Dare 2 Change

J SC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

GOBIERNO DE ESPAÑA MINISTERIO DE CONSUMO

In vitro Bioaccessibility of Food Packaging Contaminants of Emerging Concern in Foods: a Tool for Human Dietary-Exposome Assessment – BACFood4Expo Project

Antía Lestido-Cardama¹, Patricia Vázquez Loureiro¹, Sandra Mariño-Cortegoso¹, Juana Bustos², Perfecto Paseiro-Losada¹, Ana Rodríguez-Bernaldo de Quirós¹, Raquel Sendón¹, <u>Letricia Barbosa-Pereira^{1,*}</u>

¹ Department of Analytical Chemistry, Nutrition and Food Science, Faculty of Pharmacy, University of Santiago de Compostela, Campus Vida, 15782 Santiago de Compostela, Spain

² National Food Centre, Spanish Agency for Food Safety and Nutrition, 28220, Majadahonda, Spain

PROJECT MOTIVATION

Human dietary exposure to chemicals is a priority issue for public health authorities and constitutes a key step in risk evaluations. The safety of food contact materials, such as food packaging, is a main topic in the field of food safety in the EU and requires the evaluation of the chemical substances that can migrate from the material into the food. Among the potential migrants that can be found in packaging materials, the Endocrine Disrupting Compounds (EDCs) remain a group of chemicals with implications in the occurrence of metabolic diseases with a high prevalence such as Diabetes and Obesity. The safety evaluation of these chemical substances that could migrate into food and be absorbed in the gut is very important from a toxicological point of view since foodstuffs undergo a series of processes before being absorbed into the body, such as the gastrointestinal digestion.

IDEA

Evaluate the application and implementation of the *in vitro* oral bioaccessibility studies to assess the impact of human dietary exposure to chemical substances related to food packaging materials and contribute to their risk assessment.



OBJECTIVES

 To develop and validate an integrated methodology of in vitro oral bioaccessibility for assessing the impact of food matrix and gastrointestinal effects on the biokinetics of ingested emerging contaminants from food packaging materials

• To develop and validate analytical methodologies for the identification and quantification of chemical substances and potential products of degradation in food digested fractions

 To evaluate human dietary exposure to migrating substances combining: i) the migration levels into the food, with ii) the data from bioaccessibility studies, and iii) the consumption levels obtained from national food consumption surveys.

WORKPLAN

Task 1. Data source and sampling

• Definition of the pool of chemical: intentionally added substances (IAS) Task 2. *In vitro* oral bioaccessibility of food packaging contaminants in foodstuffs Task 3. Development and validation of analytical methodologies for the identification and quantification of Task 4. Studies on the effect of the different food components separately on the bioaccessibility

Health

&

Wellbeing

(bisphenols and phthalates) and nonintentionally added substances (NIAS)
Packaging materials
Food samples

Static model – *INFOGEST* protocol
 Dynamic model and kinetics studies

chemical substances

Chemicals in foods and their digested fractions
Degradation products or conjugates formed during the digestion process of the contaminants

of food packaging contaminants

 Kinetics of the solubility and stability of the chemical substances and interactions with the food components

Task 5. Evaluation of the effect of food ingredients/foods addition/combinations on the final bioaccessibility of chemicals

 Bioaccessibility of chemicals in food products that can be combined in a meal

Task 6. Risk assessment based on bioaccessibility results

 Establishment of the bioaccessibility as a main criterium for the risk assessment evaluation Task 7. Dissemination and exploitation of the results
Scientific community
Industry (webinars, trainings)
Consumers (webinars)

IMPACT

 Relevant information on chemical modifications and bioaccessibility of chemicals substances from food packaging during the gastrointestinal digestion after the oral intake with diet and biokinetics experiments that are essential for assessing the human dietary-exposome

SCIENTIFIC AND
TECHNOLOGICAL
IMPACTSOCIAL AND
ECONOMIC
IMPACT

Food Safety

agencies and

authorities

Ensure the distribution of healthy and safer foods along the food supply chain with economic and social implications

Consumption of healthy and safer foods reduce risk of diseases and therefore reduce the economic costs of national healthcare institutions

 Information on the fate of these chemicals on the human body after oral intake and before its absorption, distribution, and metabolism. Identification of new compounds or degradation products in this process that might have toxicological implications and need evaluation.

• In vitro digestion as an integrated methodology relatively inexpensive to determine the realistic worst-case internal exposure for a more accurate risk assessment without the use of animal models.



Safe food supply also supports national economies, trade, and tourism, stimulating sustainable development and the competitiveness of the European agri-food industry

New insights on dietary exposure of chemicals from food packaging through the consumption of foods in the Spanish population may also be useful to help consumers to make wiser food choices

Enable food safety and health authorities to integrate new information in risk assessment and communication activities

Funding

BACFood4Expo project (PID2020-114569RJ-I00) *In vitro* Bioaccessibility of food packaging chemical contaminants of emerging concern in foods: a tool for human dietary-exposome assessment is funded by Spanish Ministry of Science and Innovation under the competitive State R&D Program Oriented to the Challenges of the Society, *"R&D Projects* 2020" - Modalities *"Research Challenges* and *Knowledge Generation"* MCIN/ AEI /10.13039/501100011033. L. Barbosa-Pereira is grateful to the Spanish Ministry of Science and Innovation for the financial support within the framework of this project (Grant agreement no. PID2020-114569RJ-I00).



Organized by:





