GERMAN FEDERAL INSTITUTE FOR RISK ASSESSMENT

15 YEARS
Science in the Service of Humanity

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Bundesinstitut für Risikobewertung

Global Aspects of Risk Assessment in Food Safety - Future Challenges and how we can meet them

Chapter 1:
Challenged by a rapidly changing world

Reiner Wittkowski

Health Risk Assessment: Ongoing Challenges – Dynamic Reality

- New technologies and new products (novel foods)
- New substances, additives, technical aids (pesticides, veterinary drugs, flavour compounds etc.)
- Novel contaminants/process contaminants (acrylamide, 3-MCPD, furan, glycidol fatty esters etc.)
- Higher standards for animal experiments/alternative methods
- Product piracy and food fraud
- Packaging materials

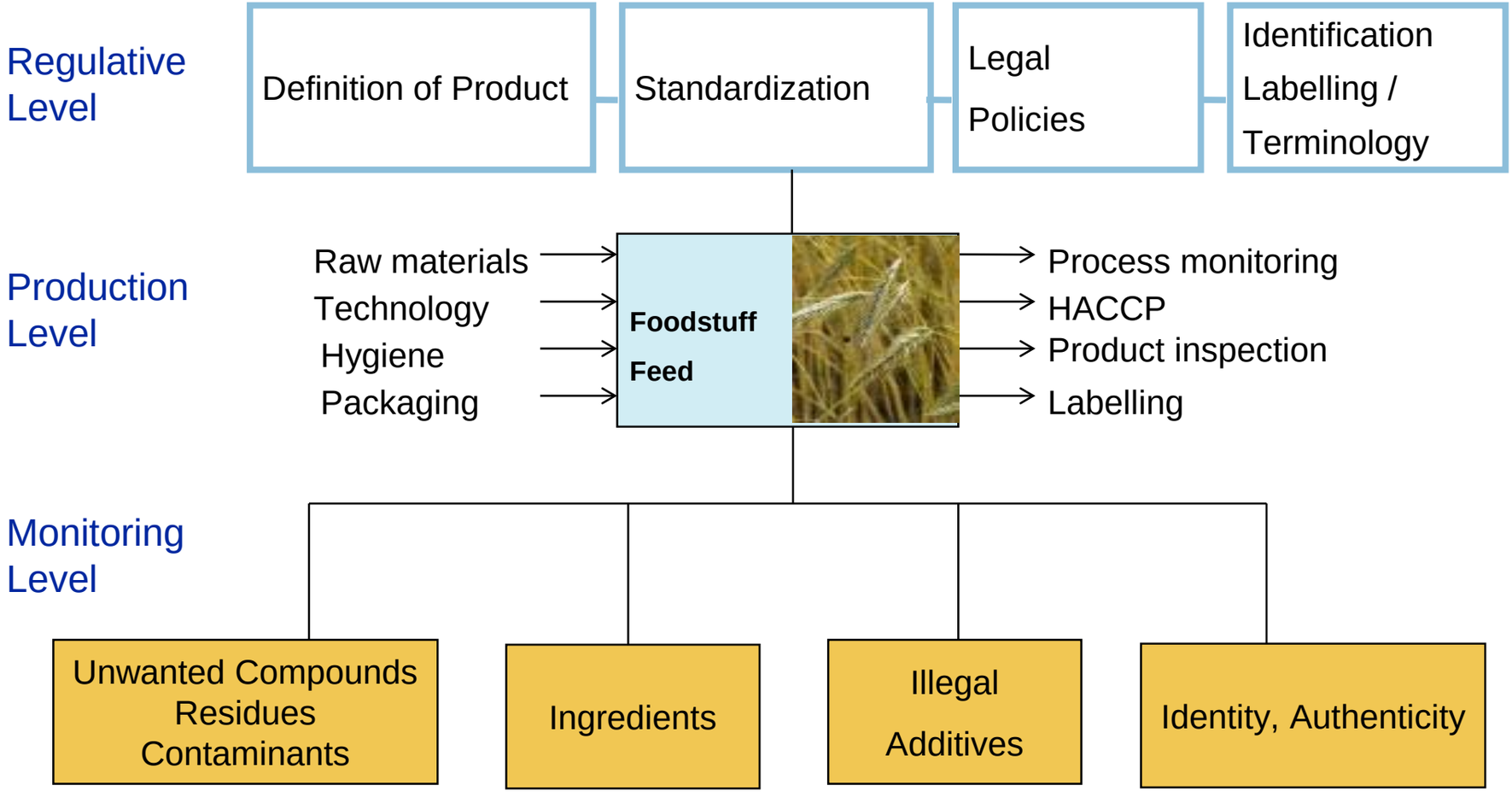
Predictable Trends – Emerging Challenges

- Increasing world population, Demographic trends
- Changes in dietary habits
- Climatic change, global warming
- Globalization in production, trade and consumption
- New energy policies
- Land grabbing

Consequences of Global Trends

- New strategies for agricultural and aquaculture production
- New technologies (nanotechnology, genetic engineering…)
- Problems from recycling processes
- Bioethanol production
- Active packaging
- Import controls
- New feed stuff
- Fighting food fraud and product piracy

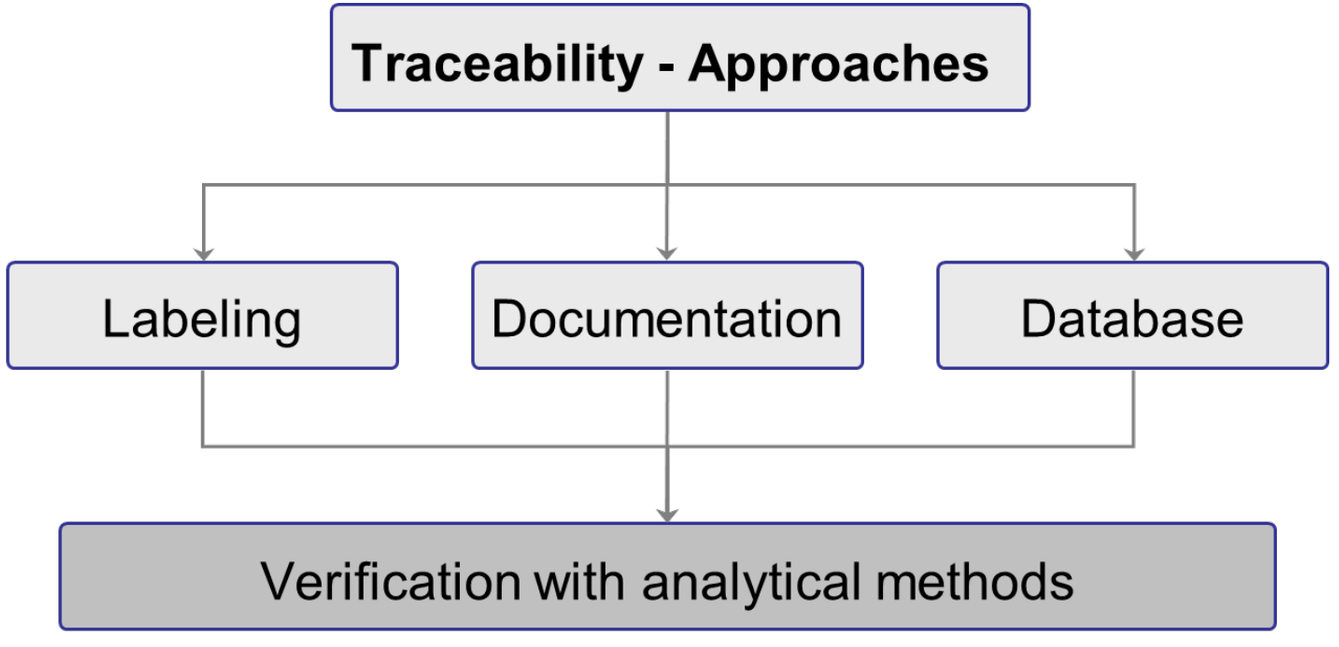
Feed and Food: A Joint Food Chain



Definition: Tracability

Codex Alimentarius: **Traceability / product tracing:**
the **ability** to follow the movement of a food through specified stages of production, processing and distribution.

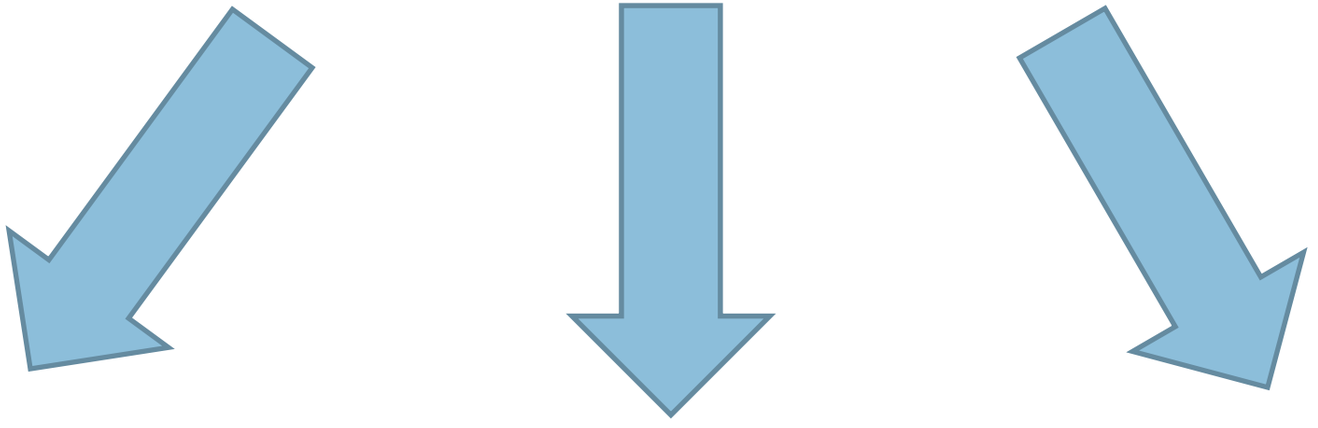
Regulation (EC) No 178/2002 §3 p 15



Traceability systems trace and track food packaging

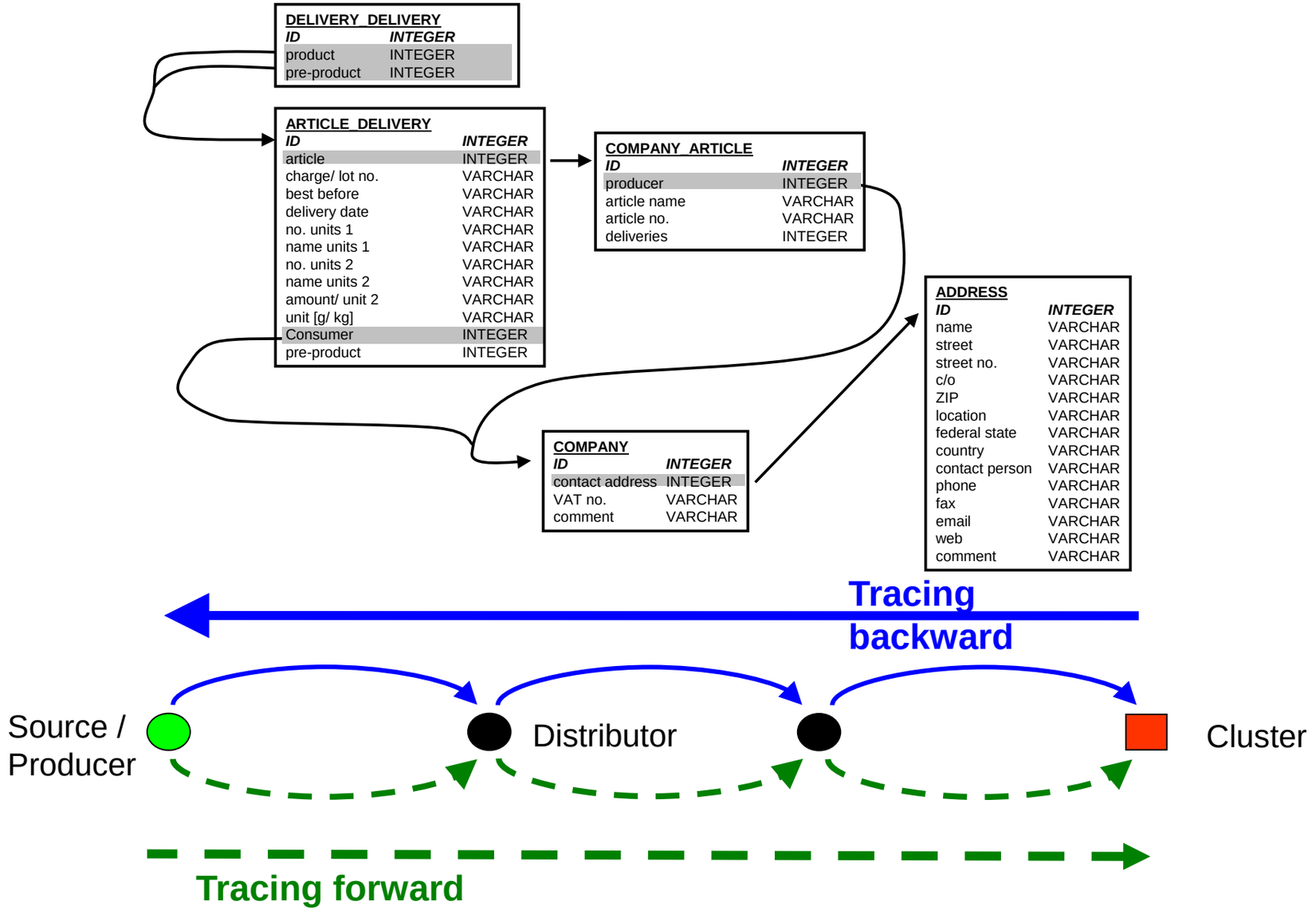
Standards

are influencing



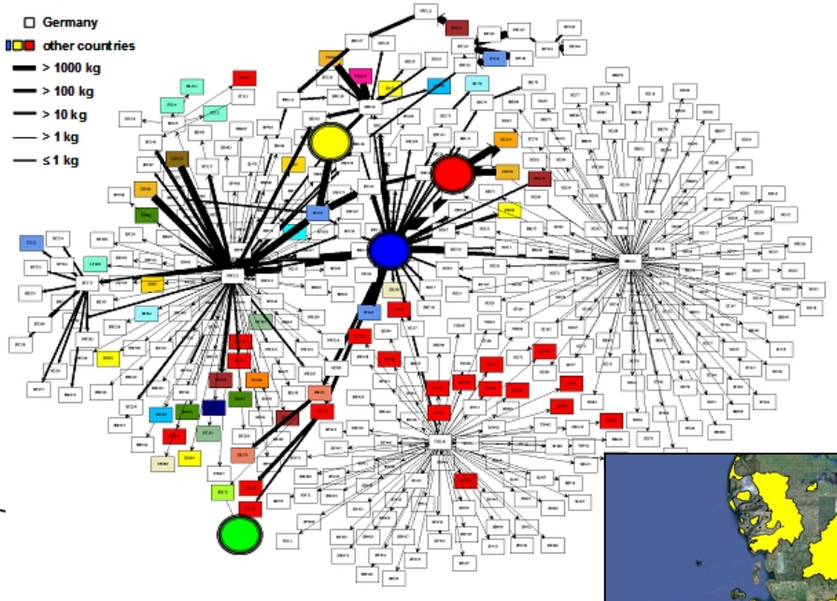
Food Safety/Security Food Fraud Freedom of Choice

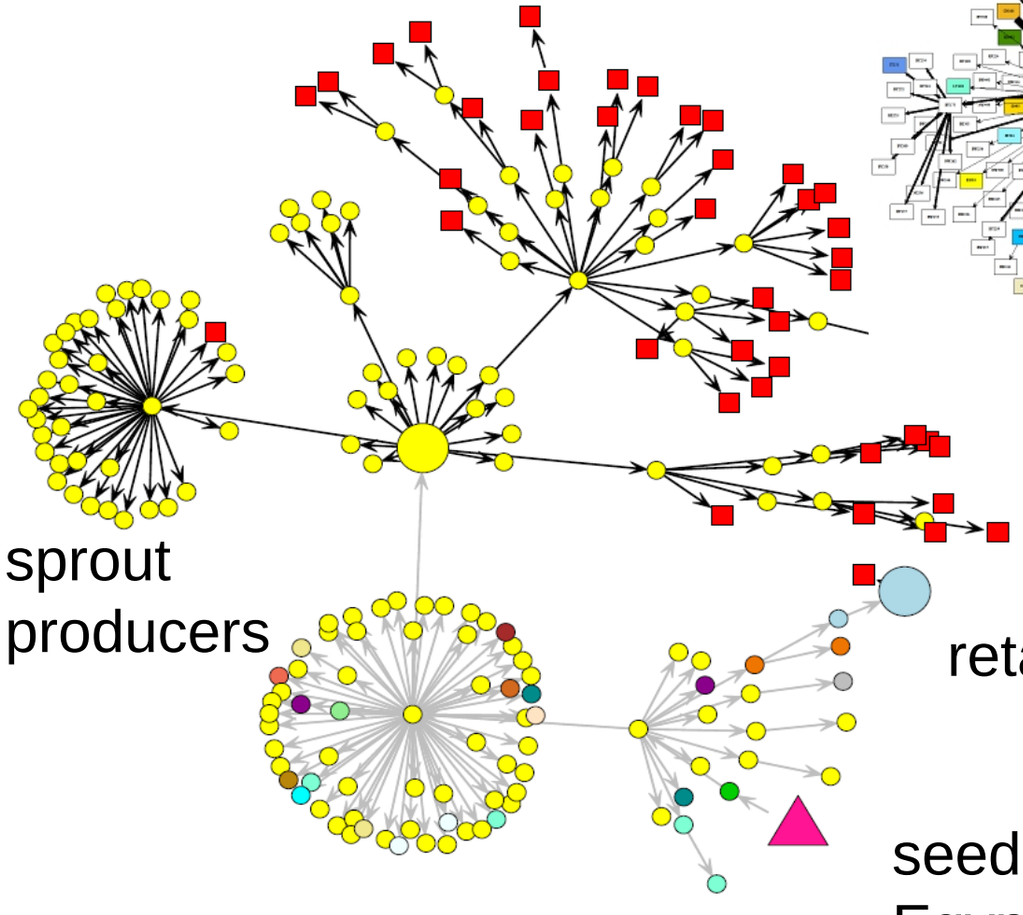
Data Management
DB as a basis for tracing back and forward



FoodChain-Lab – *ad hoc*

disease clusters

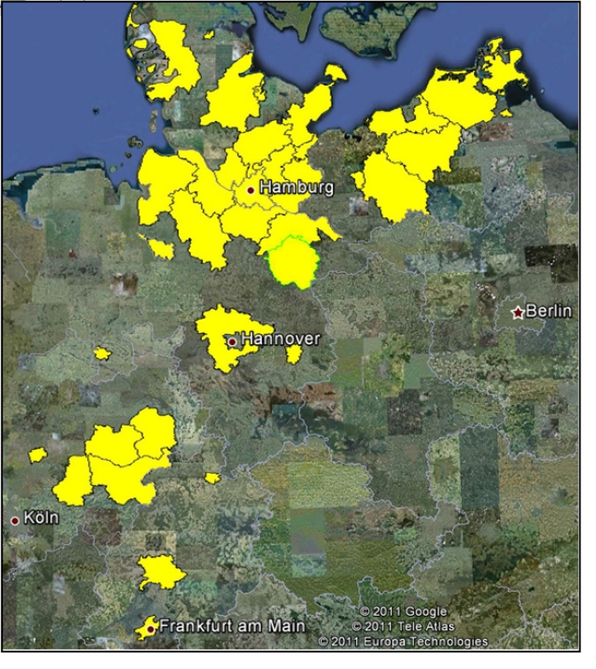




sprout producers

retailer in France

seed producer in Egypt



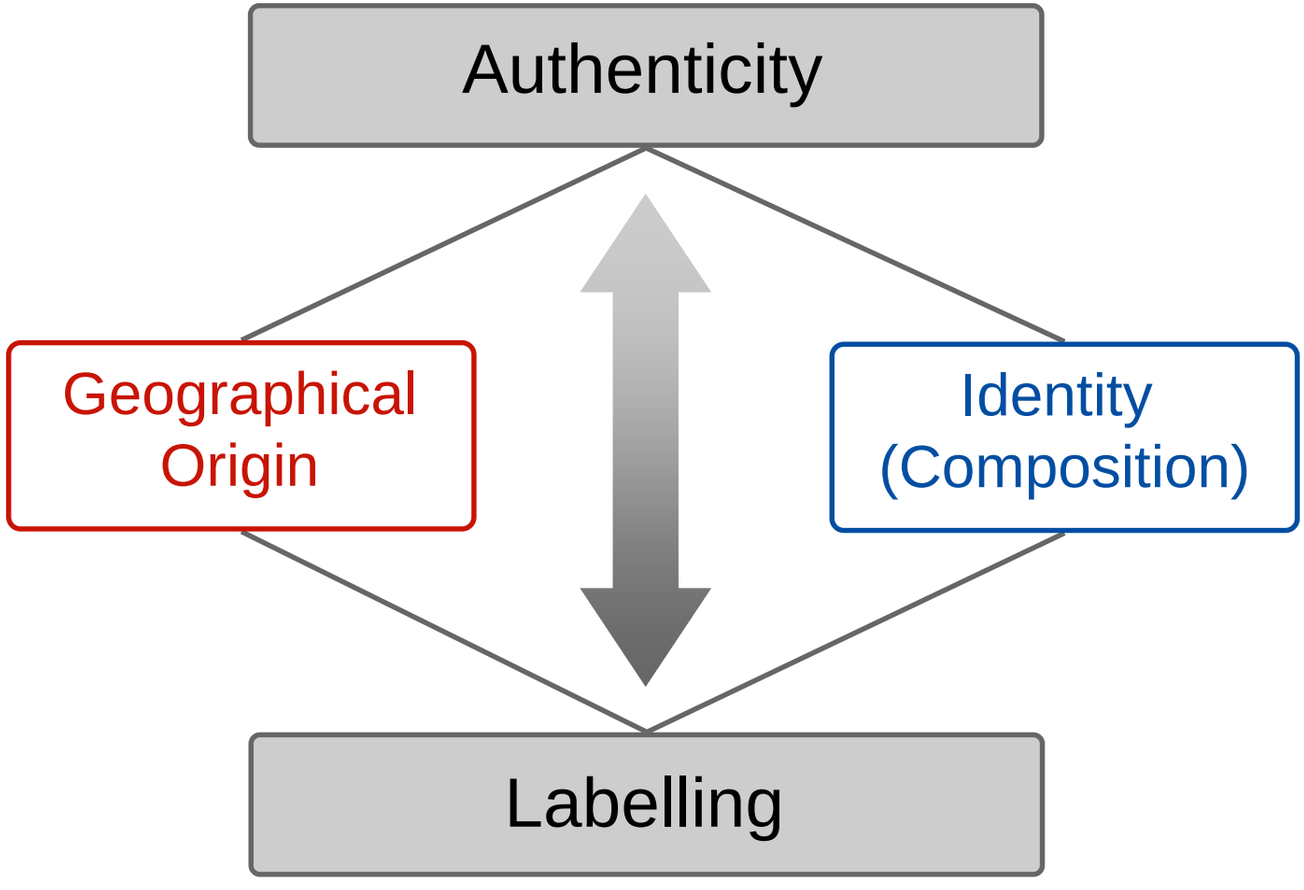
Weiser *et al.*, 2013: "Trace-Back and Trace-Forward Tools Developed Ad Hoc and Used During the STEC O104:H4 Outbreak 2011 in Germany and Generic Concepts for Future Outbreak Situations", Foodborne Pathog Dis. 2013.

Why is traceability necessary?

- Avoidance of food crises
- Fast reactions in cases of food crises
- Protection of regional markets and producers
- Guarantee of fair trade
- Provide confidence in **authenticity** of food

Protection of freedom of choice of the consumers

Authenticity of food



Fingerprinting

Non-targeted analysis

Example: Determination of melamine

- Investigation of different **milk powders** (bought in 2008)
- Analysis using **^{1}H-NMR** (400 MHz)
- Identification of melamine via **exogenous signal** at 5.93 ppm (NH_2 groups)

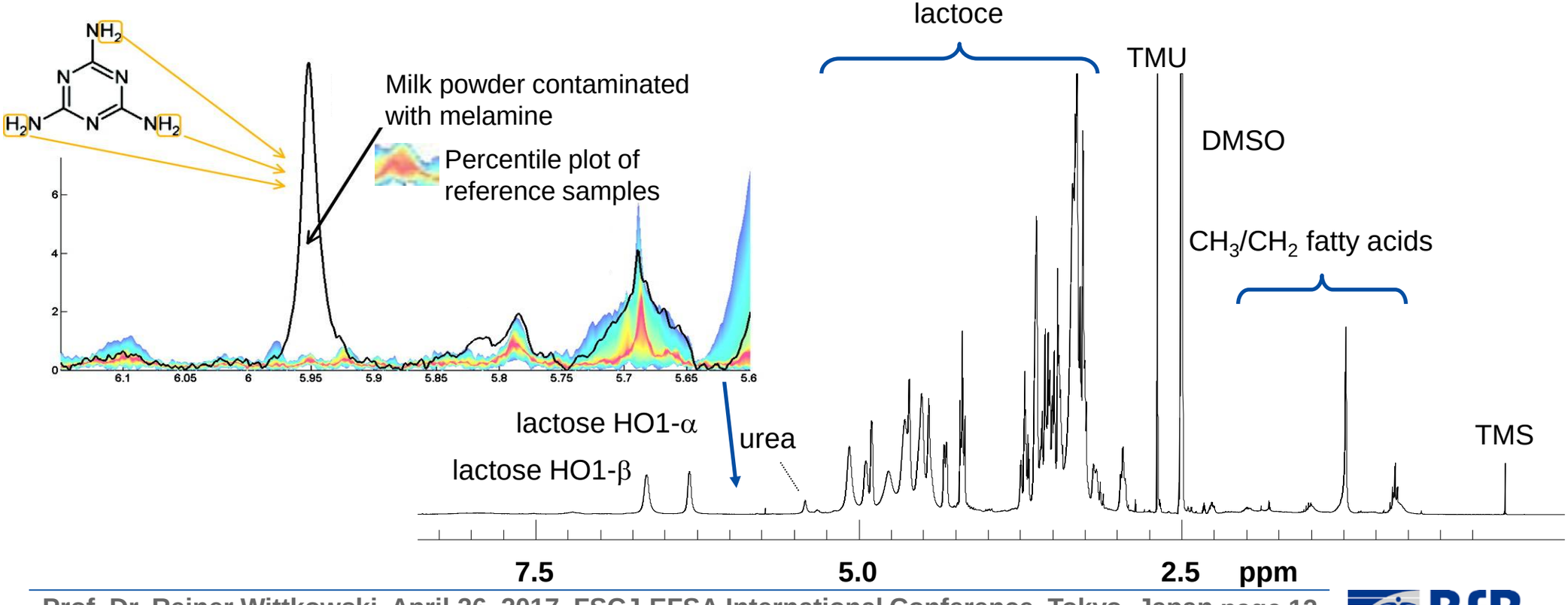
J. Agric. Food Chem. **2009,** *57,* 7194–7199
DOI:10.1021/jf902038j

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY ARTICLE

NMR-Spectroscopy for Nontargeted Screening and Simultaneous Quantification of Health-Relevant Compounds in Foods: The Example of Melamine

DIRK W. LACHENMEIER,*,† EBERHARD HUMPFER,‡ FANG FANG,‡ BIRK SCHÜTZ,‡ PETER DVORTSAK,‡ CONSTANZE SPROLL,† AND MANFRED SPRAUL‡

†Chemisches und Veterinäruntersuchungsamt (CVUA) Karlsruhe, Weissenburger Strasse 3, D-76187 Karlsruhe, Germany, and ‡Bruker BioSpin GmbH, Silberstreifen, D-76287 Rheinstetten, Germany



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Differentiation of species

Molecular-biological methods

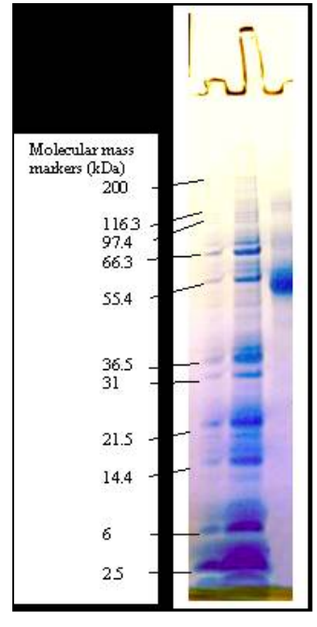
Microarray technology, microsatellite analysis, real-time PCR, proteomics applications, next genome sequencing

Product adulteration in meat products, *e. g.*

- horsemeat
- pork in halal products

Challenges:

- highly processed products (oil, wine, meat-and-bone meal)
- targeted



Benefits of traceability for the **food industry**

- Meet legislation and commercial requirements
- Labour and cost reduction, rationalization, better control
- Satisfy needs of buyers and consumers
- Competitive advantage

Benefits of traceability for the **authorities**

- Effective control
- More targeted recalls

Benefits of traceability for the **consumer**

- Food safety
- More informed choice when buying
- More targeted recalls
- Access to all food properties
- Trust

Risk Assessment: What is needed for the future?

- New analytical strategies and science-based approach
- Global harmonization of standards, methods, data interpretation
- Harmonization of risk assessment procedures
  - assessment criteria, uniform terminology
- Joint international risk assessments
- International capacity building
- Risk communication

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Thank you for your attention

Reiner Wittkowski

German Federal Institute for Risk Assessment

Max-Dohrn-Str. 8-10 ● 10589 Berlin, GERMANY

Phone +49 30 - 184 12 - 3361 ● Fax +49 30 - 184 12 - 47 41

reiner.wittkowski@bfr.bund.de ● www.bfr.bund.de/en