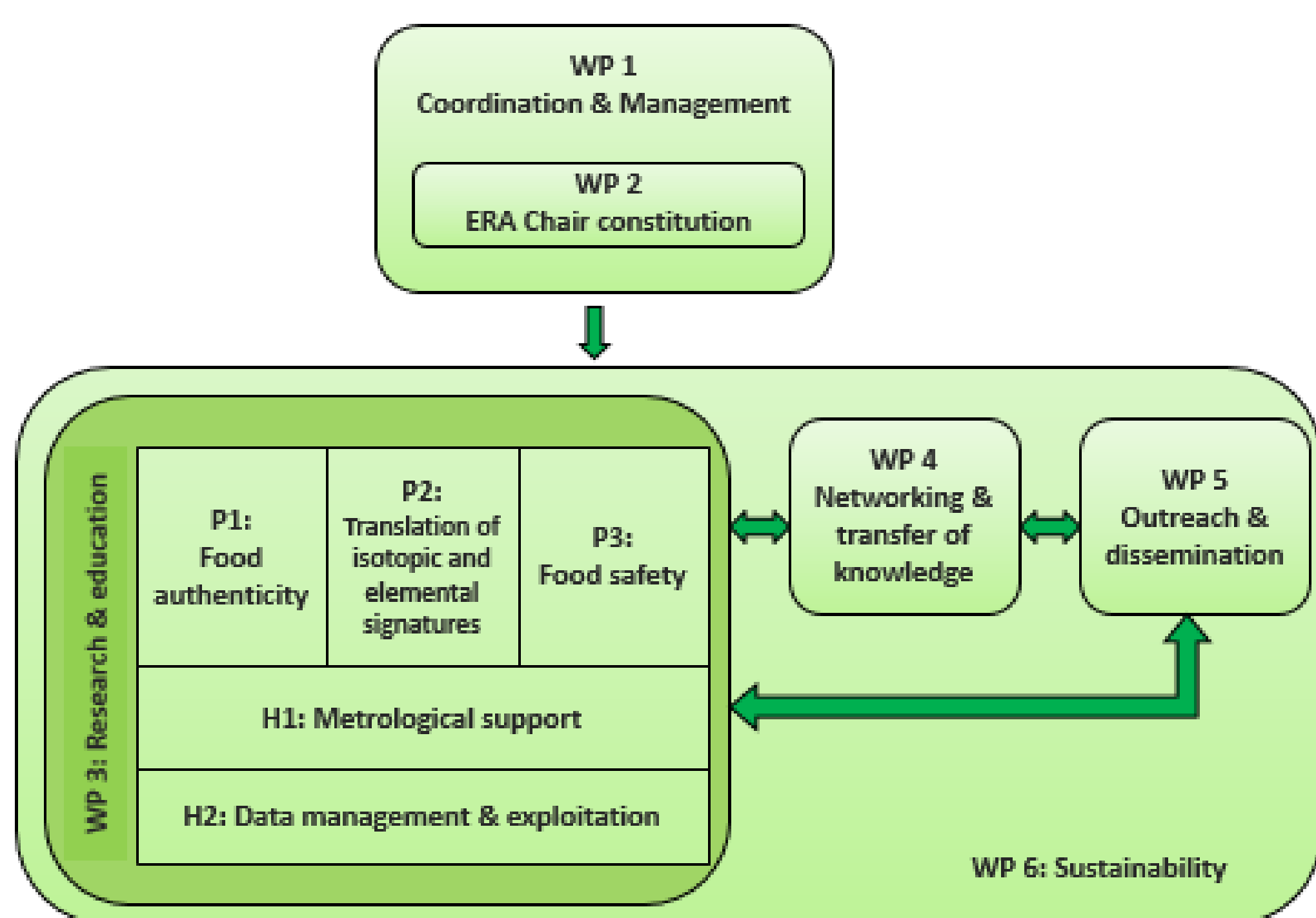


# ERA Chair "ISO-FOOD"

## Isotope techniques in food quality, safety, security and traceability

*Nives Ogrinc, Sonja Lojen, Milena Horvat, Ljudmila Benedik, Radojko Jačimović, Barbara Koroušič Seljak, Tina Kosjek, Radmila Milačič, Saša Novak, Maja Remškar, Janez Ščančar, Polona Vreča and David Heath*

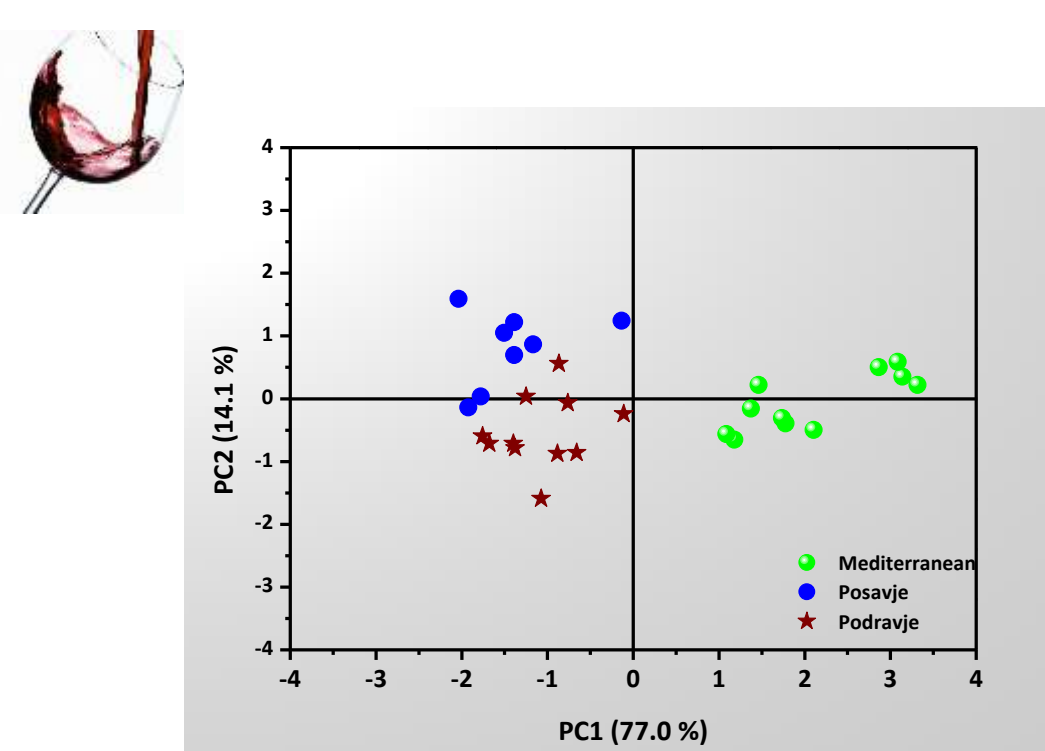
The **ISO-FOOD ERA Chair** is an independent body within the Jožef Stefan Institute formed from a collaborative effort built around the capacities of four departments. Our aim is to carry out research and education specialising in isotopic and elemental 'fingerprinting' for traceability and authenticity and advanced analytical methods for the detection of adulterants and contaminants in food, fodder and forage including inorganic contaminants and speciation, organic residues, emerging pollutants and nanoparticles.



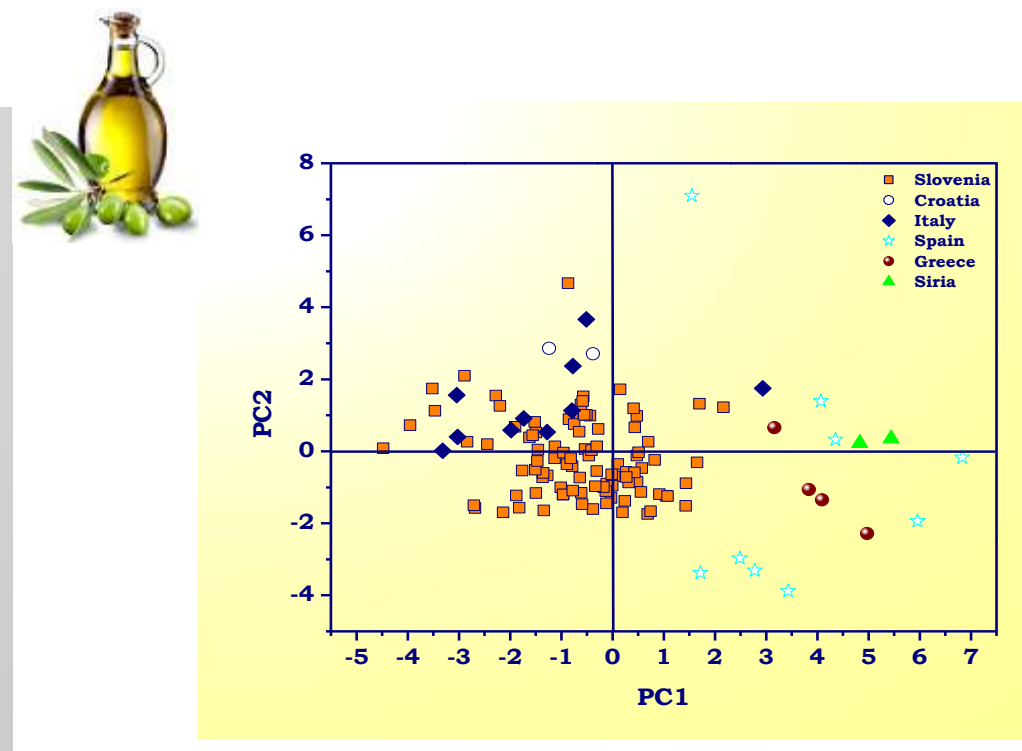
### Thematic research topics

(3 PhD theses and 6 postdoctoral projects):

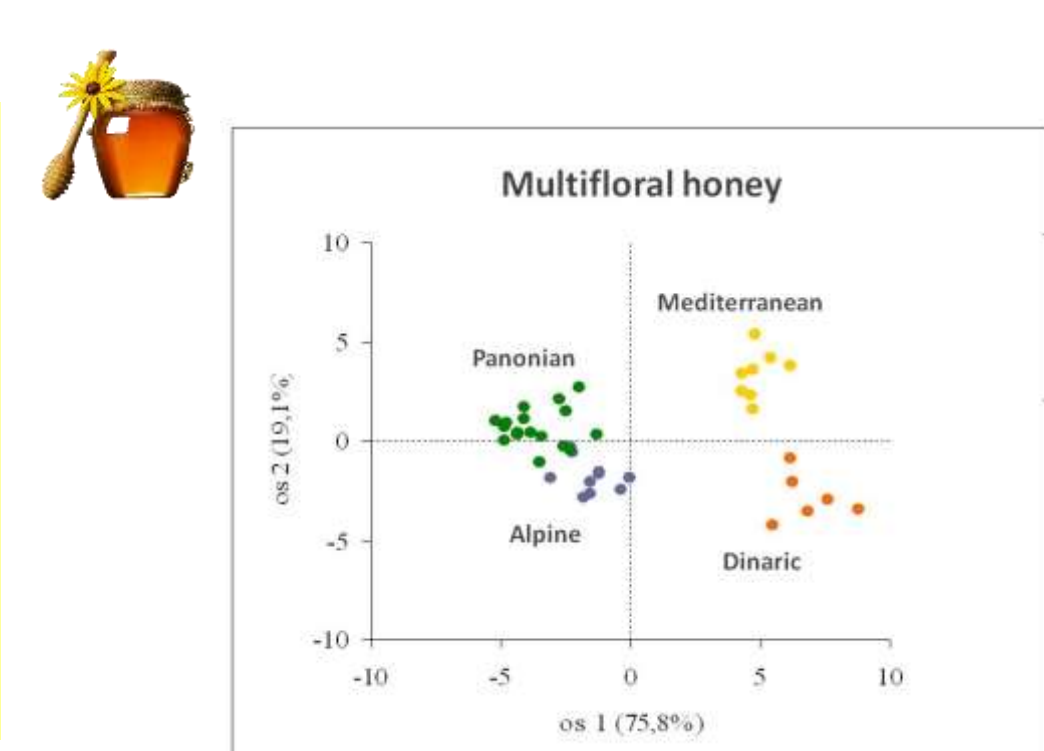
- Element concentration and speciation analysis in food and feed (Hg, Cr, Se, I, Al, As, Zn, Ni)
- Compound specific IRMS (lipid biomarkers, PAHs, hormones)
- Radionuclides ( $^{235}\text{U}$ ,  $^{234}\text{U}$ ,  $^{238}\text{U}$ ,  $^{228}\text{Th}$ ,  $^{230}\text{Th}$ ,  $^{232}\text{Th}$ ,  $^{226}\text{Ra}$ ,  $^{210}\text{Po}$ ,  $^{210}\text{Pb}$ ,  $^{40}\text{K}$ )
- Organic compounds in foodstuffs
- Nanoparticles ( $\text{TiO}_2$ )
- Food traceability and fingerprinting (light elements (H, C, N, O, S) and trace elements (Hg, Se, & Sr))
- Metrology support: measurement traceability, comparability, uncertainty evaluation
- ISO-FOOD repository for data and knowledge about food and feed composition and region-, species- and practice-specific fingerprints



$\delta^{13}\text{C}$ ,  $\delta^{18}\text{O}$  (D/H)<sub>I</sub> & (D/H)<sub>II</sub> (SNIF-NMR)



EC,  $\delta^{13}\text{C}$  &  $\delta^{15}\text{N}$  (Proteins) and  $\delta^{13}\text{C}$  (Bulk)



$\delta^{18}\text{O}$ ,  $\delta^{13}\text{C}$ ,  $\delta^{13}\text{C}_{16:0}$ ,  $\delta^{13}\text{C}_{18:0}$  - fatty acids

**State-of-the-art equipment:** MC-ICP-MS, GC-C-IRMS, ESI Q-ToF MS, ESI Q-ToF MS/MS, TRIGA Mark II nuclear reactor (NAA), TEM & SEM with EDXS and WDXS, Ultra-high vacuum AFM/STM, SMPS (Scanning Mobility Particle Sizer Spectrometer), DLPI (Dekati® Low Pressure Impactor) etc.

### Summer schools:

1. Radioisotopes in food
2. Authentication of food products by isotope and elemental fingerprinting
3. Element speciation in food analysis
4. Nanoparticles in foodstuffs

### Workshops:

1. Food traceability methodologies
2. Nanoparticles in food
3. Isotopic techniques in food characterisation
4. Metrology in food analyses

### Interlaboratory exercises:

1. Speciation of selected metals in environmental samples
2. Stable isotope analyses of light elements in foodstuffs

