

1899

# Departamento de Alimentação e Nutrição Passado Presente e Futuro

Seminários de Atualização Científica e Metodológica

Carla Motta

## Passado

Fundado em 1899 Instituto Central de Higiene, com o objetivo de pôr em funcionamento um mecanismo de defesa da saúde da população.



- Há mais de um século que os laboratórios do INSA efetuam análises de alimentos.
- **Final década de 30 - Gonçalves Ferreira** inicia os primeiros trabalhos sobre constituintes dos alimentos.

## **DAN – Áreas Científicas**

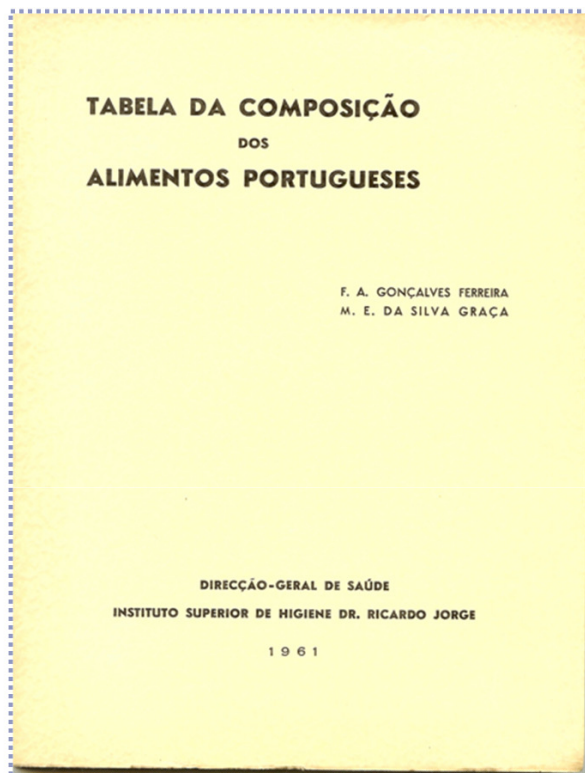
- **Composição de Alimentos**
  - Bases Dados
  - Rotulagem Nutricional
- **Segurança Alimentar e Avaliação do Risco**
  - Vigilância Epidemiológica
  - Riscos Emergentes
  - Toxicologia
- **Estilo de vida, Dieta e seu impacto na saúde**
  - Hábitos Alimentares
  - Nutrição Humana e Recomendações nutricionais

# Departamento de Alimentação e Nutrição Presente

Exemplos de Projetos  
Composição de Alimentos



Todas as Tabelas Nacionais de Composição de Alimentos foram publicadas pelo INSA



1961



2006



2010

<http://www.insa.pt/sites/INSA/Portugues/AreasCientificas/AlimentNutricao/AplicacoesOnline/TabelaAlimentos/Paginas/TabelaAlimentos.aspx>



Muitos Países têm bases de dados de composição de alimentos

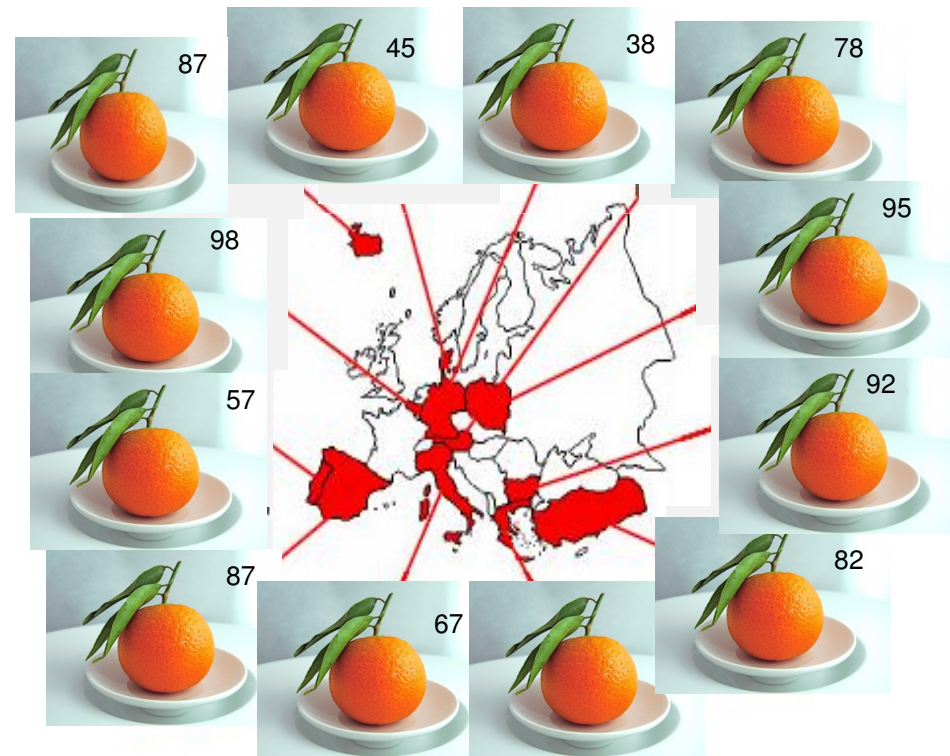
Quando se estima o aporte nutricional a partir de bases de dados de composição de alimentos. Como se explicam as diferenças observadas.

### Diferenças Naturais

- Biodiversidade
- Sazonalidade
- Origem geográfica

### Diferenças Artificiais

- Erros sistemáticos
- Erros aleatórios



Teor de Vit C mg/100g de parte edível



# EuroFIR - European Food Information Resource - Network of Excellence

www.eurofir.net

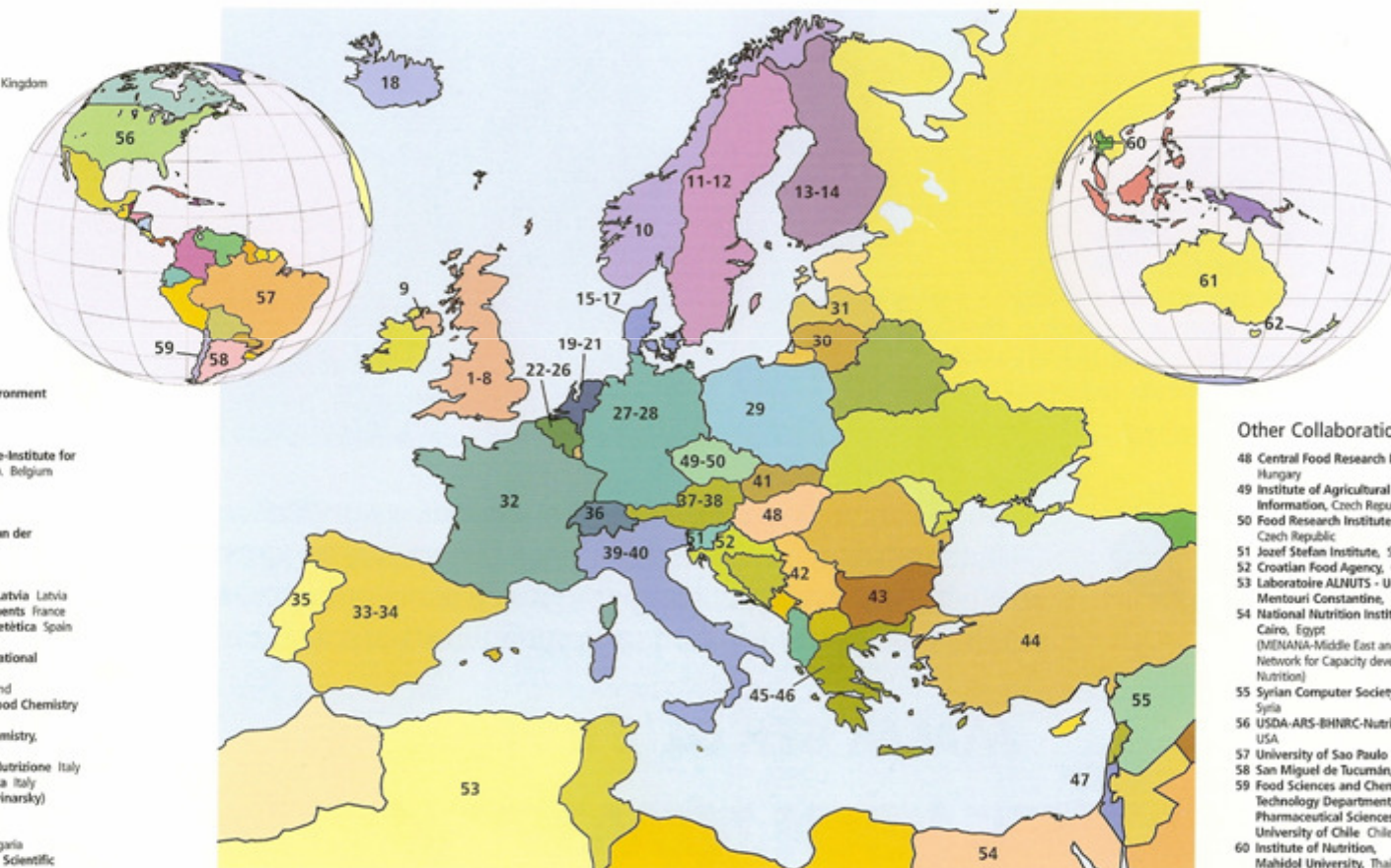
EuroFIR is providing the first comprehensive pan-European food information resource, using state of the art database linking, to allow effective management, updating, extending and comparability. This is an essential underpinning component of all food and health research in Europe. EuroFIR is also identifying and providing new information for

missing data for nutrients and biologically active compounds with putative health effects, and all food groups including traditional and ethnic foods. EuroFIR is seeking the views of all user and stakeholder groups, in order to establish and deliver their requirements for sustainable and durable food databank systems beyond the 5 year period of the NoE.



## Partners and Countries

- 1 Institute of Food Research United Kingdom
- 2 British Nutrition Foundation United Kingdom
- 3 Central Science Laboratory United Kingdom
- 4 European Molecular Biology Laboratory United Kingdom
- 5 University of Leeds United Kingdom
- 6 The University of Surrey United Kingdom
- 7 Ian D Unwin Food Information Consultancy United Kingdom
- 8 Balgent Ltd United Kingdom
- 9 University College Cork, National University of Ireland, Cork Ireland
- 10 University of Oslo Norway
- 11 Swedish National Food Administration Sweden
- 12 Sveriges Lantbruksuniversitet Sweden
- 13 National Public Health Institute Finland
- 14 Helsingin yliopisto Finland
- 15 National Food Institute, Technical University of Denmark
- 16 POLYTEC Denmark
- 17 Danish Food Information Denmark
- 18 Matís ehf Iceland
- 19 Wageningen University The Netherlands
- 20 RIKILT-Institute of Food Safety The Netherlands
- 21 National Institute of Public Health and the Environment The Netherlands
- 22 Ghent University Belgium
- 23 NUTRIENTEN BELGIE vzw Belgium
- 24 European Commission-DG Joint Research Centre-Institute for Reference Materials and Measurements (IRMM) Belgium
- 25 FOODCON Belgium
- 26 ILSI Europe a.i.s.b.l. Belgium
- 27 Max Rubner-Institute Germany
- 28 Verein zur Förderung des Technologietransfers an der Hochschule Bremerhaven e.V. Germany
- 29 National Food and Nutrition Institute Poland
- 30 National Nutrition Centre Lithuania
- 31 Food Centre of Food and Veterinary Service of Latvia Latvia
- 32 Agence Française de Sécurité Sanitaire des Aliments France
- 33 Centre d'Ensenyament Superior de Nutrició i Dietètica Spain
- 34 University of Granada Spain
- 35 Instituto Nacional de Saúde Dr. Ricardo Jorge National Institute of Health, Portugal
- 36 Eidgenössische Technische Hochschule, Switzerland
- 37 Graz University of Technology, Department of Food Chemistry and Technology Austria
- 38 University of Vienna, Institute for Analytical Chemistry, Institute of Nutritional Sciences Austria
- 39 Istituto Nazionale di Rerca per gli Alimenti e la Nutrizione Italy
- 40 Centro per lo Studio e la Prevenzione Oncologica Italy
- 41 Food Research Institute (Výskumny ústav potravinarský) Slovakia
- 42 Institute for Medical Research Serbia
- 43 National Centre of Public Health Protection Bulgaria
- 44 Turkiye Bilimsel ve Teknik Arastirma Kurumu (The Scientific and Technical Research Council of Turkey) Turkey
- 45 National and Kapodistrian University of Athens Greece
- 46 Agricultural University of Athens Greece
- 47 Ben-Gurion University of the Negev Israel



## Other Collaborations

- 48 Central Food Research Institute, Hungary
- 49 Institute of Agricultural Economics and Information, Czech Republic
- 50 Food Research Institute Prague, Czech Republic
- 51 Jozef Stefan Institute, Slovenia
- 52 Croatian Food Agency, Croatia
- 53 Laboratoire ALNUTS - Université Mentouri Constantine, Algeria
- 54 National Nutrition Institute Cairo, Egypt (MENANA-Middle East and North Africa Network for Capacity development in Nutrition)
- 55 Syrian Computer Society Network, Syria
- 56 USDA-ARS-BHNR-Nutrient Data Lab, USA
- 57 University of Sao Paulo Brazil
- 58 San Miguel de Tucumán, Argentina
- 59 Food Sciences and Chemical Technology Department, Chemical and Pharmaceutical Sciences School, University of Chile Chile
- 60 Institute of Nutrition, Mahidol University, Thailand
- 61 University of New South Wales, Australia
- 62 Crop and Food Research Food Industry Science Centre, New Zealand

For further information about EuroFIR please contact the Project Management Office (PMO)  
Tel: +44 (0) 1603 251431, Fax: +44 (0) 1603 251470 or email: if.eurofir@bbsrc.ac.uk Website www.eurofir.net



# The PortFIR Programme

## Portuguese Food Information Resource

### OBJECTIVES

Collect, compile/collate, share and exchange information existing in Portugal, at national and international level, essential for the assessment of nutritional status and diet associated risk, in a normalized format compatible with international requirements.

Data on Food composition, contamination and consumption will be compiled and made available through an electronic platform – sGRIA – loaded at national level with the information produced in INSA and by the members of the PortFIR Networks

#### **Approximately 60 public and private entities:**

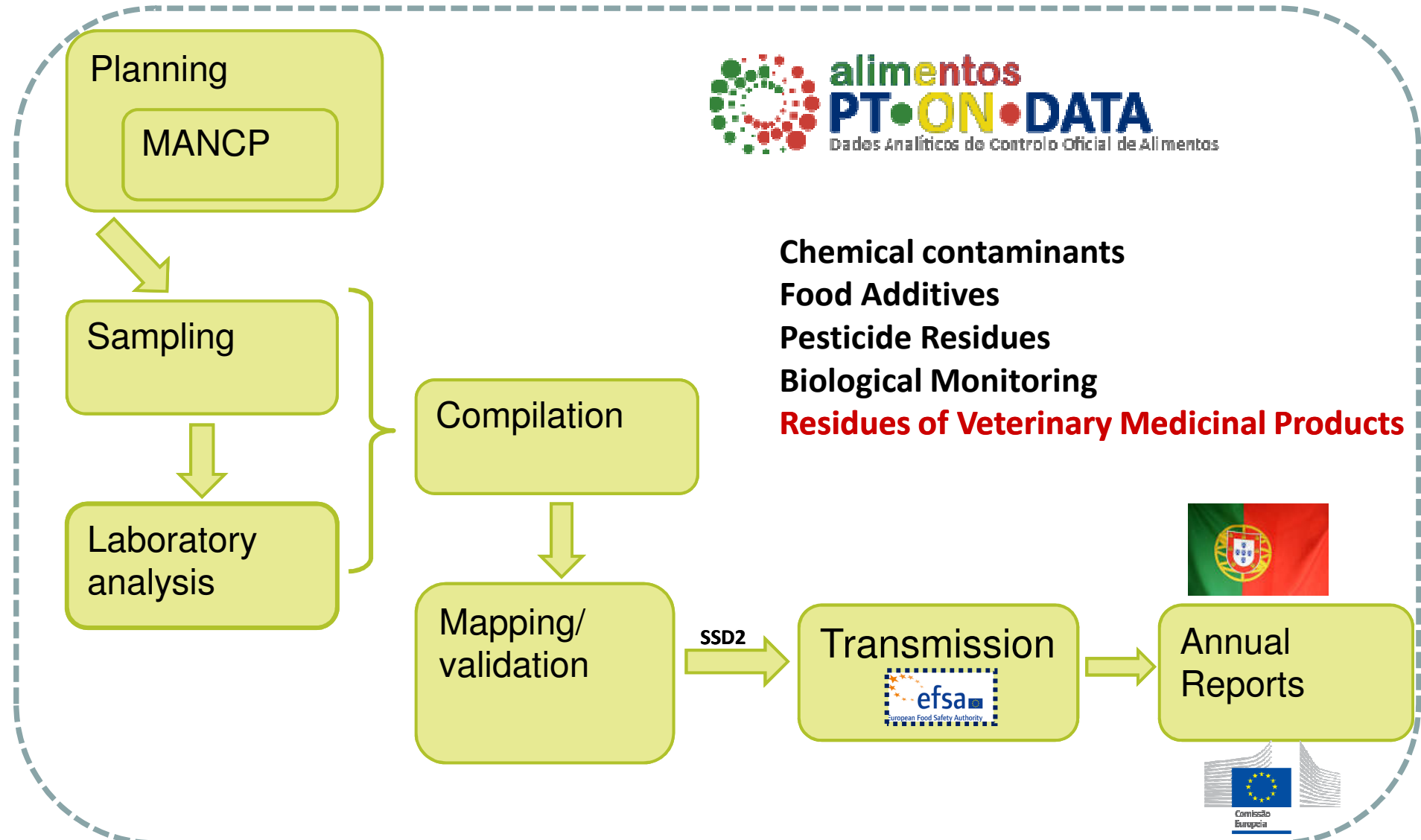
State laboratories, universities, health and supervisory authorities, legislators and regulators, traders and agro-food sector organizations

# Sistema Nacional de Gestão de Dados

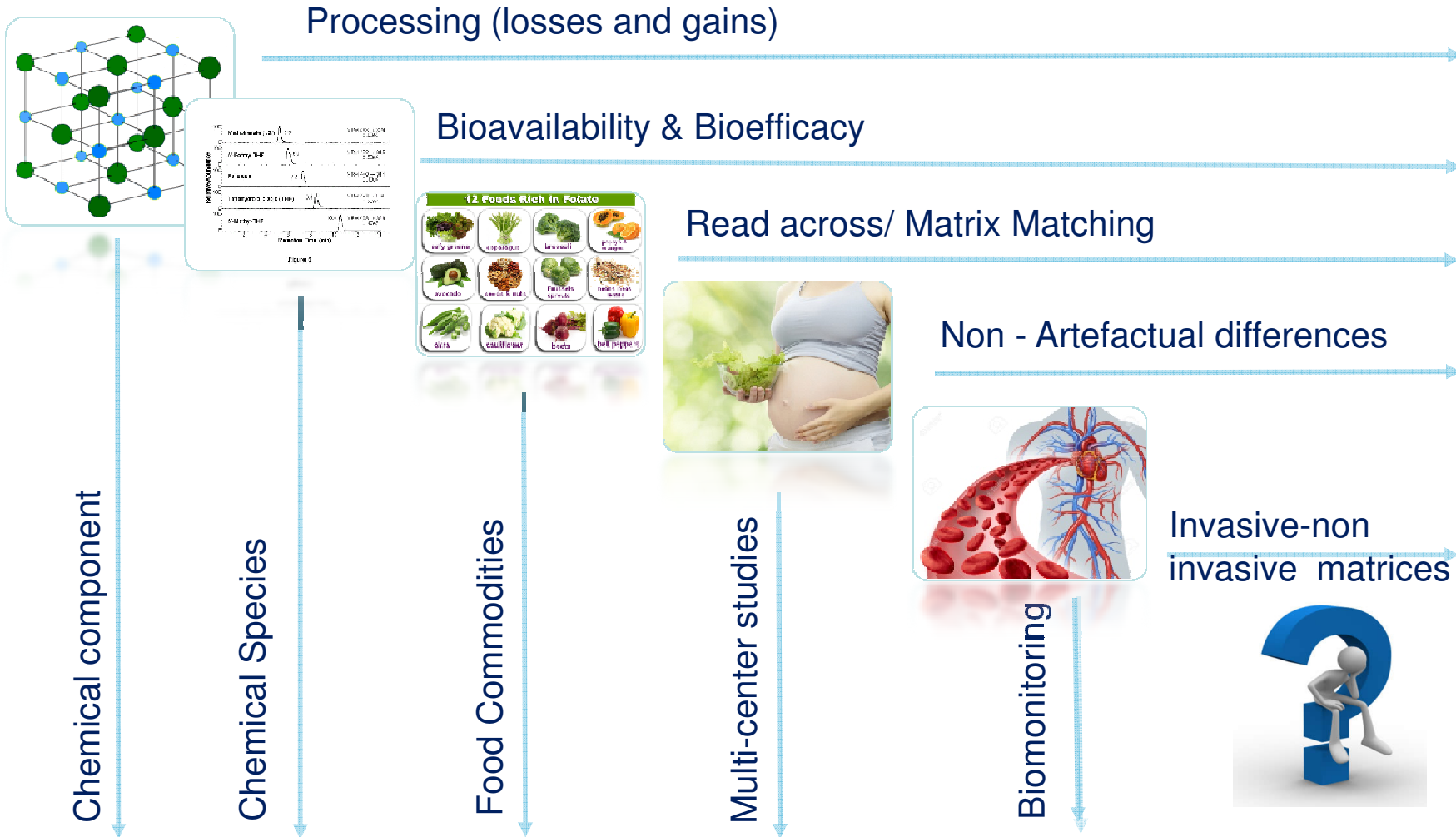
# SSD2 Project



**Chemical contaminants**  
**Food Additives**  
**Pesticide Residues**  
**Biological Monitoring**  
**Residues of Veterinary Medicinal Products**



# TC-23 Metrology in Food and Nutrition



Fit for Purpose

## Accurate Measurements

SI Units

*A specific session "dedicated to metrology for food composition analyses  
 "Food Composition Data - how do we assess quality?" - organized in cooperation with EUROFIR*

# Departamento de Alimentação e Nutrição Presente

Exemplos de Projetos  
Segurança Alimentar





# Projeto ORQUE SUDOE



2012-2014

## Observatoire de Recherche sur la Qualité de l'Environnement du Grand Sud-Ouest Européen

- É uma iniciativa comum que congrega nove parceiros: Universidades e Laboratórios de investigação públicos de Portugal, Espanha e do Sudoeste de França.
- Visa a **avaliação da qualidade química dos meios litorais** e a criação de uma base de amostras de referência.
- O INSA tem a responsabilidade de identificar as zonas de recolha de amostras na região do Sado.
- Competências adquiridas e a adquirir:
  - Capacitação do INSA para a realização de ensaios pela técnica hifenada de HPLC-ICP-MS na análise de espécies químicas de arsénio.
  - Dotar o INSA com metodologia única no país.

## Embalagens em Contacto com Alimentos

- Rose4Pack
- Nano Pack 4Food

Biodegradable active packaging with rosemary extract (*Rosmarinus officinalis* L.) to improve food shelf-life

### Rose4Pack

**Funding Institution:** FCT  
**Duration:** 2 years (2013 - 2015)



#### THE CHALLENGE

To develop and evaluate the effectiveness of a biodegradable active food packaging that incorporates rosemary extract with antioxidant properties



## Labelling and tracking of nanoclay from food packaging nanocomposites: a food safety issue - NanoPack4Food

Transnational Cooperation

Agreement between Portugal (FCT) and Italy (CNR)



**Type of project:** Transnational Cooperation- Portugal/Italy

**Funding Institution:** FCT

**Duration:** 2 years (2015/2016).

**Participant Institutions:** INSA (Portugal) and Institute of Polymers, Composites and Biomaterials (Italy)



MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA

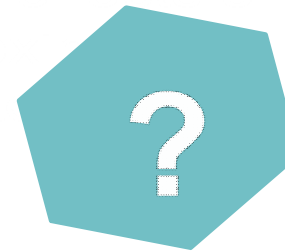


## Desenvolvimento de embalagens ativas e biodegradáveis

# HYPOTHESIS: CHILDREN ARE EXPOSED TO MULTIPLE MYCOTOXIN THROUGH THEIR DIET AND THIS CONSTITUTES A HEALTH THREAT

## MYCOMIX

Exploring the toxic effects of mixtures of mycotoxins in infant food and potential health impact



**Are children exposed to mycotoxins mixtures in diet?**

**Are there interactive effects of mixtures in toxicity?**

**Could this exposure be a health threat to children?**

**february 2012- january 2016**

**Project FP7- KBBE-2011-5- TDSEXPOSURE** (Total Diet Studies Exposure) funded by the 7th Framework Programme (FP7) of the European Commission.

**Coordination :** ANSES (FR)

**Participants :** 19 European countries, 26 beneficiaries, including INSA

Shortage of both available and harmonized procedures for TDS studies; some European countries never conducted a TDS study.



The project aims to improve and standardize the monitoring of food contaminants and beneficial compounds of the daily diet; and create a TDS network at European level.

# Alimentos geneticamente modificados: uma ameaça para a saúde?



## 1 Alergenicidade

- **Lack of detectable allergenicity of transgenic maize and soya samples.** *JACI 2005*
- **A proteomic study to identify soya allergens- The human response to transgenic vs. non-transgenic soya samples.** *Int Arch Allergy Immunol 2007*
- **Characterization of maize allergens- MON810 vs. Its non-transgenic counterpart.**  
*J. Proteomics 2012*

## 2 Engenharia genética vs. outras técnicas de melhoramento convencional

- **Microarray analyses reveal that plant mutagenesis may induce more transcriptomic changes than transgene insertion.** *PNAS 2008*

## 3 Estratégias de avaliação de risco

- **Plant natural variability may affect safety assessment data.** *Reg.Toxicol Pharmacol 2010*
- ***In vitro* culture may be the major contributing factor for transgenic vs. non-transgenic proteomic plant differences.** *Proteomics 2015*

# Departamento de Alimentação e Nutrição Presente

## Exemplos de Projetos

Estilo de vida, Dieta e seu impacto na saúde





## BaSeFood

**Sustainable exploitation of bioactive components  
from the Black Sea Area traditional foods (FP7-  
KBBE-227118)**

**Coordinator - L. Filippo D'Antuono**

The BaSeFood research Consortium consists of 13 partners. Six are from all the coastal nations of the Black Sea Area: Russia, Ukraine (2), Romania, Bulgaria, Turkey and Georgia. The others are from Italy (2), United Kingdom, Greece, **Portugal** and Serbia.

**WP2 - Bioactive components, nutritional and microbiological  
characterization of traditional foods (*Caracterização nutricional,  
microbiológica e compostos bioativos de alimentos tradicionais*)**

**Workpackage leader – Helena S. Costa (INSA)**

# PTranSALT



## Avaliação de ácidos gordos *trans*, gordura saturada e sal em alimentos processados: estudo do panorama Português (2012-2015)

<b>Investigador responsável</b>	<b>Helena Soares Costa</b>
<b>Parcerias</b>	Departamento de Epidemiologia (INSA, I.P.) Faculdade de Farmácia da Universidade do Porto
<b>Financiamento</b>	INSA, I.P.
<b>Objetivo</b>	Aprofundar e atualizar o conhecimento sobre os teores de AGT, AGS, gordura total, colesterol e sal em alimentos processados disponíveis no mercado português e amplamente consumidos pela população portuguesa, com a finalidade de fornecer informação fundamental para a formulação de políticas alimentares e de nutrição, contribuindo para melhorar o estado nutricional e de saúde da população portuguesa

# “Childhood Obesity Surveillance Initiative”

## COSI-PORTUGAL 2008, 2010, 2013

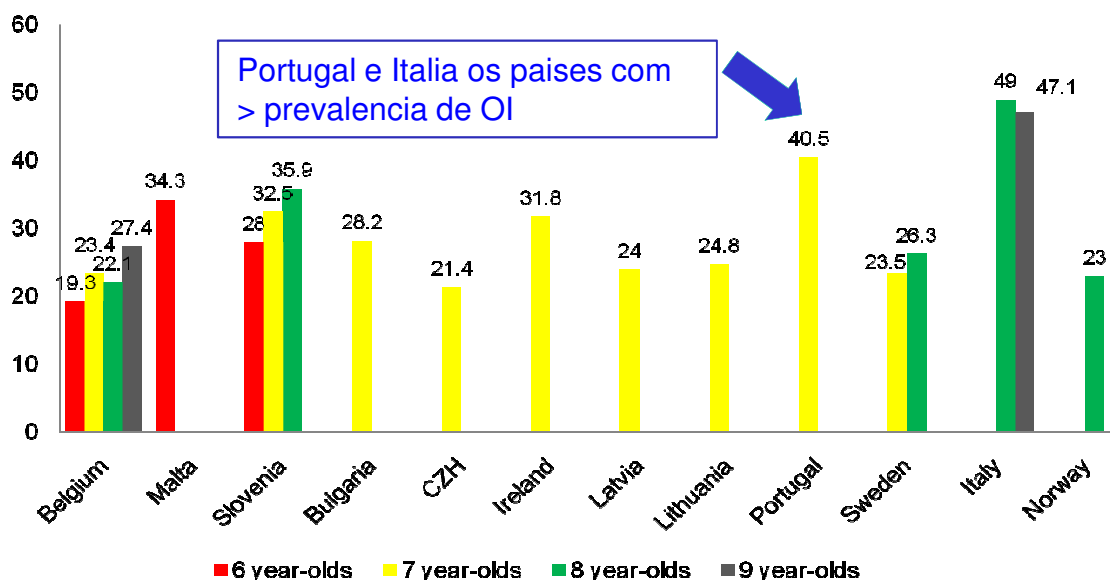
- O **COSI-Portugal** está integrado no estudo COSI da OMS/Europa (17 países).
- Sistema articulado com as 7 regiões de Saúde (ARS e DRS Madeira e Açores)
- Sistema de vigilância nutricional infantil de crianças portuguesas dos 6-8 anos

- 2008-** Excesso de peso 37,9% incluindo **15,8% obesidade**
- 2010-** Excesso de peso 35,7% incluindo **14,7% obesidade**
- 2013-** Excesso de peso 31,6% incluindo **13,9% obesidade**

<http://www.insa.pt/sites/INSA/Portugues/ComInf/Noticias/Paginas/RelatorioCOSIPortugal2013.aspx>



Rito A et al. Prevalence of obesity among Portuguese children (6–8 years old) using three definition criteria: COSI Portugal, 2008. *Pediatric Obesity*, 7(6), 413-422. 2012.



# Food and Nutrition Department has been designated “WHO Collaborating Centre for Nutrition and Childhood Obesity”

## from 21 July 2015



WORLD HEALTH ORGANIZATION  
ORGANISATION MONDIALE DE LA SANTÉ  
WELTGESUNDHEITSORGANISATION  
ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ

REGIONAL OFFICE FOR EUROPE  
BUREAU REGIONAL DE L'EUROPE  
REGIONALBÜRO FÜR EUROPA  
ЕВРОПЕЙСКОЕ РЕГИОНАЛЬНОЕ БЮРО

Head office:

UN City, Marmorvej 51,  
DK-2100 Copenhagen Ø, Denmark  
Tel.: +45 45 33 70 00; Fax: +45 45 33 70 01  
Email: [contact@euro.who.int](mailto:contact@euro.who.int)  
Website: <http://www.euro.who.int>

Our reference: POR-11  
Notre référence:  
Unser Zeichen:  
См. наш номер:

Your reference:  
Votre référence:  
Ihr Zeichen:  
На Ваш номер:

Dear Dr Almeida,

I am pleased to inform you that the World Health Organization has designated the Food and Nutrition Department, National Institute of Health Dr Ricardo Jorge as WHO Collaborating Centre for Nutrition and Childhood Obesity, under WHO's reference number POR-11. As previously agreed, Prof Dr Jose Maria Albuquerque and Dr Antonia Calhau will act as Heads of the Centre. Should there be any change in the future, please inform WHO without delay.

The agreed terms of reference and workplan of the Centre are attached. We wish to emphasize that institutions designated as WHO collaborating centres are expected to implement the agreed workplan in a timely manner and to the highest possible standard of quality. Any issue that may affect the implementation of the agreed workplan should be brought to the attention of the WHO responsible officer, Ms Frederiek Mantingh, e-mail: [mantingh@who.int](mailto:mantingh@who.int). For information on administrative matters, please visit the WHO website: <http://www.who.int/collaboratingcentres/information/en/>

We wish also to emphasize that institutions designated as WHO collaborating centres must comply with the attached *Terms and conditions for WHO collaborating centres*. Please note that the WHO name and emblem may only be used by a WHO Collaborating Centre as described in the terms and conditions. On the anniversary of the designation date, institutions designated as WHO collaborating centres must complete a short online progress report. Details will be sent to the email address of the Head of the Centre specified in the designation form.

The designation as a WHO Collaborating Centre will be effective for a period of four years, as from 21 July 2015 and will automatically end on 21 July 2019 unless redesignation has been approved by WHO before that date. During the period of designation, either party may revoke the designation at any time by giving three months advance notice in writing.

I look forward to our successful collaboration.

Yours sincerely,

Zsuzsanna Jakab  
Regional Director

Date: 21 July 2015

Doctor Fernando Almeida  
Food and Nutrition Department  
National Institute of Health Dr Ricardo Jorge  
Avenida Padre Cruz  
1649-016 Lisbon  
Portugal

*with our much  
pleasure.  
We congratulate  
1- Sr Ministro da Saúde,  
2- Sr SEARS  
3- DG 5,  
4- DNV  
5- Gabinete de Comunicação  
Albuquerque e António Calhau  
para designação  
15-07-24*

**Fernando de Almeida**  
Presidente do Conselho Diretivo  
Instituto Nacional de Saúde  
Doutor Ricardo Jorge - INSA, IP



# Departamento de Alimentação e Nutrição Presente

Exemplos de Redes de trabalho Nacionais e  
Internacionais



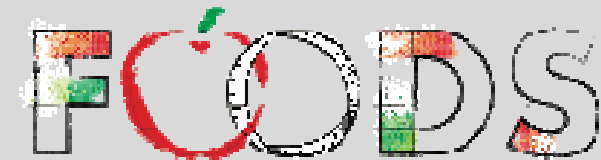


**MoniQA Association  
(Monitoring and Quality Assurance in the Total Food Supply Chain)**



2<sup>nd</sup>

**IMEKO**



Metrology Promoting Objective and Measurable Food Quality and Safety

INFOGEST

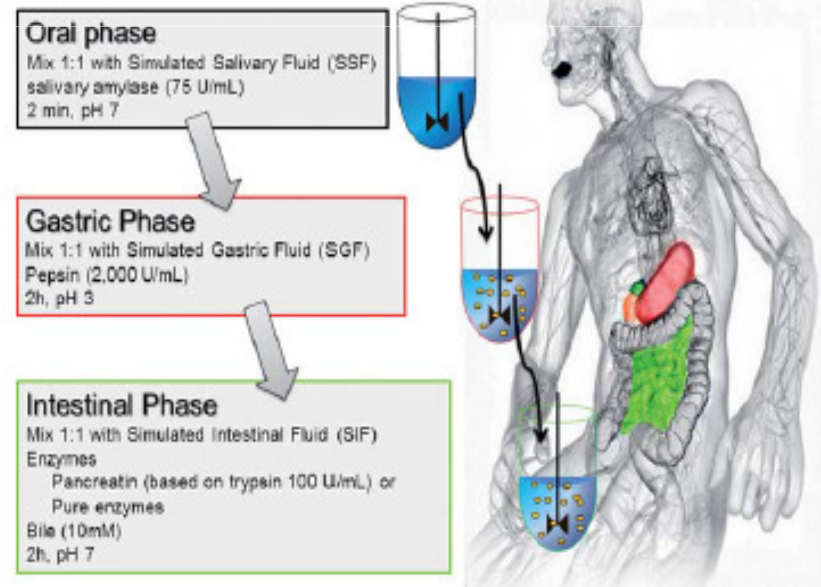


## IN VITRO SIMULATION OF THE DIGESTION AND INTESTINAL ABSORPTION

Improving Health Properties of Food by Sharing our Knowledge on the Digestive Process, *COST FA 1005 INFOGEST (2011-2015)*, D. Dupont, INRA



### Consensus *in vitro* digestion method for food



# Departamento de Alimentação e Nutrição Presente

- Exemplos de Trabalho Analítico



## Análise Química Alimentos:

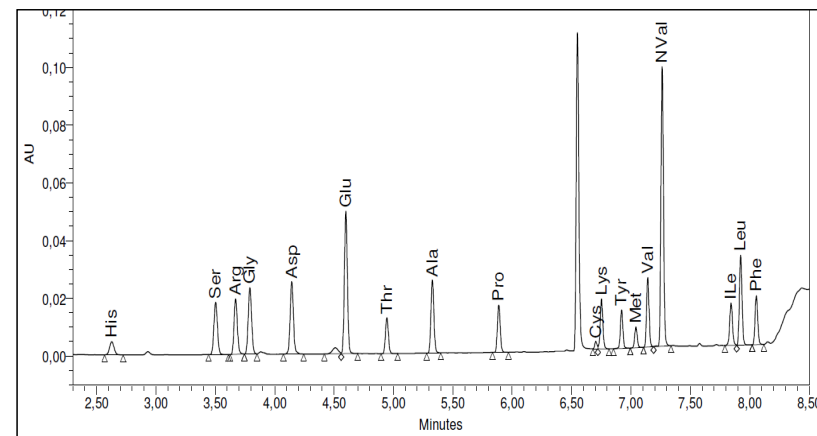
- **Composição Alimentos** (Macronutrientes, Vitaminas, Minerais, Compostos Bioativos)
- **Contaminantes** (Micotoxinas, Metais Pesados, Nitratos)
- **Aditivos,**
- **Alérgenos Alimentares** (Glúten/Gliadina)
- **Embalagens e Material de contacto com Alimentos**

**Laboratório acreditado de acordo com EN ISO/IEC 17025 desde Janeiro de 2008, pelo IPAC**



## Cromatografia Líquida

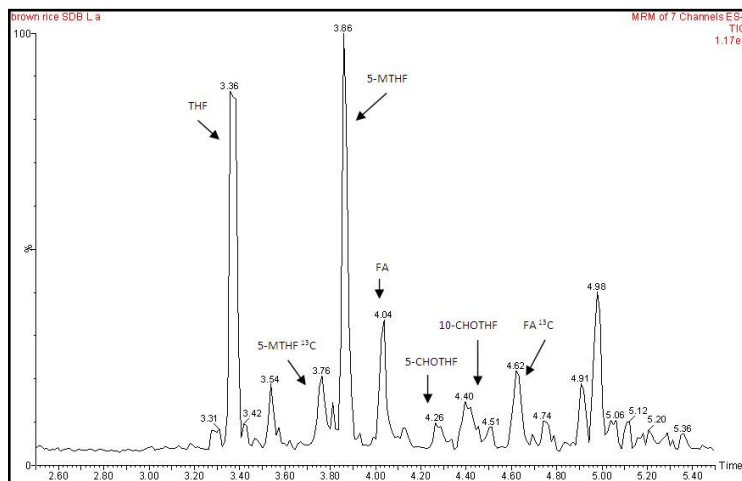
- Vitaminas
- Antioxidantes
- Nitratos
- Aminoácidos



Perfil Aminoácidos do Arroz

# Cromatografia Líquida Com Detetor Massas LC-MS/MS

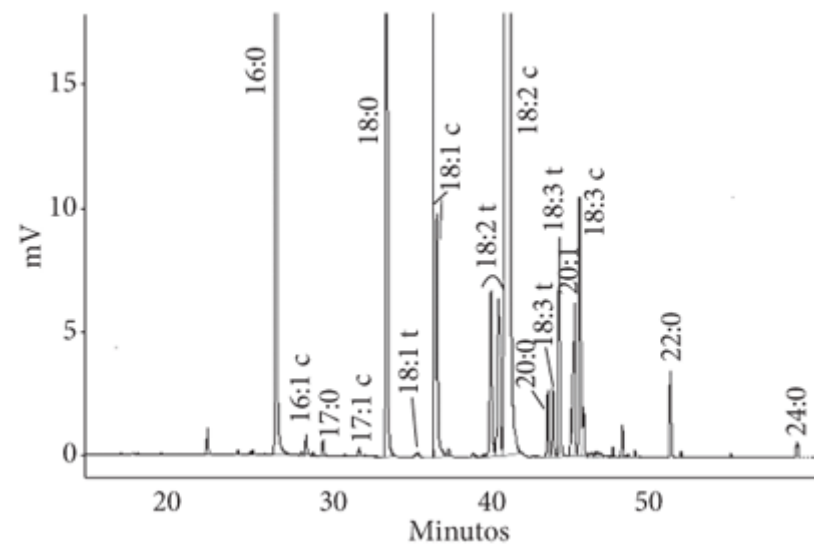
- Acrilamida
- Folatos Naturais
- Vitamina B12
- Micotoxinas



Folatos Naturais – Separação Vitâmeros

# Cromatografia Gasosa

## - Ácidos Gordos



Perfil ácidos gordos óleo refinado

## HPLC-ICP-MS

- Especificação Arsénio (Orgânico e Inorgânico)
- Especificação Selénio
- Contaminantes



## ICP-OES

- Minerais
- Oligoelementos

# **Perspetivando o Futuro**

- excelência com história -

*cultivar a herança*

*colher ganhos em saúde*

Um Muito Obrigada à Equipa do DAN

# A equipa... Fantástica!!!

