



The Food and Environment
Research Agency

New approaches for tracing the origin of food

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To be discussed

- Importance of tracing food origin
- Introduction to TRACE
- Traceability and data interchange
- Analytical tools for verification

Traceability: European drivers

- Consumer socio-economic concerns and preferences relating to the origin of food-
 - BSE,
 - dioxins,
 - Sudan red,
 - regional foods,
 - type of production
- One step up one step down legislation introduced 178/2002
- EU FPVI Food 2003 2A T 4.1 “Development of reliable traceability methods and systems to establish the origin/ mode of production of food products”

Tracing the origin of food- high profile



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GoodHealth

'Wild' salmon from fish farms. 'Free-range' eggs from battery hens. How health-conscious shoppers are being conned by food that's not all it seems...



THE GOOD FOOD FRAUD GUIDE

WILD SALMON
Wild salmon is sold for a premium price. But many fish farms use farmed salmon, which is cheaper and has a different taste. Look for the words 'wild' and 'Atlantic' on the label.

FREE-RANGE EGGS
Free-range eggs are sold for a premium price. But many farms use battery hens, which are cheaper and have a different taste. Look for the words 'free-range' and 'cage-free' on the label.

TOSH HONEY
Tosh honey is sold for a premium price. But many farms use artificial sweeteners, which are cheaper and have a different taste. Look for the words 'tosh' and 'natural' on the label.

ORGANIC VEGETABLES
Organic vegetables are sold for a premium price. But many farms use pesticides, which are cheaper and have a different taste. Look for the words 'organic' and 'pesticide-free' on the label.

THE TIMES

Saturday May 26 2007 timesonline.co.uk No 68022

Free book for every reader

Uncommon British days

News in brief
Food firm starts delivery service

Massive storm fire
A fire in the south of England has caused a massive storm fire, with a large area of the forest being destroyed.

Food test exposes 'mis-sold' superstore chickens

Amazing Joseph over internet

Times investigation raises fears over quality

New food tests which could bolster consumer confidence in premium-priced products have been used to discover that Britain's biggest supermarket chain has been mis-selling ordinary chickens as 'corn fed'.

Government scientists found that birds from Tesco's 'Taste' range had not contained enough maize to justify being labelled as 'corn fed'.

HONEY LAUNDERING

UK Honey Laundering

UK Honey Laundering is a process where honey is mixed with other substances to make it appear more valuable. This is often done to increase the price of the honey.

Shaftesbury killers get 25 years in jail
The Earl of Shaftesbury and his brother get 25 years in prison for his murder.

GP hours warning
Failings in out-of-hours GP care will claim more victims, says the partner of one NHS boss.

Sweet taste of success in catching the food cheats

Scientists find test to beat cheats who peddle bogus regional foods

A group of science scientists pioneering new techniques which will give all of us some food for thought.

Government scientists found that birds from Tesco's 'Taste' range had not contained enough maize to justify being labelled as 'corn fed'.

Disappointed children from Hillfield Primary School

Disappointed children from Hillfield Primary School, near Ipswich, are seen in a photograph. They are holding a sign that says 'JOSEPH BAZZA'.

David Baddiel Loves Martha's Vineyard

Shaftesbury killers get 25 years in jail

The Earl of Shaftesbury and his brother get 25 years in prison for his murder.

GP hours warning
Failings in out-of-hours GP care will claim more victims, says the partner of one NHS boss.

How scientists spotted the fake
Scientists used a new test to identify fake honey.

Food tests expose 'mis-sold' chickens
New food tests have been used to discover that Britain's biggest supermarket chain has been mis-selling ordinary chickens as 'corn fed'.

US peanut recall



**“More peanut products added to recall list
More than 31 million pounds, 125 items affected
in salmonella probe”**  Jan. 23, 2009

**“Salmonella outbreak eases way for food safety reforms
Lawmakers, industry in accord after salmonella outbreak”**
By Matthew Hay Brown | matthew.brown@baltsun.com February 15, 2009



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New US traceability legislation*?

- **S.510 FDA Food Safety Modernization Act**
 - Safe And Fair Enforcement and **Recall** for Meat, Poultry, and Food Act of 2009

- **H.R. 1332: Safe FEAST Act of 2009 SEC.**
 - To amend the Federal Food, Drug, and Cosmetic Act with respect to the safety of the food supply. Section 204. **ENHANCING TRACEBACK AND RECORDKEEPING**

- **H.R. 814 TRACE Act of 2009**
 - To amend the Federal Food, Drug, and Cosmetic Act, the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act to improve the safety of food, meat, and poultry products **through enhanced traceability, and for other purposes**

*Source www.govtrack.us/congress

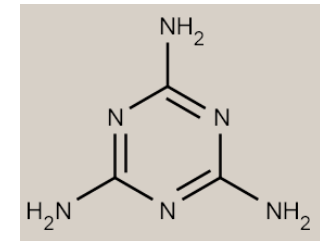
FDA : food adulteration

- The US Food and Drug Administration (FDA) is to hold a meeting designed to find ways to prevent the adulteration of food for economic reasons.
- FDA defines economically motivated adulteration (EMA) as *“the fraudulent, intentional substitution or addition of a substance in a product for the purpose of increasing the apparent value of the product or reducing the cost of its production”*.

Traceability a global issue



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- Melamine



Added to foods to extend apparent protein content
China milk scandal: 4 deaths and 53,000 children fall
ill from contaminated milk powder, Daily Telegraph
September 22 2008

China tainted milk scandal: 22 arrested, The Daily Telegraph
September 29 2008



Cadbury hit by tainted milk scandal and withdraws
Eclairs and Dairy Milk, The Times September 30 2008

Use of traceability systems

- Support food safety
- Risk management
- Food quality- quality assurance
- Support food authenticity
- Business management tool

Increasing consumer confidence

- Improved (cost effective) traceability for all
- European food perceived as higher quality as quality (and safety) specifications can easily be traced and verified.
- Promotes value added foods and sustainable agriculture e.g. regional foods, organic, country of origin.
- Benefits the food industry as well as consumers

Traceability is a tool

- Traceability does not make food safe
- Traceability systems track and trace food packaging
- Need methods for verifying the contents

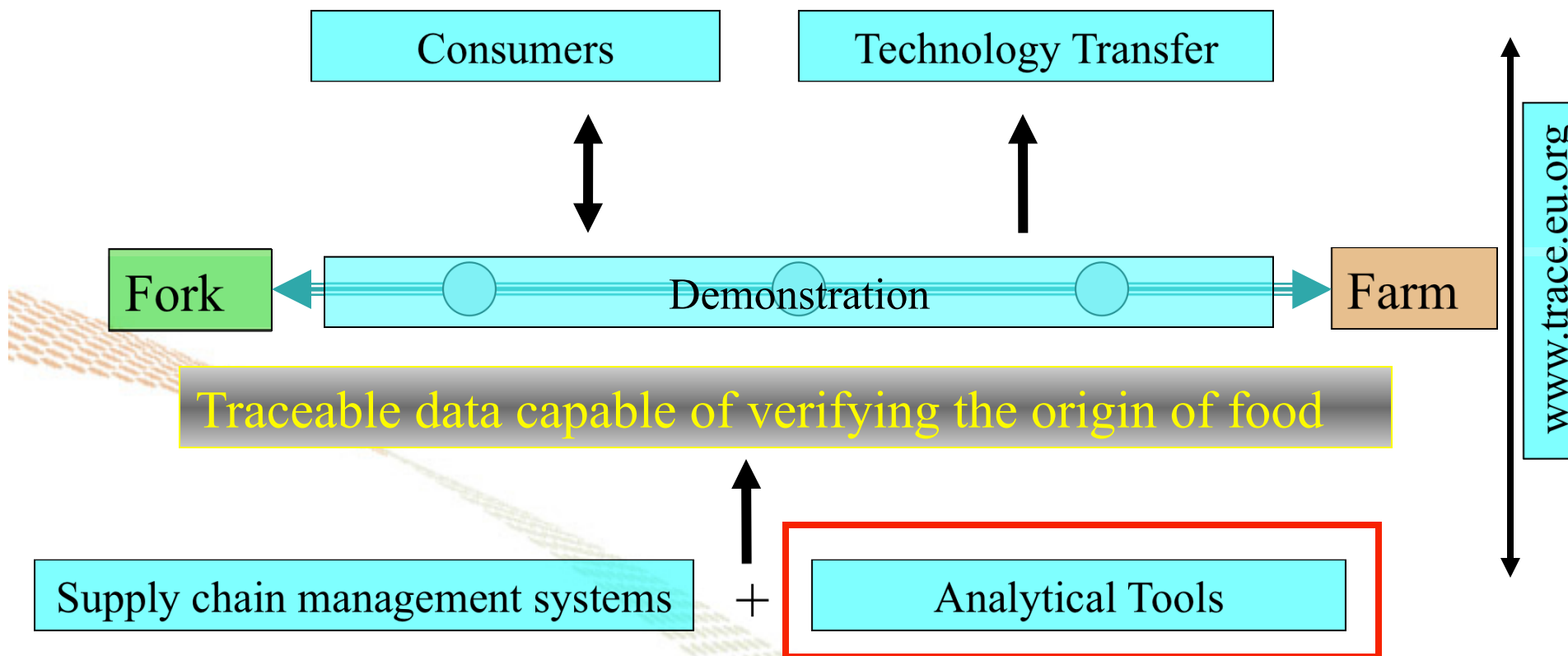




- 19 M€
- 60 months
- 50 participants (13 SME's)



➤ “To develop traceability methods and systems that will provide consumers with added confidence in the authenticity of European food.”



TRACE:General Approach



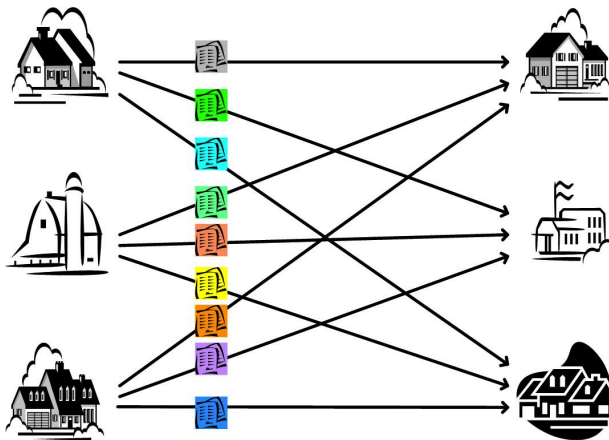
- Develop/harmonise traceability processes and language for tracking and tracing
- Develop methods for verifying “origin”
 - e.g. quantify geographical origin
- Develop food verification procedures
 - Compliance assessment
- Integrate into traceability systems ?

TraceCore- facilitating data exchange

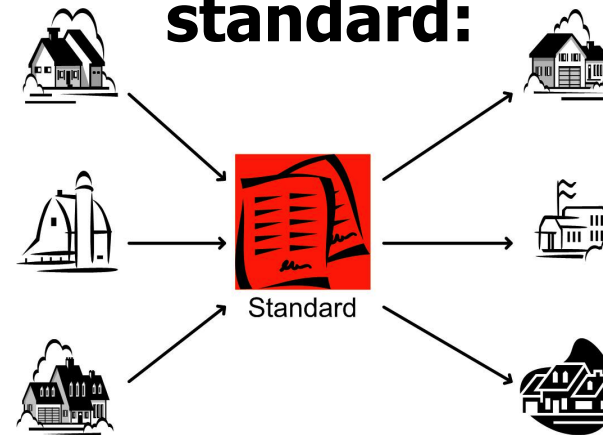


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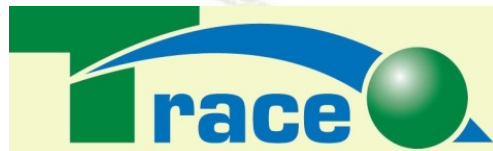
Information exchange without a standard:



Information exchange with a standard:

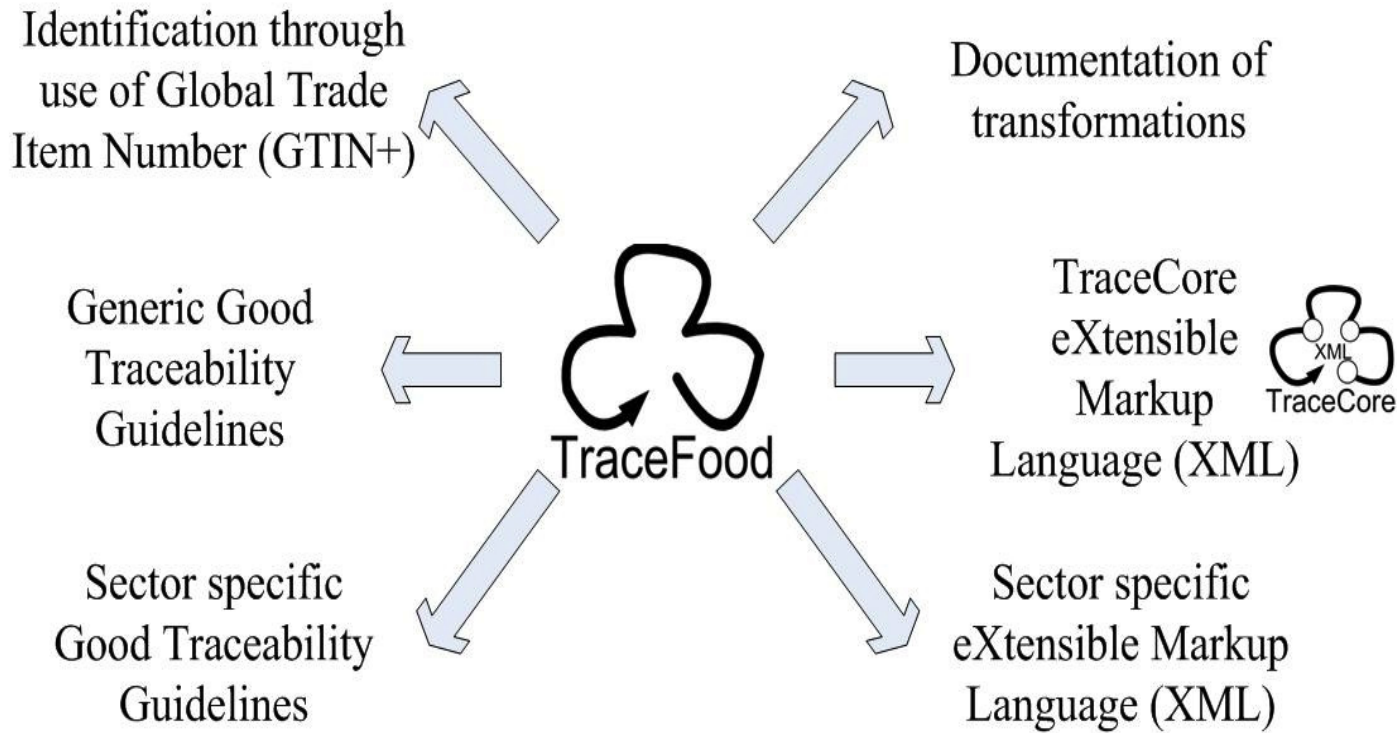


Group Leader: Petter
Olsen



Trace Core  XML

TraceFood Framework

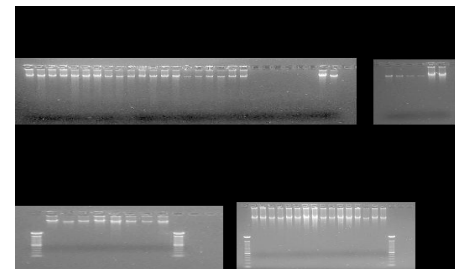
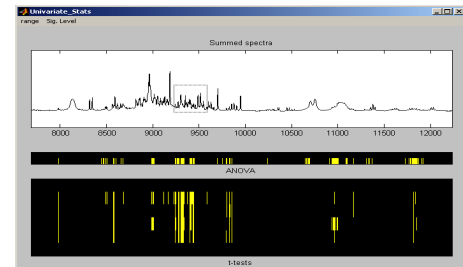
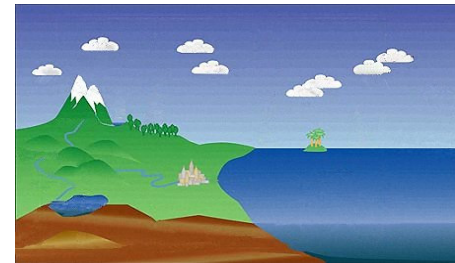


(www.tracefood.org)

Analytical tools for verifying origin

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- WP1 Food Origin Mapping (geo origin)
ICP-MS, SIRMS, geochemistry,
statistics
- WP2 Food verification methods
NMR, Raman, M-IF, NIR, GC-MS, LC-MS,
statistics
- WP3 Species origin methods,
Real time PCR, microarray, microsatellite
analysis



Can we confirm where a food has come from?

- Most traceability systems trace the packaging not the food
- There is a need to reassure the consumer about product integrity
- How can we cheaply provide a method for verifying a foods origin?

Determining geographical origin



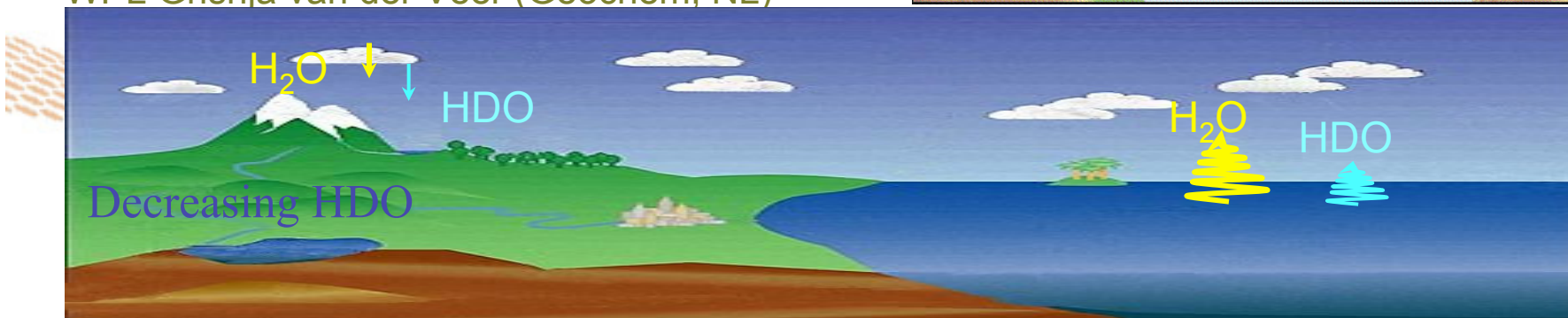
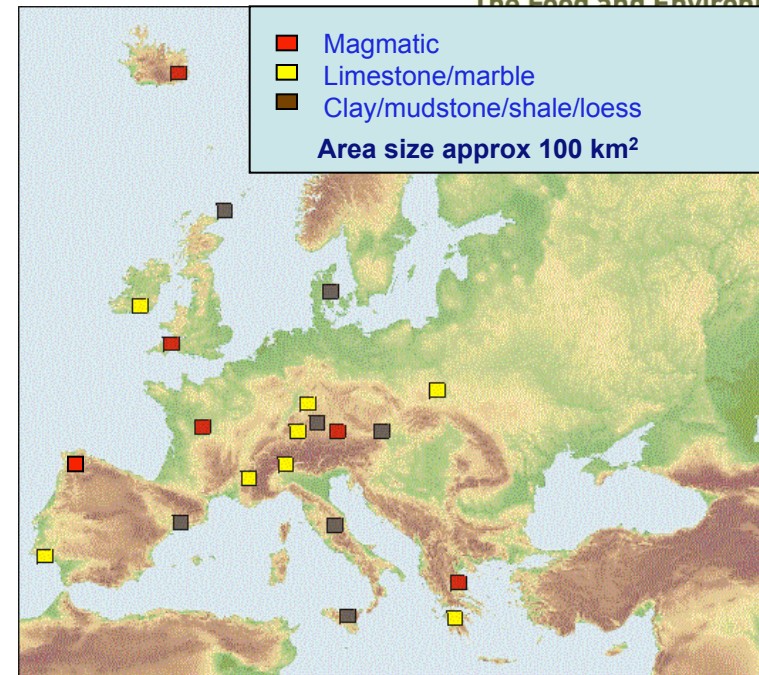
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To investigate the correlation between soil geochemistry & bioclimatic factors and locally produced food and mineral water.

WPL Andreas Rossmann (Isolab, DE)

WPL Jurian Hoogewerff (Univ. East Anglia)

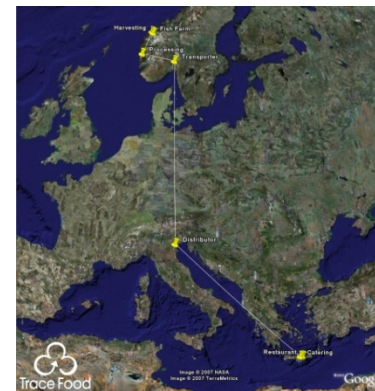
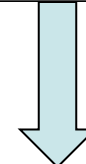
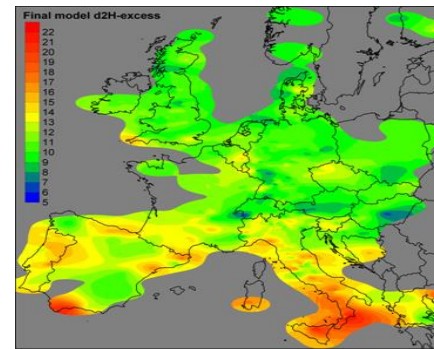
WPL Grishja van der Veer (Geochem, NL)



Food Origin Mapping: rationale

- Can components in a food and its environment be linked?
- If so can we predict the levels of certain components in a food of declared provenance ?
- Can the predicted levels (specifications) be used as an objective means of verifying geographical origin ?

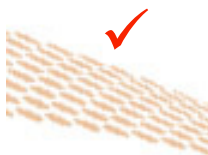
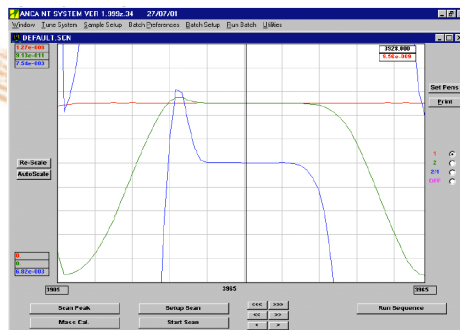
TRACE:Food mapping rationale



$X = \pm ?$
 $Y = \pm ?$
 $Z = \pm ?$



Check when necessary



Integrated traceability system



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Specifications relating to origin included in traceability system

Eventually could be generated independently from website

Specification can be checked by any stakeholders in the chain

Parameter	Specification	Result	Ref to method
$\delta^{87}\text{Sr}$	[<-x->]	✓	TRACE
$\delta^{18}\text{O}$	[<-Y->]	✓	TRACE
$\delta^2\text{H}$ excess	[<-z->]	✓	TRACE

New opportunities for analysis

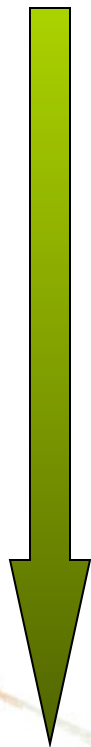
- Previously analytical community has played largely a reactive role to problems
 - “Tell me what the analyte is and I will detect/measure it”
- Advances in technology now allow a more proactive role in identifying problems
 - “I think we may have a problem”
 - “We do have a problem”
 - “We have a completely new problem/analyte”

Food verification methodology



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Increasing
specificity

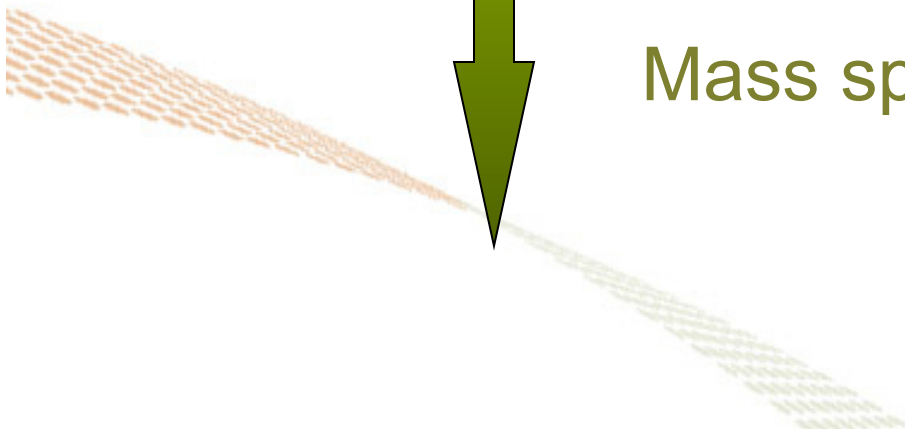


FT-IR spectroscopy

NMR spectroscopy

Mass spectrometry

Increasing
coverage



Generic food verification methods

- Generic methods to verify food integrity



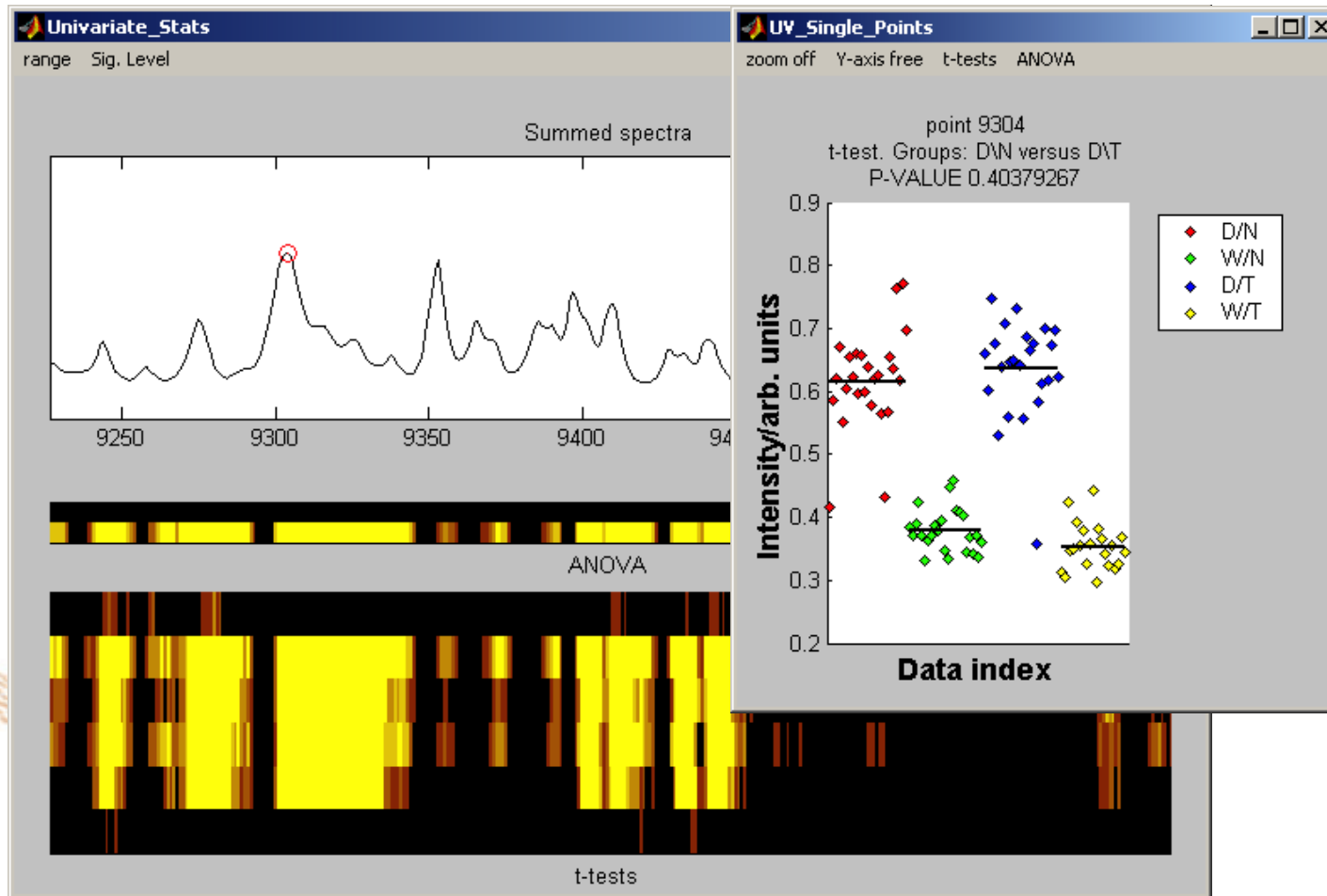
Contains spectral information characterising sample(s)/
batches



Data capture/interpretation



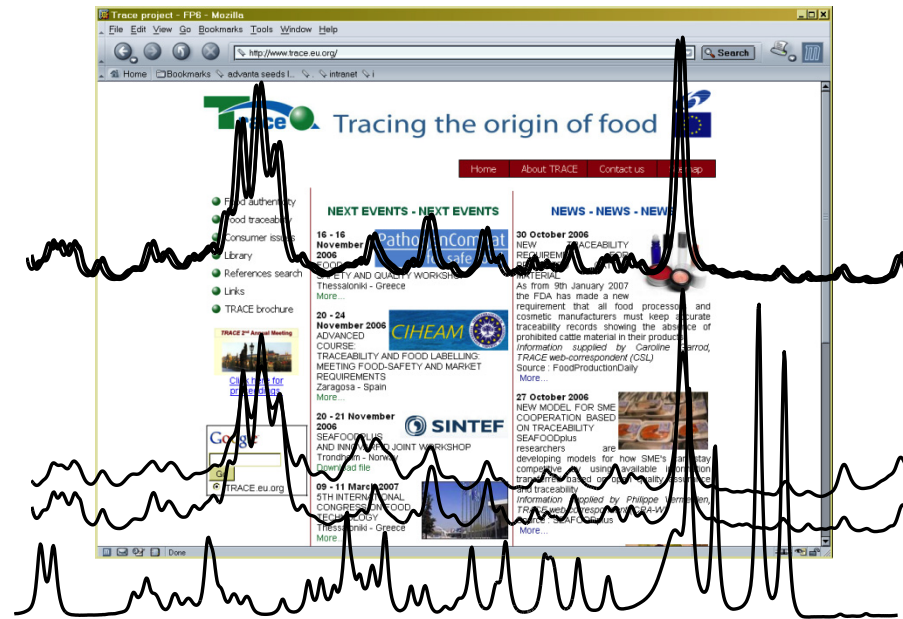
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Food verification systems

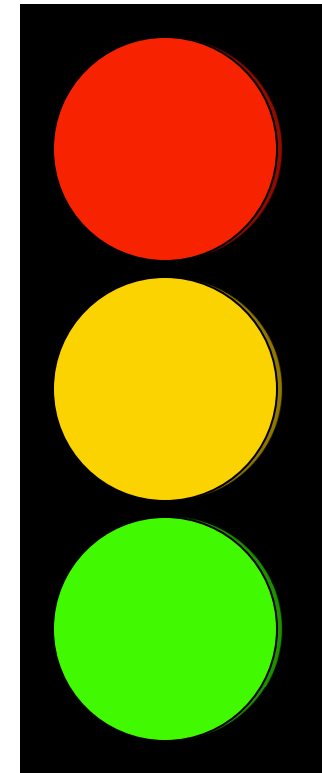


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www.trace.eu.org

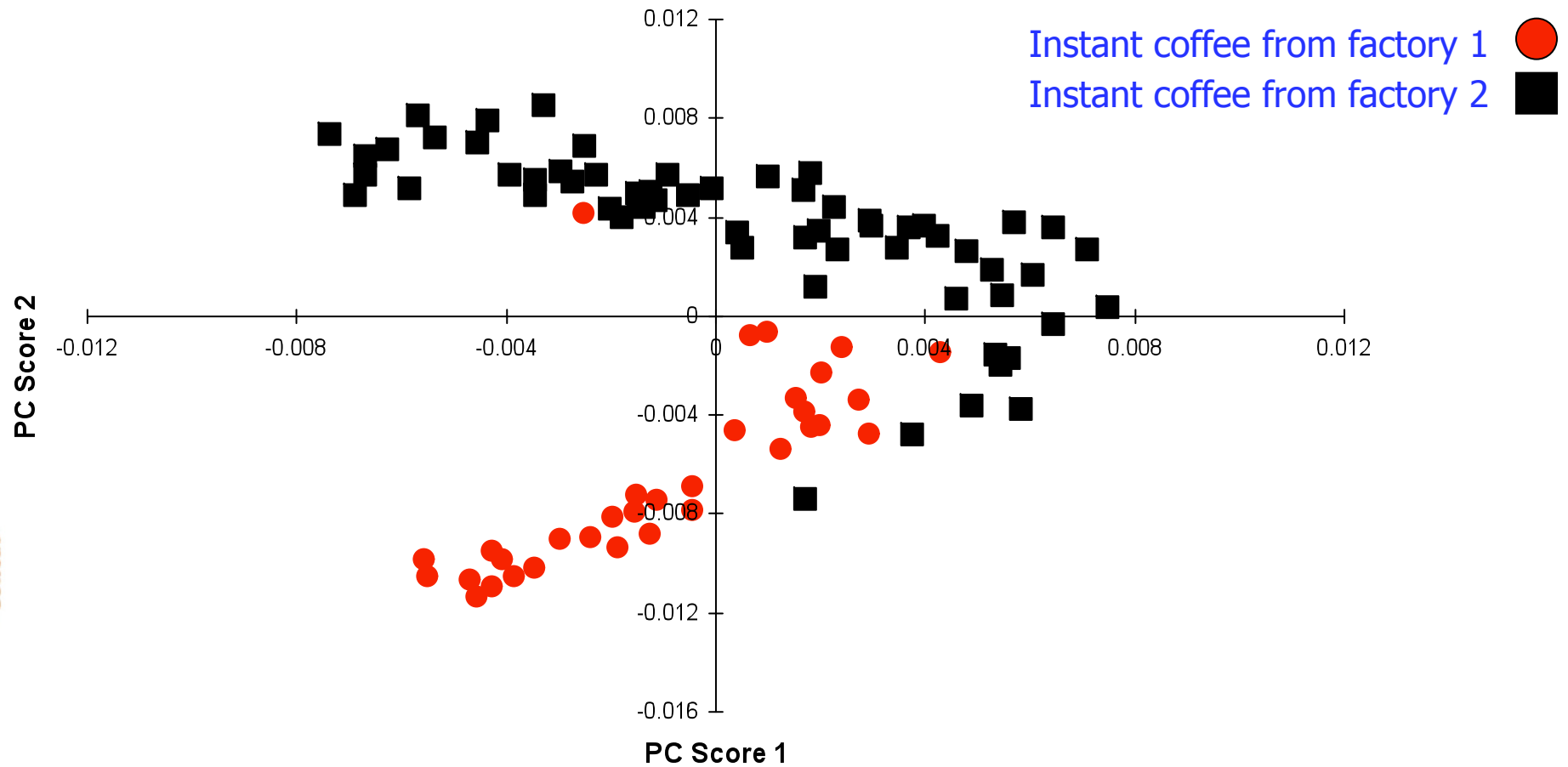
Code specifications
containing specification



Coffee authenticity



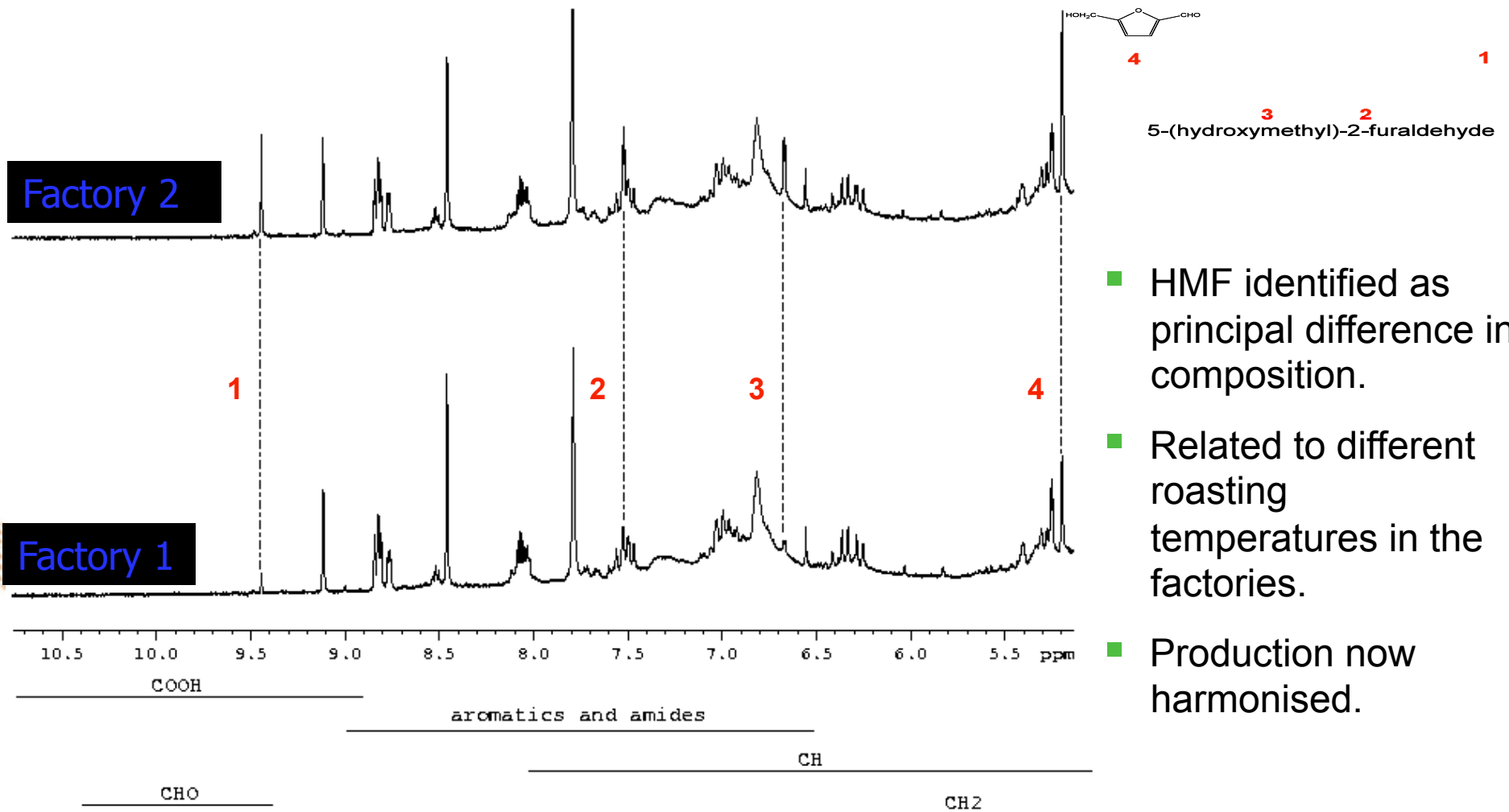
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Coffee authenticity



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- HMF identified as principal difference in composition.
- Related to different roasting temperatures in the factories.
- Production now harmonised.

Summary

- Increased use of methods and systems to substantiate “origin”
- Need for improved chain traceability
- (Gradual) move away from targeted to non target methodology e.g. spectroscopic fingerprinting, microarray
- Greater emphasis on traceability systems to verify as well as track and trace

www.trace.eu.org



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[Competitive call for additional contractor](#)



TRACE 4th Annual Meeting
Lost without TRACE
23-25 April 2008
Torremolinos - Spain
[Click here for registration](#)

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WORKSHOP "TRACEFOOD
FRAMEWORK AND TRACECORE
XML"
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MEETING: LOST WITHOUT
TRACE - NEW



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28 January 2008
FOURTH TRACE **Food authenticity and traceability**
NEWSLETTER **NEWSLETTER**
RELEASED
The 4th Food authenticity and traceability newsletter is available now. In the spotlight the announcement of the 4th TRACE annual conference planned on 23 to 25 April 2008 in Spain.
Information supplied by Philippe Vermeulen, TRACE web-correspondent (CRA-W)
Source : TRACE
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24 January 2008
PERSPECTIVE FOR FOOD **Research FOOD 2030**
2030
On 17-18 April 2007 the Directorate-General for Research of the European Commission organised a major Conference on the future research and competitiveness aspects of the European food industry. The overall purpose of the Conference was to anticipate research needs by 2030 and develop coherent actions in view of the diverse and increasingly important changes that the European food industry will have to face.
Information supplied by Philippe Vermeulen, TRACE web-correspondent (CRA-W)
Source : European commission
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Acknowledgements to the consortium....:

