RISKBENEFIT4EU PROJECT
THE ESSENTIAL BALANCE OF RISKS & BENEFITS OF FOODS

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Food is a basic necessity for life, but...
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**Beneficial Effects**
- Essential nutrients
- Energy

**Hazards**
- Toxins & hazardous chemicals
- Pathogenic microorganisms

**Adverse Effects**
Adverse effects and risk assessment

Food safety management has adopted a risk-based approach in both the microbiological and chemical/toxicological fields.

Risk assessment

Impact of hazards + food consumption evaluated by

**Risk** = probability that an adverse health effect affecting an organism, a system, or a sub-population will occur, as a consequence of an exposure to a hazard in food.
Generic components of risk analysis paradigm
(adapted from FAO/WHO, 2009)
Problem formulation

Exposure assessment
- Levels of substance in food and diet
- Amounts of food consumed
- Intake in individuals
- Intake in special population groups

Hazard identification
- Identification of adverse health effects
  - Human studies
  - Animal-based toxicology studies
  - In vitro toxicology studies
  - Structure-activity considerations

Hazard characterization
- Selection of critical data set
- Mode/mechanism of action
- Kinetic variability
- Dynamic variability
- Dose-response for critical effect
- Identification of starting point

Risk characterization

Risk assessment framework
(adapted from Renwick et al., 2003)
Beneficial effects and benefit assessment

\[ Benefit = \text{probability of a positive health effect and/or the probability of a reduction of an adverse health effect in an organism, system, or (sub)population, in reaction to exposure to an agent} \]
Beneficial effects and benefit assessment

Benefit assessment framework

- Exposure assessment
- Positive health/reduced adverse effect identification
- Positive health/reduced adverse effect characterization
- Benefit characterization
Food is a basic necessity for life, but food could be a vehicle of health beneficial but also adverse effects.

Assessment of Risks + Benefits

Consumption of foods presenting various types of microbial (e.g. pathogens), chemical (e.g. acute toxic or endocrine-disrupting substances), and/or nutritional (e.g. saturated fatty acids) hazards, together with beneficial nutritional components (e.g. unsaturated fatty acids).
What is risk-benefit assessment?

A science-based process intended to estimate the benefits and risks for humans following exposure (or lack of exposure) to a particular food or food component and to integrate them in comparable measures, thus facilitating better informed decisions by decision-makers

Why to perform risk-benefit assessment?

• Modification of food standards
• Reconsidering legislation to improve the quality of food available
• Establishing recommendations for consumers to change their food habits into a healthier diet and lifestyle
  – Food choice
  – Consumption habits
  – Cooking practices

Risk-benefit assessment

Risk-benefit assessment paradigm
(EFSA, 2010)
Previous studies on Risk-benefit assessment

- 1st RBA study → 1999
- RBA on fish consumption → most studied topic (70%)
- Few studies have performed an integrated approach (Chemistry + Microbiology + Nutrition)
Previous European projects on Risk-benefit assessment

- **BRAFO**: Benefit Risk Assessment For Food
- **BEPRARIBEAN**: Best PRActices of Risk-BEnefit Analysis
- **QALIBRA**: Quality of Life – Integrated Benefit and Risk Analysis
- **BENERIS**: Benefit-Risk Assessment for Food: an Iterative Value-of-Information Approach
And what about Risk-benefit assessment performed in Portugal?

- Only approached issues related with fish and seafood consumption
- Mainly dedicated to the nutritional and chemical components
- Just few included probabilistic approaches
- Studies including common health metrics (as DALYs) are not available

Portugal remains as a country that needs technical and scientific support to develop and implement RBA

Risk-benefit assessment: gaps & challenges

- Integration of **probabilistic** and **interdisciplinary approaches** namely nutritional, microbiological and chemical components
- Within EU, risk-benefit assessment methodologies are **far from being well established**
RiskBenefit4EU – Partnering to strengthen the risk-benefit assessment within EU using a holistic approach

AIM: to strengthen the EU capacity to assess and integrate food risks and benefits in the areas of microbiological, nutritional and chemical components through the development of a harmonized framework that will be available to EU member states organizations.
RiskBenefit4EU

Partners:

Portugal

Denmark

France

Funding:

EFSA Partnering Grant
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RiskBenefit4EU: objectives

1) To **capacitate** recipient partners on food RBA

2) To develop **RBA tools** that can estimate the overall health effects of foods, food ingredients and diets

3) To develop a **harmonized framework for RBA** that can be applied to data from different countries

4) To validate the generated framework through the application to a **case study**

5) To **disseminate and promote** the harmonized framework to potential **EU users**
RiskBenefit4EU: main activities

Training
(where project partners will transfer and exchange knowledge)

Research
(framework development and its application to a case study)

Dissemination and promotion activities
(through web-site dissemination, publications and international conference organization)

International Workshop on Food Risk-Benefit Assessment
21st & 23rd May 2018, Lisbon

RBA case study

Website
https://riskbenefit4eu.wordpress.com/
RiskBenefit4EU: case study

• To validate all the developed tools, a Portuguese case study on cereal-based foods will be developed

Needed data?
RiskBenefit4EU: case study

• To validate all the developed tools, a Portuguese case study on cereal-based foods will be developed.

Needed data?

- Chemical contaminants (Mycotoxins)
- Microbiological contaminants
- Consumption data: information on food consumption
RiskBenefit4EU will contribute for the development and the establishment of RBA as a tool to provide **scientific evidence to inform risk management decisions** in the area of food safety and nutrition.
RiskBenefit4EU & IAN-AF

Two projects

A fruitful collaboration to improve human health