6th International Conference on Food Digestion



Granada, Spain
April 2-4, 2019

INFOGEST

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Scientific programme

Tuesday 2nd April

9.30 - 11.30

Satellite Meeting: Stance4Health

Manuel de Falla Auditorium

Coordinator:

José Ángel Rufián Henares

Stance4Health Coordinator. Department of Nutrition and Food Sciences. Granada University. Spain.

- **Smart Technologies for personalized nutrition and consumer engagement**

Speaker:

José Ángel Rufián Henares

Stance4Health Coordinator. Department of Nutrition and Food Sciences. Granada University. Spain.

- **In vitro gastrointestinal digestion and in vitro fermentation method: effects on SCFAs production and polyphenols metabolism**

Speaker:

Sergio Pérez-Burillo

Department of Nutrition and Food Science. University of Granada. Spain.

- **In vitro gastrointestinal digestion and in vitro fermentation of tannins**

Speaker:

Silvia Molino

Department of Nutrition and Bromatology. Institute of Nutrition and Food Technology. Center for Biomedical Research. Spain.

- **Optimization of a protocol for stabilization/resuscitation of the gut microbiota in fresh and frozen fecal samples before in vitro fermentation**

Speaker:

M. Pilar Francino

Foment of Sanitary and Biomedical Research Foundation (FISABIO). Head of Genomics and Health Area. Valencia. Spain.

- **Building a functional metabolic network of the gut microbiota**

Speaker:

Iñigo Apaolaza

TECNUN. University of Navarra. Spain.

- **Bile acids metabolites deriving from fermentation studies**

Speaker:

Sascha Rohn

Institute for Food Chemistry. University of Hamburg. Germany.

- **Food-Derived Maillard Reaction Products as Modulators of Intestinal Carbohydrate Digestion**

Speaker:

Bettina Cämmerer

Institute of Food Technology and Food Chemistry. University of Berlin. Germany.

- **Gut microbiota in food-related paediatric illnesses (coeliac disease, food allergy, obesity)**

Speaker:

Kostas Priftis

Pediatrics Department. National and Kapodistrian University of Athens. Greece.

- **Validation of Smart Personalized Nutrition (SPN) strategies in adult populations**

Speaker:

Fabio Lauria

National Research Council. Institute of Food Sciences. Italy.

- 12.00 - 13.15** **Registration**
- 13.30 - 14.00** **Opening ceremony**
Manuel de Falla Auditorium
- 14.00 - 14.15** **Presentation: INFOGEST and ICFD**
Manuel de Falla Auditorium
Speaker:
Didier Dupont
Chair of INFOGEST, INRA Rennes. National Institute of Agricultural Research. France.
- 14.15 - 15.00** **Keynote Lecture: 1**
Manuel de Falla Auditorium
- **Impact of diet on maternal-neonatal microbiota during first 1000 days of life**
Keynote Speaker:
Maria Carmen Collado
Research Scientist. IATA-CSIC. Department of Biotechnology. Valencia. Spain.
- 15.00 - 15.20** **In vitro digestion evidence of how plant proteins modulate infant formulas digestibility**
Manuel de Falla Auditorium
Speaker:
Linda Le Roux
STLO INRA-Agrocampus Ouest. Rennes. France.
- 15.20 - 15.40** **The glycation level of milk protein strongly modulates post-prandial plasma lysine availability in vivo in humans**
Manuel de Falla Auditorium
Speaker:
Glenn van Lieshout
Friesland Campina. The Netherlands.
- 15.40 - 16.40** **Coffe Break & Poster Session 1**
- 16.40 - 17.00** **Digestion of dairy proteins: a matter of gastric restructuring**
Manuel de Falla Auditorium
Speaker:
Ana Isabel Mulet Cabero
Quadram Institute Bioscience. Norwich. UK.
- 17.00 - 17.20** **Monitoring in vitro gastric digestion of whey protein gel by nuclear magnetic resonance and magnetic resonance imaging**
Manuel de Falla Auditorium
Speaker:
Ruoxuan Deng
Wageningen University & Research. Wageningen. The Netherlands.
- 17.20 - 17.40** **Particulation of whey protein slows protein digestion in vivo and is associated with decreased weight gain in mice**
Manuel de Falla Auditorium
Speaker:
Ines Greco
University of Copenhagen. Denmark.
- 17.40 - 18.00** **Digestion and oral comfort of cheese developed to meet the sensory and nutritional needs of the elderly**
Manuel de Falla Auditorium
Speaker:
Didier Dupont
Chair of INFOGEST, INRA Rennes. National Institute of Agricultural Research. France.

- 18.00 - 18.20** **Role of the food additive Carrageenan in modulating proteomic profiles in the gut lumen of toddlers and inflammatory pathways**
Manuel de Falla Auditorium
Speaker:
Uri Lesmes
Technion. Israel Institute of Technology. Haifa. Israel.
- 18.20 - 18.40** **Lessons learnt from MyCyFAPP Project: Effect of host-related factors and inherent to food properties on lipolysis in real foods**
Manuel de Falla Auditorium
Speaker:
Joaquim Calvo Lerma
Institute of Food Engineering for Development. Universitat Politècnica de València. Spain
- 20.00 - 21.00** **Welcome Cocktail**
María de la O Restaurant

Wednesday 3rd April

- 9.00 - 9.45** **Keynote Lecture: 2**
Manuel de Falla Auditorium
- **Exploring the dynamic nature of the GI tract: characterization of GI drug disposition and GI fluid composition and structure**
Keynote Speaker:
Patrick Augustijns
Drug Delivery and Disposition. Department of Pharmaceutical and Pharmacological Sciences. Kuleuven. Belgium.
- 9.45 - 10.05** **Investigating in vitro digestion of food models to explain in vivo micro-nutrient bioavailability**
Manuel de Falla Auditorium
Speaker:
Manon Hiolle
STLO. INRA-Agrocampus Ouest. Rennes. France.
- 10.05 - 10.25** **Dietary fibre limits nutrient absorption by lowering intestinal mucus permeability**
Manuel de Falla Auditorium
Speaker:
Alan Mackie
University of Leeds. United Kingdom.
- 10.25 - 10.45** **A nutrikinetic model linking broccoli processing conditions to isothiocyanate bioavailability**
Manuel de Falla Auditorium
Speaker:
Matthijs Dekker
WUR. Wageningen. The Netherlands.
- 10.45 - 11.40** **Coffe Break & Poster Session 1**
- 11.40 - 12.00** **In silico modelling of the physiology of the digestive system, digestion and absorption**
Manuel de Falla Auditorium
Speaker:
George Van Aken
Insight Food inside. Breda. The Netherlands.

- 12.00 - 12.20** **Using computational fluid dynamics to assess mixing during in vitro digestion experiments**
Manuel de Falla Auditorium
Speaker:
Simon Harrison
CSIRO. Melbourne. Australia.
- 12.20 - 12.40** **Predicting satiation and satiety rating of breakfast cereals with a combination of an in vitro model and in silico artificial neural network**
Manuel de Falla Auditorium
Speaker:
Susann Bellmann
Triskelion. Zeist. The Netherlands.
- 12.40 - 13.00** **Development of a computational 1D flow model for carbohydrate fermentation in the colon**
Manuel de Falla Auditorium
Speaker:
Matthew Sinnott
CSIRO. Melbourne. Australia.
- 13.00 - 14.30** **Lunch**
- 14.30 - 15.15** **Keynote Lecture: 3**
Manuel de Falla Auditorium
- **The role of dietary fibre in food gastrointestinal digestion, physiology and health**
Keynote Speaker:
Kaisa Poutanen
Research professor in food technology. Finland.
- 15.15 - 15.35** **Reduction of the glycemic response to bread in the presence of lemon juice, but not tea: A two-branched human study with magnetic resonance imaging (MRI)**
Manuel de Falla Auditorium
Speaker:
Daniela Freitas
GMPA. INRA-AgroParisTech. UPSay & Teagasc. Ireland.
- 15.35 - 15.55** **Nutritional evaluation of wheat–legume pasta: Impact of formulation and process conditions on in vitro protein digestibility and protein metabolism in young and old rats**
Manuel de Falla Auditorium
Speaker:
Valerie Micard
IATE. Montpellier SupAgro. Montpellier. France.
- 15.55 - 17.00** **Coffe Break & Poster Session 2**
- 17.00 - 17.20** **Comparison of methods for postprandial intragastric pH measurement in a pig model during digestion of plant-based foods with different structures**
Manuel de Falla Auditorium
Speaker:
Yohan Reynaud
Improve. Dury. France.
- 17.20 - 17.40** **Elucidation of human gastrointestinal metabolism of soy allergens in an in-vitro model and proteome analysis by LC-HRMS/MS**
Manuel de Falla Auditorium

Speaker:
Julia Bräcker
University of Stuttgart. Stuttgart. Germany.

- 17.40 - 18.00 **True ileal protein digestibility of zein and whey protein isolate in healthy humans**
Manuel de Falla Auditorium
Speaker:
Juliane Calvez
PNCA. AgroParisTech-INRA. Paris. France.
- 18.00 - 18.15 **Presentation: ICFD7**
Manuel de Falla Auditorium
- 19.30 **Transfer by bus to the gala dinner. Meeting point: Saray Hotel**
- 20.30 - 23.30 **Gala dinner**
Carmen de los Chapiteles
- 23.30 **Transfer by bus to the Saray Hotel**

Thursday 4th April

- 9.00 - 9.45 **Keynote Lecture: 4**
Manuel de Falla Auditorium
- **Effects of moderate consumption of fermented beverages on gut microbiota**
Keynote Speaker:
Ascensión Marcos Sánchez
Research Professor at the Spanish National Research Council. Head of the Immunonutrition Research Group. President of the Spanish Federation of Societies of Nutrition, Food and Dietetics (FESNAD) and President of the International Society for Immunonutrition (ISIN).
- 9.45 - 10.05 **Changes in gut microbiota in predigested Roselle (Hibiscus sabdariffa L) calyces and Agave (Agave tequilana Weber) Fructans assessed in a dynamic in vitro model of the human colon**
Manuel de Falla Auditorium
Speaker:
Sonia G. Sáyago-Ayerdi
Tecnológico Nacional de México. Mexico.
- 10.05 - 10.25 **Catabolism of polyphenols from jaboticaba (Myrciaria trunciflora) fruit peel by human gut microbiota**
Manuel de Falla Auditorium
Speaker:
Tatiana Emanuelli
Federal University of Santa Maria. Santa Maria. Brazil.
- 10.25 - 11.30 Coffe Break & Poster Session 2**
- 11.30 - 11.50 **Characterization of structural changes during food digestion: can non-destructive approaches be correlated to destructive measurements?**
Manuel de Falla Auditorium
Speaker:
Prof. Gail Michele Bornhorst
University of California Davis. USA.
- 11.50 - 12.10 **Establishing a multiresponse model of the in vitro lipid digestion process**
Manuel de Falla Auditorium

Speaker:
Sarah Verkempinck
KU Leuven. Leuven. Belgium.

12.10 - 12.30 **A semi-dynamic digestion and bioaccessibility method based on a microfluidic lab-on-a-chip**
Manuel de Falla Auditorium

Speaker:
Sébastien Marze
INRA BIA. Nantes. France.

12.30 - 12.45 **Conclusion and perspectives**
Manuel de Falla Auditorium

13.00 - 14.30 **Lunch**

14.30 - 16.00 **Working Group: Working Group 2. Food interaction – meal digestion**
Manuel de Falla Auditorium

Coordinators:
Milena Corredig
Uri Lesmes
Pasquale Ferranti

14.30 - 16.00 **Working Group: Working Group 3. Absorption models**
Seminar rooms 6+7

Coordinators:
Linda Giblin
Brigitte Graf

16.00 - 17.30 **Working Group: Working Group 4. Digestive lipases and lipid digestion**
Manuel de Falla Auditorium

Coordinators:
Myriam Grundy
Frederic Carriere

16.00 - 17.30 **Working Group: Working Group 5. Digestive amylases and starch digestion**
Seminar rooms 3+4

Coordinators:
Nadja Siegert
Caroline Orfila

16.00 - 17.30 **Working Group: Working Group 6. In silico models**
Seminar rooms 6+7

Coordinators:
Steven Le Feunteun
Choi-Hong Lai

(*) Participation to these individual WGs meetings will be free of charge. Do not forget to confirm your participation when registering to the Conference. In the “comments” box, please indicate to which WG meeting you’d like to participate.

Oral presentations – Abstracts



378/228. BIOACCESSIBILITY, FIRST-PASS BIO-TRANSFORMATION AND CYTOTOXICITY OF PHENOLIC COMPOUNDS FROM SELECTED SMALL FRUITS

(¹)Wall-Medrano, A., (²)Olivas-Aguirre, F., (³)Mendoza-Diaz, S., (⁴)Cárdenas-Robles, A., (²)González Aguilar, G., (⁵)Robles-Zepeda, R.

(¹)*Institute of Biomedical sciences. Ciudad Juarez University. Mexico.*, (²)*University of Sonora. Hermosillo. Mexico.*, (³)*Departamento de Investigación y Posgrado en Alimentos (PROPAC). Universidad Autónoma de Querétaro. México.*, (⁴)*Departamento de Tecnología de Alimentos de Origen Vegetal. Centro de Investigación en Alimentación y Desarrollo. A.C. Sonora. México.*, (⁵)*División de Ciencias Biológicas y de la Salud. Universidad de Sonora. México.*

Introduction

Small fruits are good sources of phenolic compounds but their ultimate bio availability and biological action depends on their enteral bio accessibility and first-pass metabolism.

Objective

To evaluate the antioxidant profile, first-pass metabolism and anti-proliferative capacity of three fruits with graded levels of phenolic compounds

Methodology

Phenolic compounds (PC) and antioxidant capacity of globe grape, raspberry and blackberry was evaluated by spectrophotometry and HPLC-ESI-q-TOF-MS. In vitro bioaccessibility of PC subclasses was followed under simulated GI conditions (oral, gastric, intestinal). Real-time ex vivo (gut everted sac) monitoring of first-pass phenolic metabolites and PC's apparent permeability (Papp) were followed by differential pulse voltammetry (0 to 120 min), spectrophotometry and HPLC-ESI-q-TOF-MS (120 min). The anti-proliferative capacity of main PC and metabolites was assayed (MTT).

Main findings

PC richness/fingerprint (cyanidin/pelargonidin derivatives, catechin, epicatechin), antioxidant (DPPH, FRAP) and electrochemical reactivity and bioaccessibility (total PC and flavonoids) was red blackberry > raspberry > globe grape. In vitro anthocyanins' stability was pH-dependent. Papp of PC from globe grape favored their absorption while PC efflux was favored in raspberry and blackberry. PC's absorption and ex vivo biotransformation was fruit-dependent and quinic acid (raspberry/blackberry), malvidin-3-O-glucoside and caffeic acid (blackberry) were major metabolites but they did not showed antiproliferative capacity in normal retinal, breast, lung and colorectal carcinoma cells.

Conclusion

PC's bioaccessibility, chemical stability, first-pass metabolism was fruit richness-dependent but the anti-cancer potential of its metabolites (bioequivalence) is not. Mexican Council of Science and Technology (CONACyT; project CB-2015-1/254063)

Key words

Phenolic compounds, bioaccessibility, first-pass metabolism, MTT assay