WP3
Implementation of innovations in food authenticity

Prof Saskia van Ruth

Wageningen University & Research

Dr Teresa Müller

German Federal Institute for Risk Assessment (BfR)

saskia.vanruth@wur.nl

EU-China Safe H2020 project

Developed from: need to build the core components of an EU-China food control system

Integrates five key elements (FAO, WHO):

1. Food control management
2. Food legislation
3. Food inspection
4. Food control laboratories
5. Food safety & quality information, education & communication

EU-China Safe strategic objective

Develop & implement shared vision of best practice within EU & China to build harmonised EU-China food control system

Collaborate & exchange knowledge to:

- Achieve mutual recognition (data & standards)
- Restore consumer trust
- Enhance food safety
- **Prevent food fraud**

EU-China Safe specific objective (WP3)

To develop, in collaboration, new/improved food authenticity surveillance systems

Transfer of food fraud methodology (EU $\leftrightarrow$ China)

Two main tasks:

- **T3.1:** Transfer & implementation of fraud detection methods
  - Innovative targeted & non-targeted (screening) techniques

- **T3.2:** Fraud vulnerability assessment in selected food chain

T3.1 Five key product groups

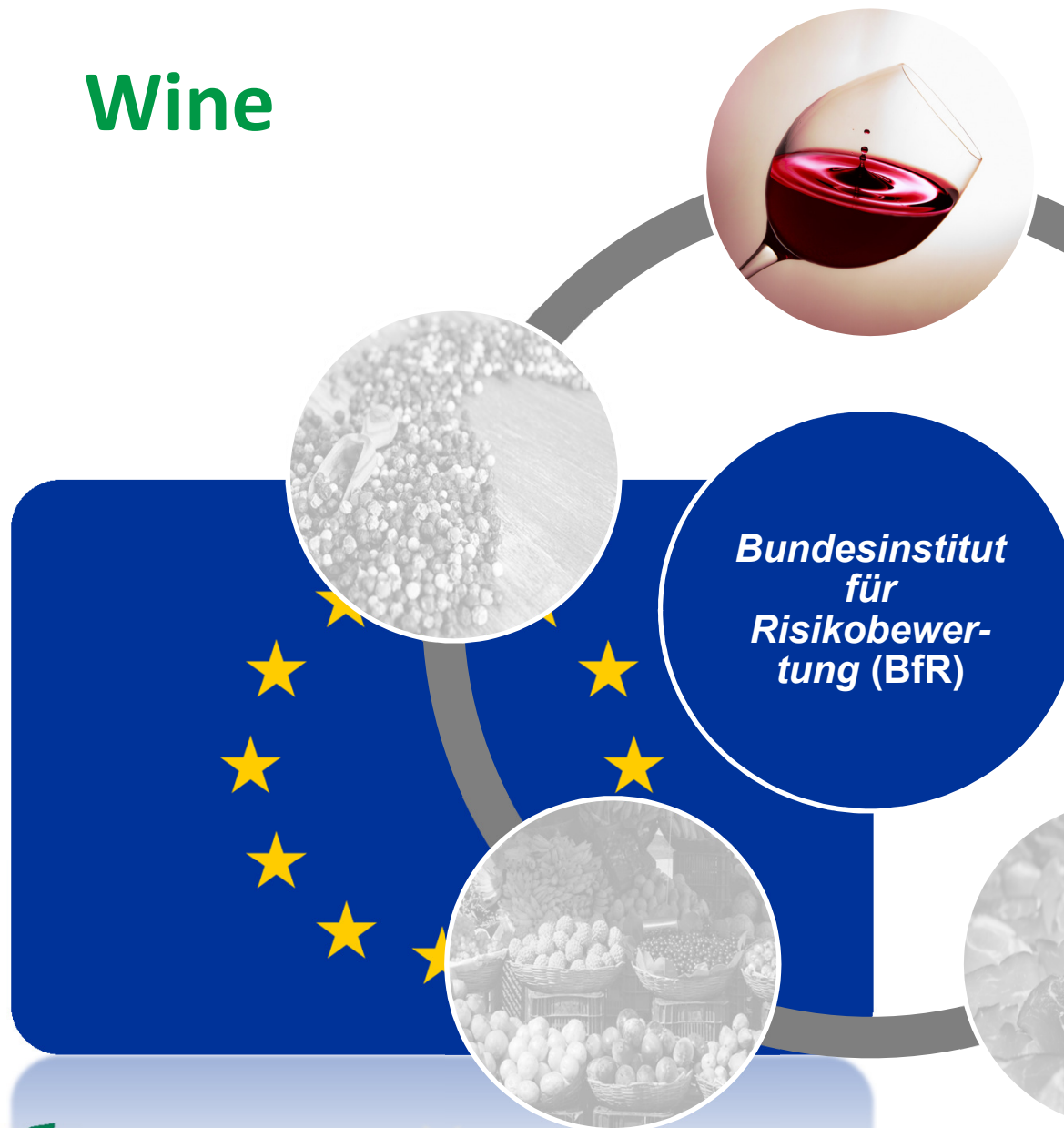Susceptible to fraud & of importance in EU & China

- T3.1.1 Wine (BfR, EU)

- T3.1.2 Dairy infant formula (ZJTH, China)

- T3.1.3 Processed meats (CMRC, China)

- T3.1.4 Organic fruits & vegetables (VSCHT, EU)

- T3.1.5 Spices (WUR, EU)

Five key products

WP3 Food Authenticity

- Wine
- Dairy infant formula
- Processed meats
- Organic fruits & vegetables
- Spices

Wine

Bundesinstitut für Risikobewertung (BfR)

Partners involved:

National Research Institute of Food & Fermentation Industries (CNRIFFI)
China

Ningbo Entry & Exit Inspection & Quarantine Bureau (NCIQ)
China

Joint Research Centre - European Commission (JRC)
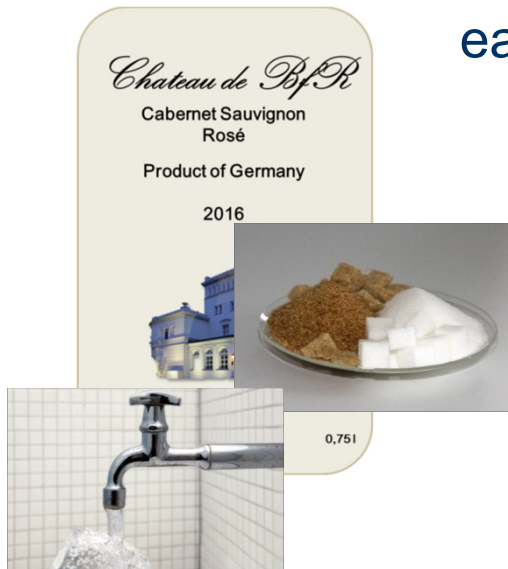**Belgium, EU**

The Hong Kong Polytechnic University (PolyU) (for Fingerprinting)
China

Wine as a food fraud target

Wine is easy to adulterate

- aqueous/alcoholic liquid
  → good solvent for various additives/dyes
  easy to dilute, transfer or blend

Wine is a valuable product

- Besides sensory qualities
  origin, vintage & grape variety
  determine the price
  → fake labels claim higher quality

Chateau de BfR
Cabernet Sauvignon
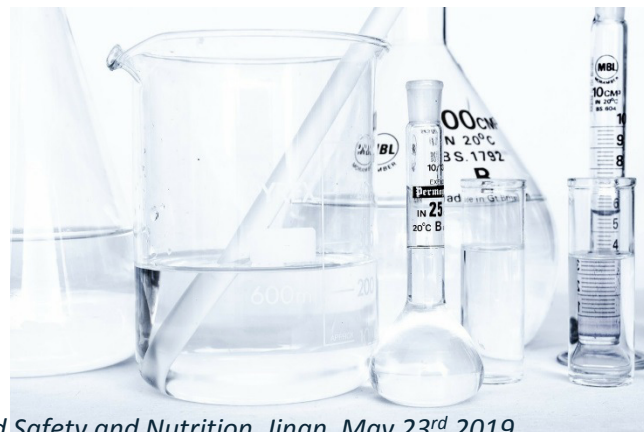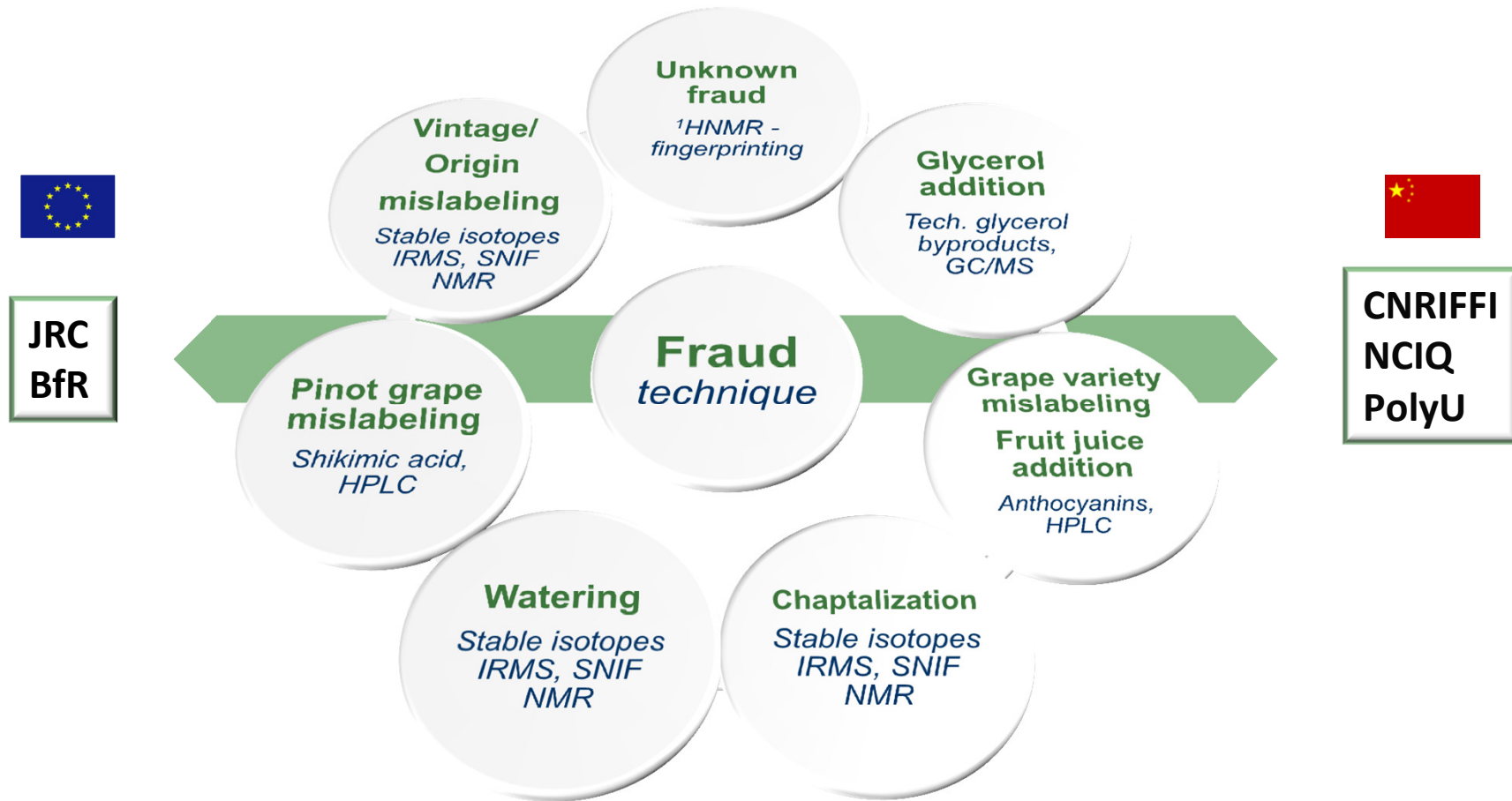Rosé

Product of Germany

2016

0,75 l

Wine authentication analysis

Seven methods for wine authenticity analyses to be implemented at the Chinese partners' facilities

- Six are official OIV methods
- Seventh is an NMR-based fingerprinting approach (Godelmann et al. 2015, Wine Screener® protocol)

Wine authentication analysis – Method transfer

Fraud technique

Unknown fraud
^{1}HNMR - fingerprinting

Vintage/Origin mislabeling
Stable isotopes IRMS, SNIF NMR

Glycerol addition
Tech. glycerol byproducts, GC/MS

Pinot grape mislabeling
Shikimic acid, HPLC

Grape variety mislabeling
Fruit juice addition
Anthocyanins, HPLC

Watering
Stable isotopes IRMS, SNIF NMR

Chaptalization
Stable isotopes IRMS, SNIF NMR

JRC BfR

CNRIFFI NCIQ PolyU

Dairy infant formula

Yangtze Delta Region Institute of Tsinghua University Zhejiang (ZJTH)

Partners involved:

The Queen's University of Belfast (QUB)
UK, EU

China National Centre for Food Safety Risk Assessment (CFSA)
China

U.S. Pharmacopoeia (China office) (USP)
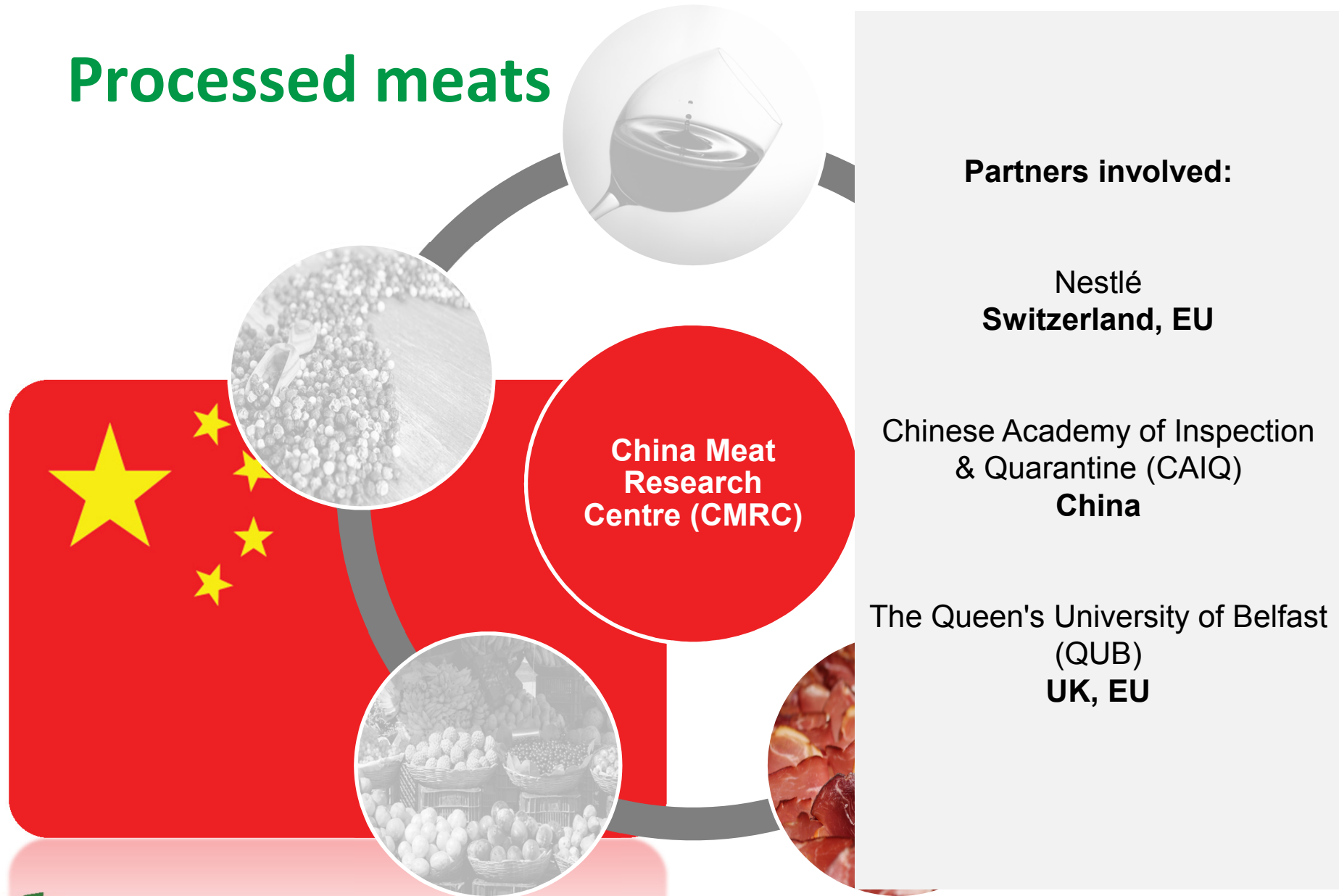**China**

Nestlé & Danone
China

Dairy infant formula

Methodology for fraud detection to focus on detection of cheap protein additions & the transfer of methodology developed at ZJTH to EU
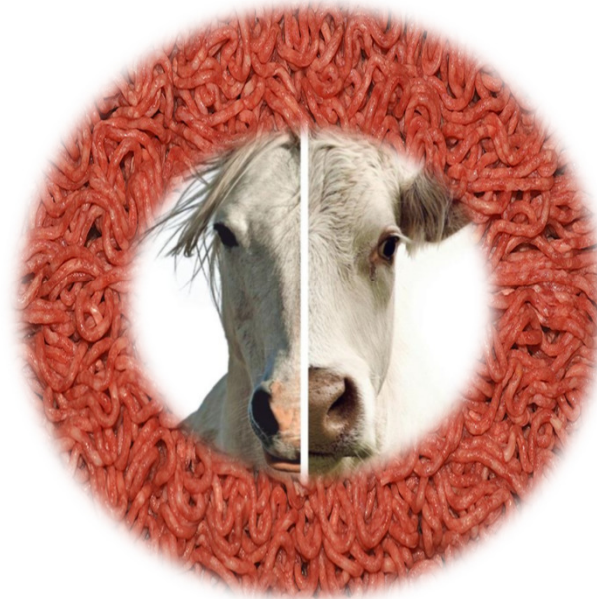
Processed meats

China Meat Research Centre (CMRC)

Partners involved:

Nestlé
Switzerland, EU

Chinese Academy of Inspection & Quarantine (CAIQ)
China

The Queen's University of Belfast (QUB)
UK, EU

Processed meats

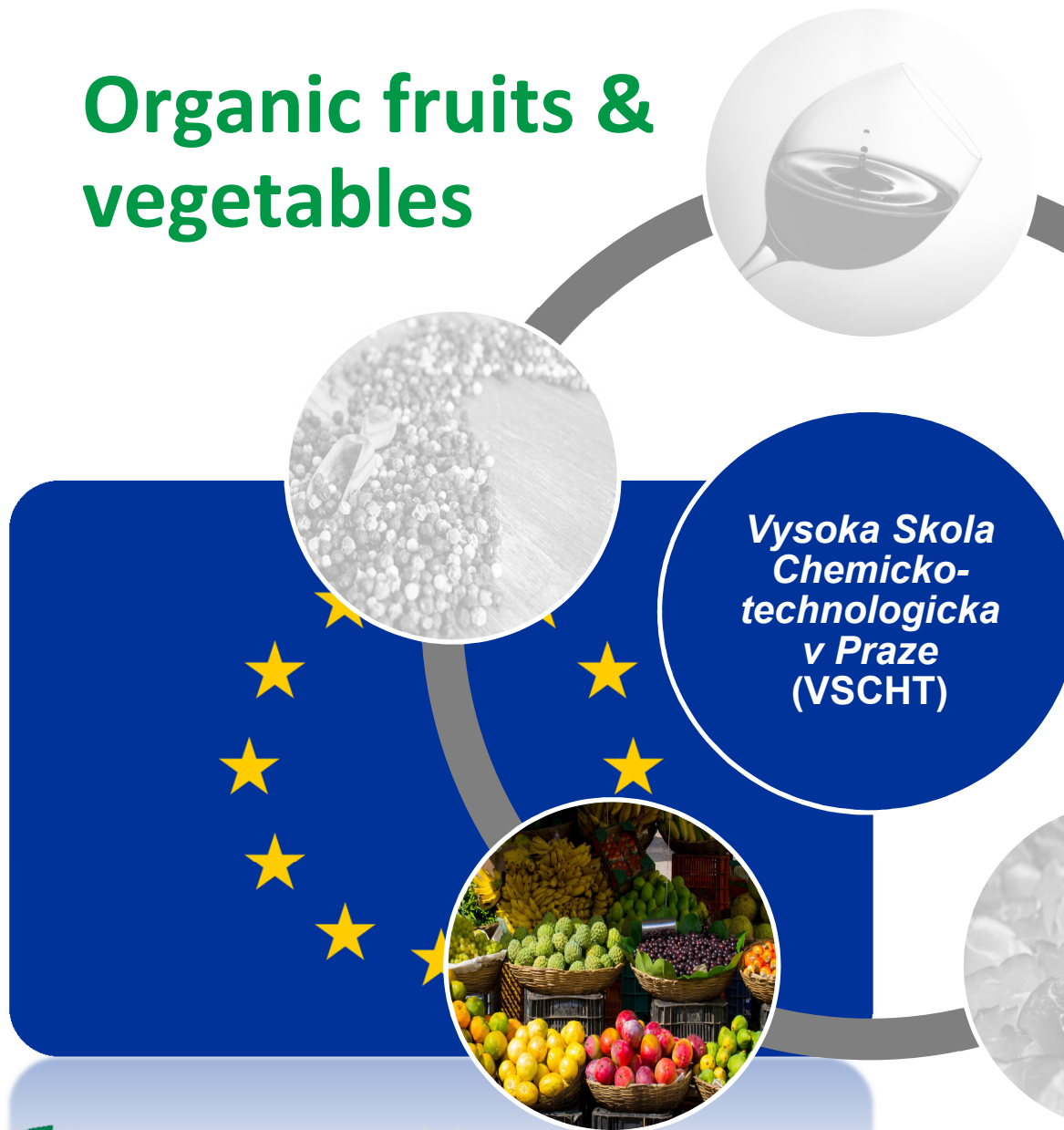Water-retaining additives test method using LC-MS/MS

- China to EU

Spectroscopic screening method using portable NIR

- Adulteration of processed meat products (beef & pork)
- China to EU

Organic fruits & vegetables

Vysoka Skola Chemicko-technologicka v Praze (VSCHT)
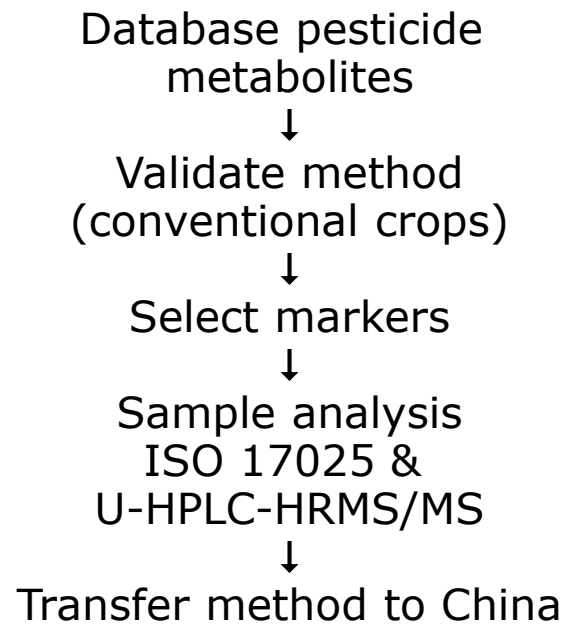
Partners involved:

Chinese Academy of Inspection & Quarantine (CAIQ)
China

Organic fruits & vegetables

Determine presence of pesticide metabolites

- Ultra-high performance chromatography coupled with tandem high resolution mass spectrometry

Database pesticide
metabolites
↓
Validate method
(conventional crops)
↓
Select markers
↓
Sample analysis
ISO 17025 &
U-HPLC-HRMS/MS
↓
Transfer method to China

Spices

Partners involved:

The Queen's University of Belfast
(QUB)
UK, EU

Beijing Centre for Disease
Control & Prevention (BJCDC)
China

Nestlé
Switzerland, EU

Wageningen University (WU)

Spices

First part entails transfer of successful methodology for broad anomaly detection (developed in EU SPICED), from WU to China (BJCDC) for various spices plus the further extension of local databases

Second part involves portable spectral applications for the screening of suspect/fraudulent samples

- Portable/handheld light spectroscopy devices are the focus for on-site screening applications

www.euchinasafe.eu