

Research needs for product development

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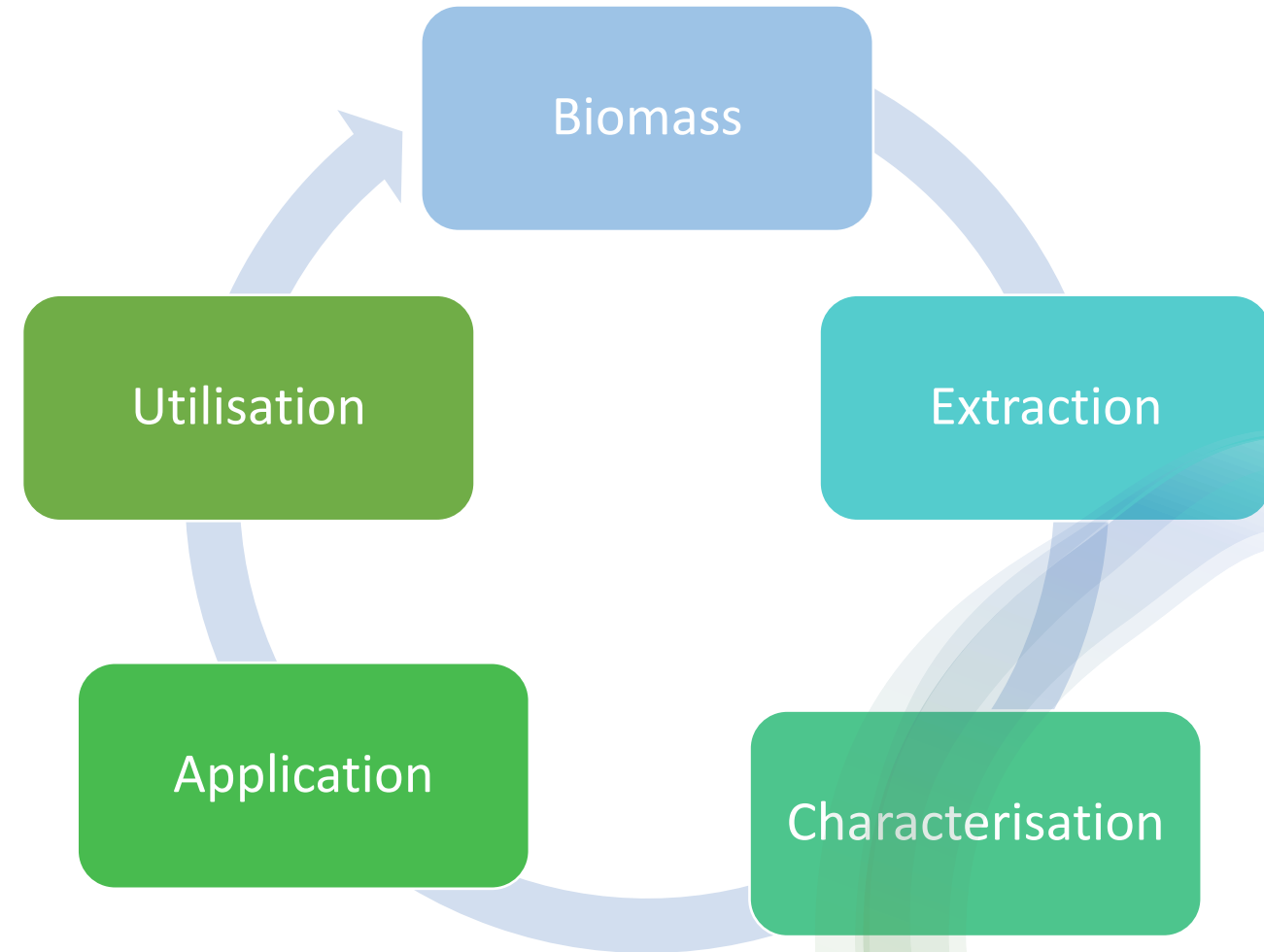
The Natural Resource Research Centre of the University of Latvia



- Research
 - Natural products and resources
 - Hydrochemistry
 - Characterisation of natural products
- Application of phytochemicals and biomaterials
- Research and development activities together with entrepreneurs

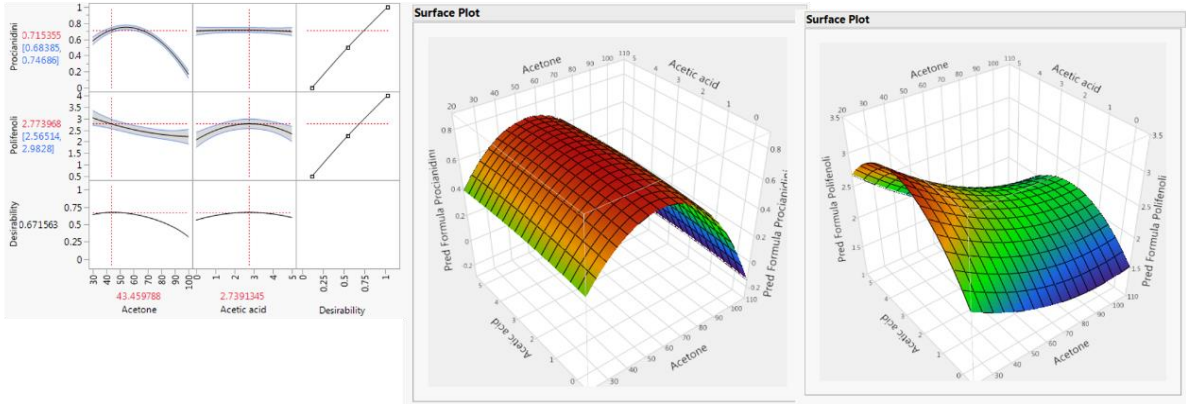
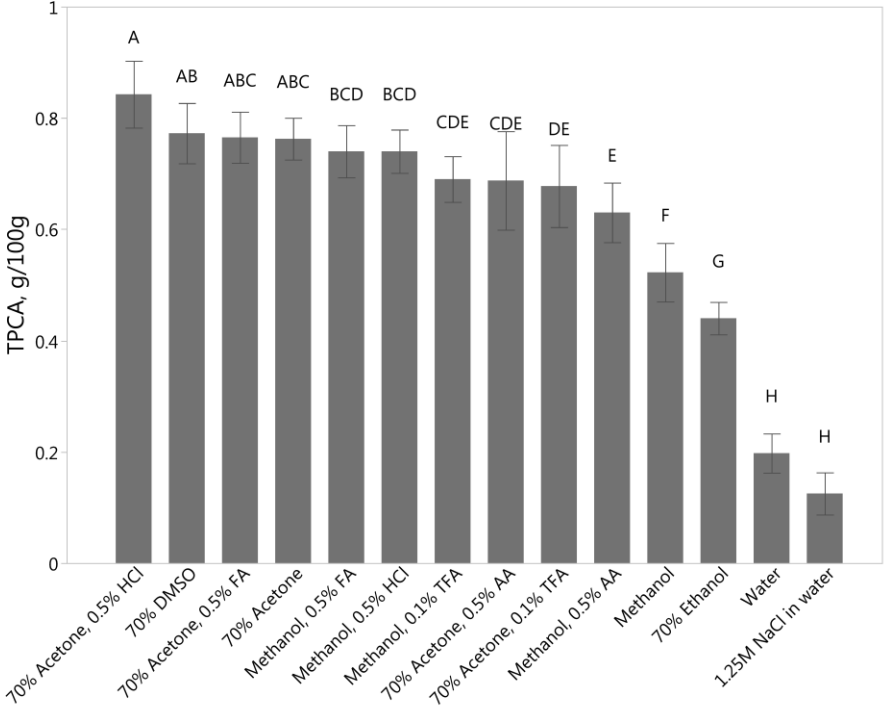
Areas of focus

- **Preparation and storage of biomass**
 - Food waste, by-products
- **Complex extraction of various phytochemicals**
 - Optimisation to improve yield
- **Characterisation of extract composition**
 - Groups of compounds or individual compounds
- **Application of extracts based on their chemical composition**
 - Biological effects or functional properties
- **Utilisation of extracted biomass into compost or biochar**
 - Uses in agronomy, plant growth tests



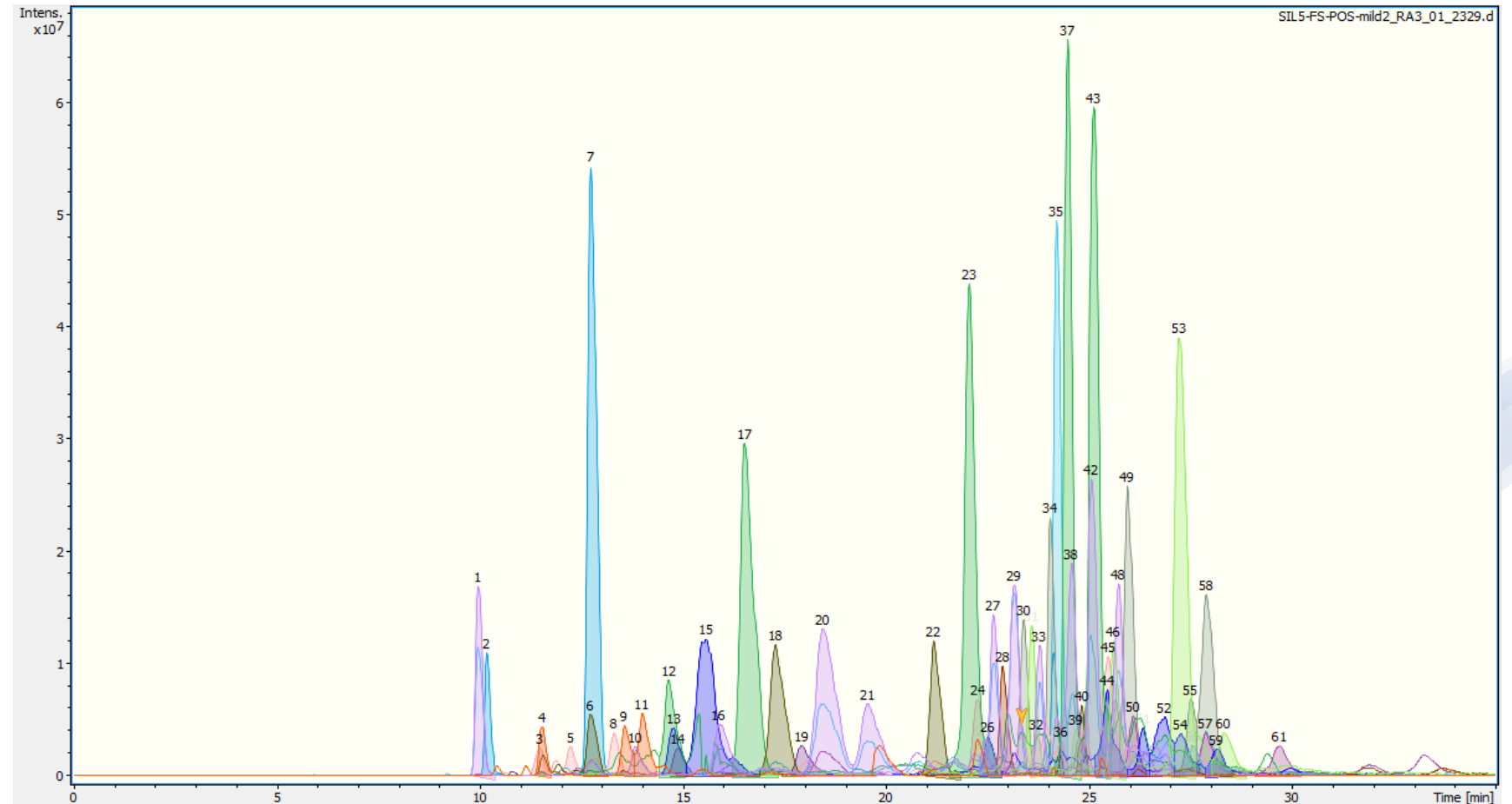
Case study – Extraction of procyanidins (optimisation)

- Obtaining the highest extraction yield
- Use of specific extraction conditions to obtain compounds of interest
- RSM approach is more efficient
 - Less experimental runs



Case study – Extraction of procyanidins (characterisation)

- FT-ICR-HRMS identification
- 61 different cranberry procyanidins were identified
- The higher the degree of polymerisation the less radical scavenging activity

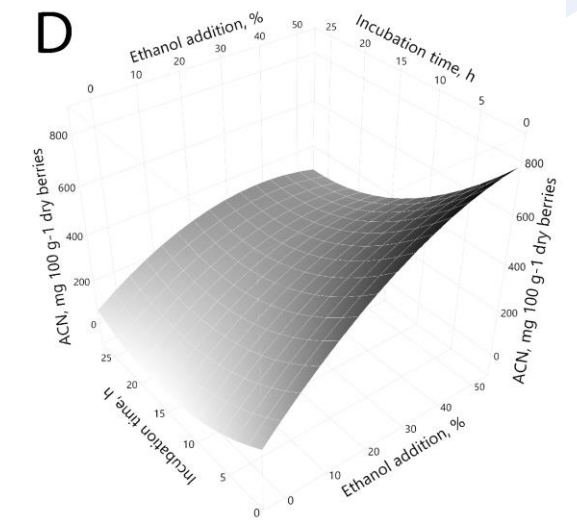
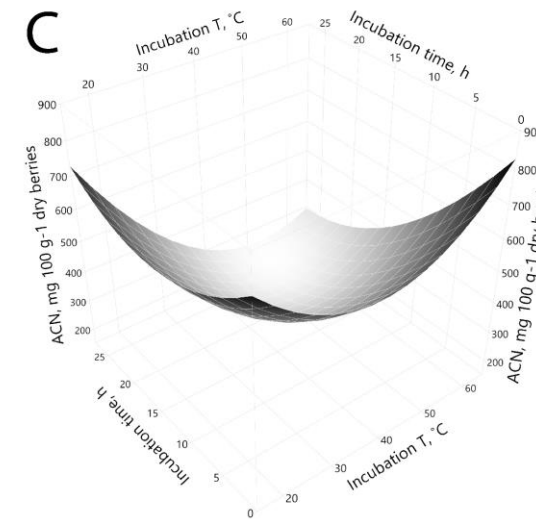
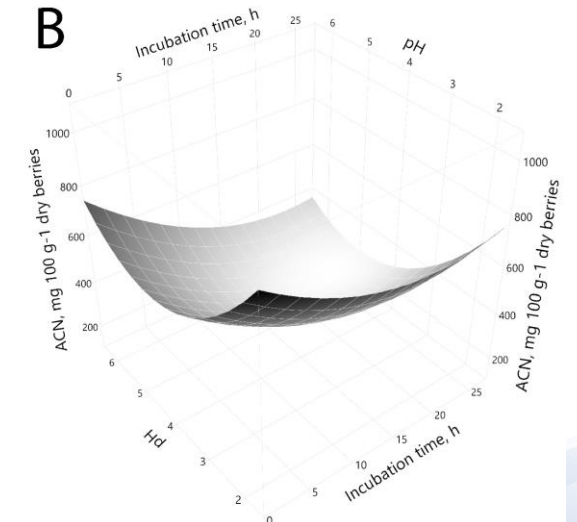
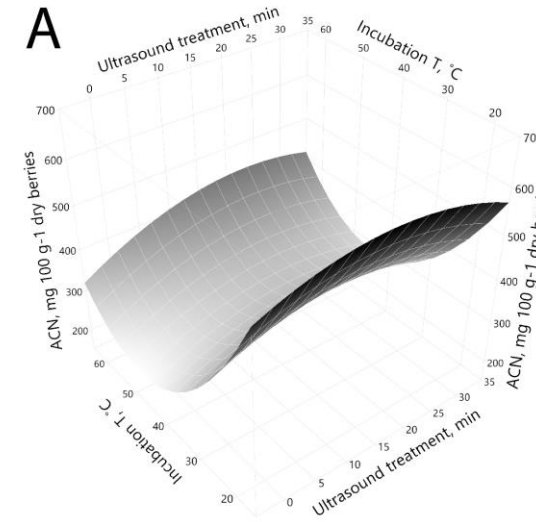


Case study – Enzyme assisted extraction of blueberry press residues



The aim of the study was to increase the anthocyanin contents and antioxidative potential of berry juice

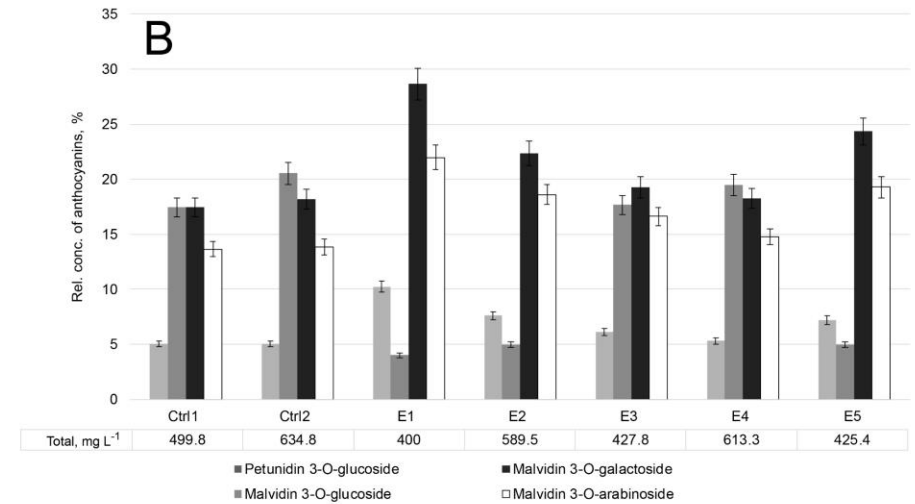
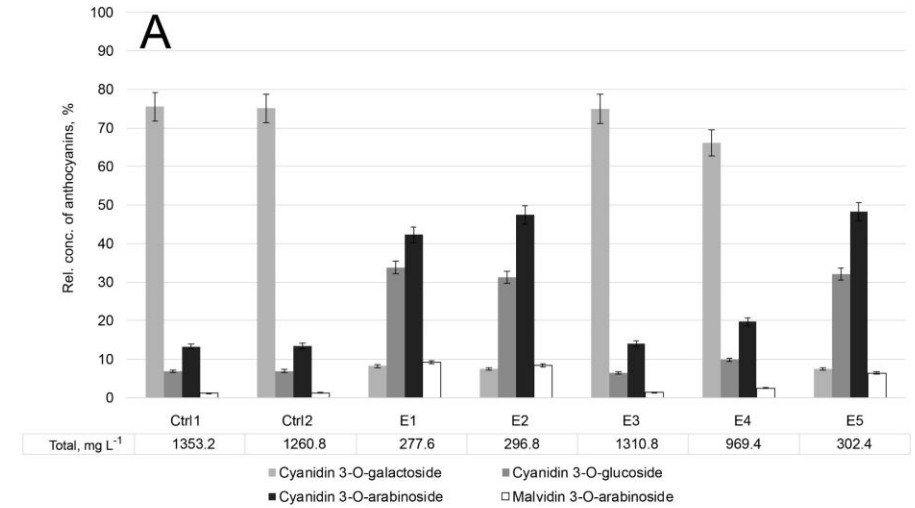
More efficient utilisation of the whole berry – reduction of food waste



Case study – Enzyme assisted extraction of blueberry press residues

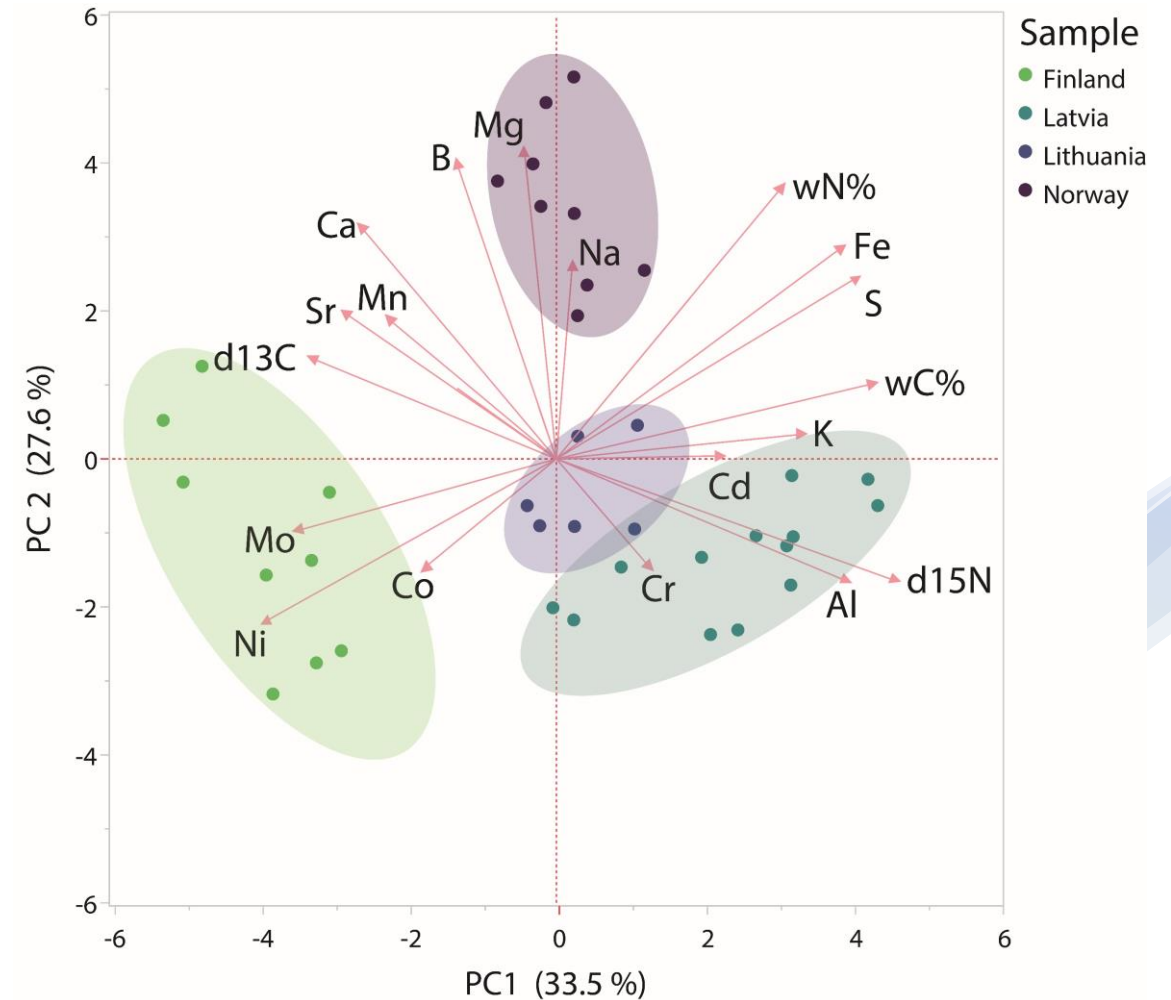
Most commonly used enzymes for fruit liquification were tested.

Degradation of anthocyanins was recorded – the appearance of the juice is an important factor for the consumer.



Case study – Bilberry authenticity (stable isotope analysis)

- Anthocyanin profiles are often used for authenticity testing
 - Depends on used extraction/type of product
 - Adulteration is possible by addition of other berries
 - Berry powders, juice concentrates
- Development of methods for authenticity testing and traceability
 - IRMS
 - Metal analysis
 - Combination of both
- Regions of the berry origin can be distinguished
- Possibility to provide reliable traceability information
- Ongoing study – more samples are being included



Other collaborations

- Analysis of berry and berry seed oils
 - Black currant, Sea buckthorn, wild strawberry
- Cricket and worm meal oils
- Antioxidants in berries and medicinal plants
- Extraction of Himalayan medicinal plants
- Omega fatty acid contents in cosmetics ingredients
- Analysis of flavours and fragrances
- Metal contents in spirulina
- Analysis of peat quality for industrial scale mining
- Natural antioxidants in cough syrups





**Thank you for
attention!**