

Food-related Research at EMÜ

Research and collaboration

Reelika Rätsep, PhD

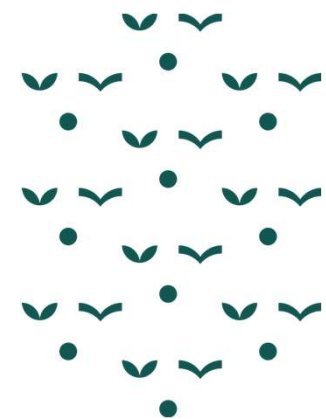
20.05.2026

Tartu

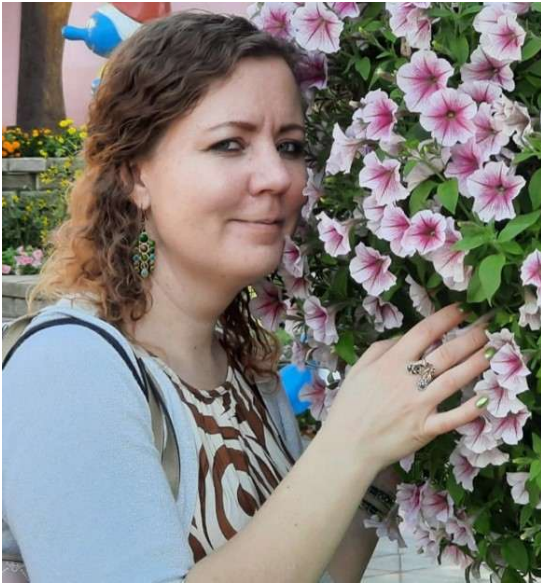


Focus areas of the EMÜ:

- 3 institutes
- 22 chairs
- 8 experimental stations
- Agriculture
- Rural Economy
- Forestry
- Environmental Sciences
- Veterinary Medicine and Animal Husbandry
- Engineering and Technology
- Only university in Estonia which cover the whole chain of circlebioeconomy and management of bioresources „from farm to fork“.



Introduction



- **PhD in Agriculture (2016)**
 - **Thesis:** grapevine and strawberry sustainable cultivation technologies
 - **Research:** fruit quality, processing, side streams/ byproducts, valorisation
1. Chair of Horticulture, Polli Horticultural Research Centre (2015 -...)
Biochemistry on horticultural crops, side stream valorisation
 2. Chair of Food Science and Technology (January 2025- ...)
Lecturer of plant-based food technologies, green technologies

Estonian University of Life Sciences, Polli Horticultural Research Centre

- Situated in South Estonia
- 60 hectares of orchards, breeding and preserving genetic resources of fruits and berries
- Storage and production unit
- Technological and analytical units of Competence Centre Plantvalor



Polli Horticultural Research Centre,

Estonian University of Life Sciences



- 1945 – fruit and berry breeding and cultivation technologies
- 2008 – fruit and berry storage technologies
- 2009 – fruit and berry primary processing and product development
- 2010 – value-added products from plant-origin materials
- 2019 – 2023 ERA Chair for Food (By)Product valorization VALORTECH
- 2024 – ... development of valorisation technologies

Fruit and berry
breeding

Cultivation
technologies

Storage technologies

Primary processing,
product development

Competence centre
PLANTVALOR
Extraction technologies

ERA Chair VALORTECH

Development of
valorisation technologies



Genetic resources and breeding collection

A base for sustainable food production

Local and introduced cvs
Basic breeding material
Cultivation trials
Suitable to the region

Whole number of accessions c.a **1100**

Apple 449



'Karksi renett'

Pears 95



'Pepi'

Plums 95



'Ave'

Cherries 98



'Nõmme liivakirss'

Strawberries 76



'Polka'

Blackcurrants 110



'Mulgi must'

In addition: Red and white currant, gooseberry, raspberry, edible honeysuckle, blackberry, rowanberry

104 of 255 Estonian fruit and berry varieties originate from our breeders in Polli

<http://sordivaramu.emu.ee/index.php>



FRUIT GENETIC RESOURCES OF ESTONIAN UNIVERSITY OF LIFE SCIENCES

HOME POME FRUITS STONE FRUITS SMALL FRUITS FOR ORGANIC GROWERS

Search for cultivar or breeding parent **SEARCH**



Welcome to the webpage of fruit genetic resources of Estonian University of Life Sciences!

Polli Horticultural Research Centre of the Estonian University of Life Sciences is responsible for the investigation and preservation of the genetic resources of fruit and berry cultivars and selections bred in Estonia. One of our responsibilities is to share the information on cultivars and landraces of Estonian origin as well as introduced geotypes that have proved to be suitable for growing in Estonia.

Web page renewal

- Local cultivars
- Introduced cultivars
- Addition of traits for fruit and berry processing

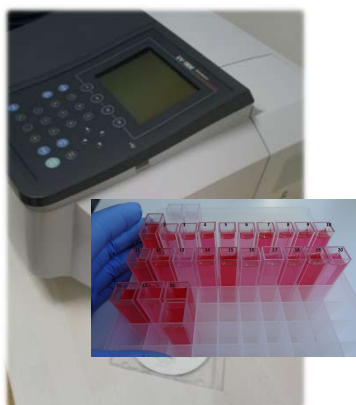
<https://sordivaramu.emu.ee/>

Analysis lab infrastructure

Titration



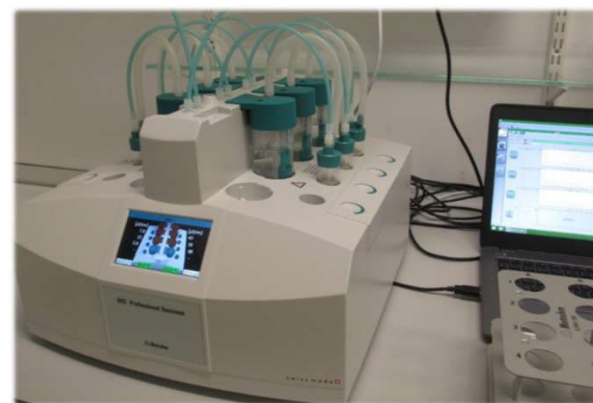
Spectrophotometry



FT-IR wine analyser



Rancimat oxidation stability

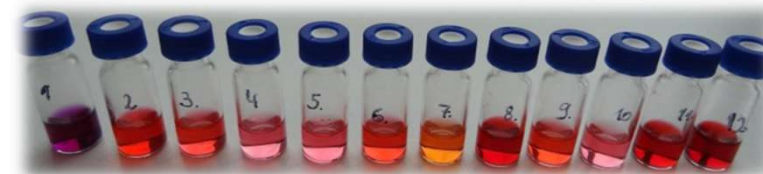


HPLC-MS/MS



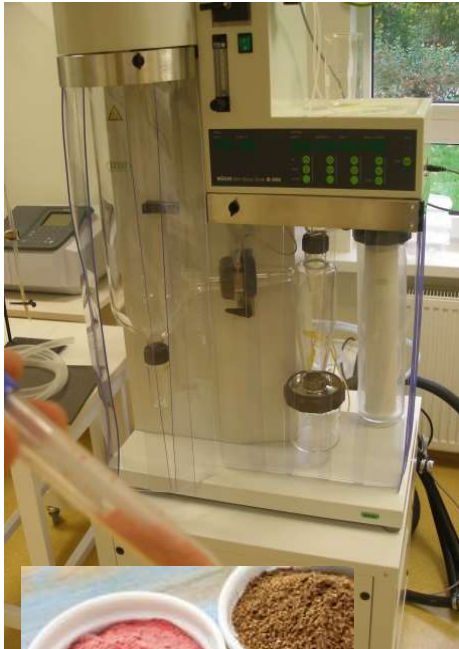
Research focus: pigments and bioactive compounds in plants

- Polyphenols, anthocyanins
- Carotenoids
- Terpenoids
- Tannins
- Mono- and disaccharides

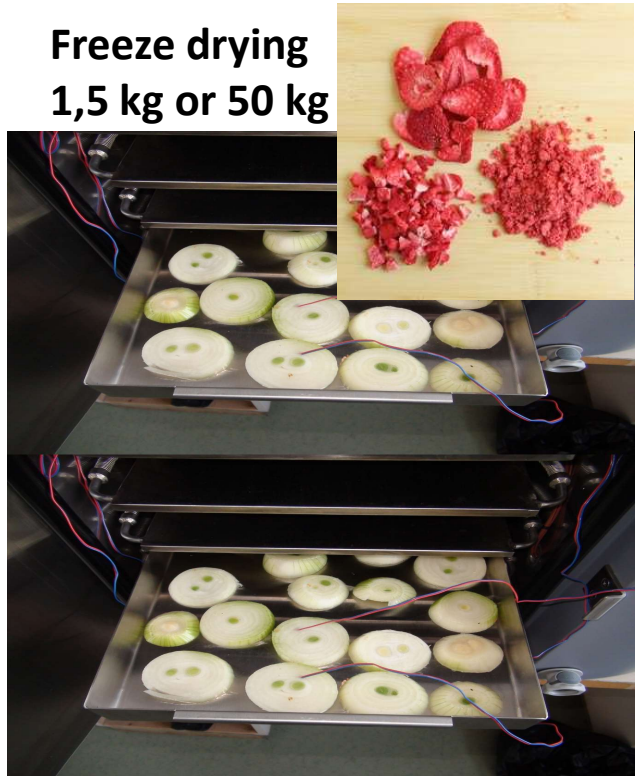


Drying technologies

Spray drying and encapsulation



Freeze drying
1,5 kg or 50 kg



+ condensation and infrared drying

Extraction technologies

Microwave extraction and steam distillation



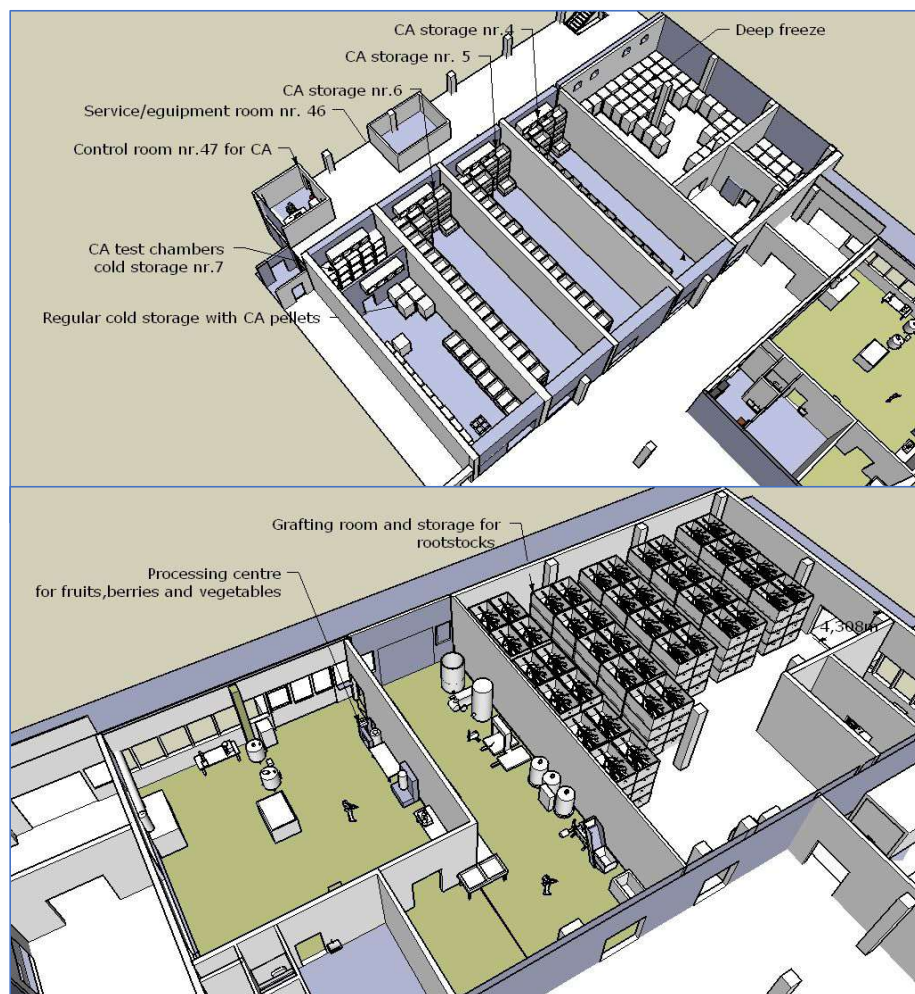
Naviglio

Ultrasonication extraction



Supercritical extraction (SFE, SFF)

Storage and processing unit at Polli



- Cold storage and deep freezer
- 310m² processing unit for various products
- Unclarified, enzymated and clarified juice processing
- Production of carbonated juice drinks
- Puree and jam production
- Dehydration processes, dried products
- Disintegrator milling process
- Seedoil production
- Modified atmosphere packaging (MAP)

Scaled fractionation and utilization of apple pomace

Juice pressing



Mixing apple pomace
and water



Heat treatment



Separation of seeds



Mixing of ingredients



Pasteurization



Mixing 3,8 kg/min
with water



Heat treatment



Separation 6,6-11,6 kg/min



Pasteurization 250 kg



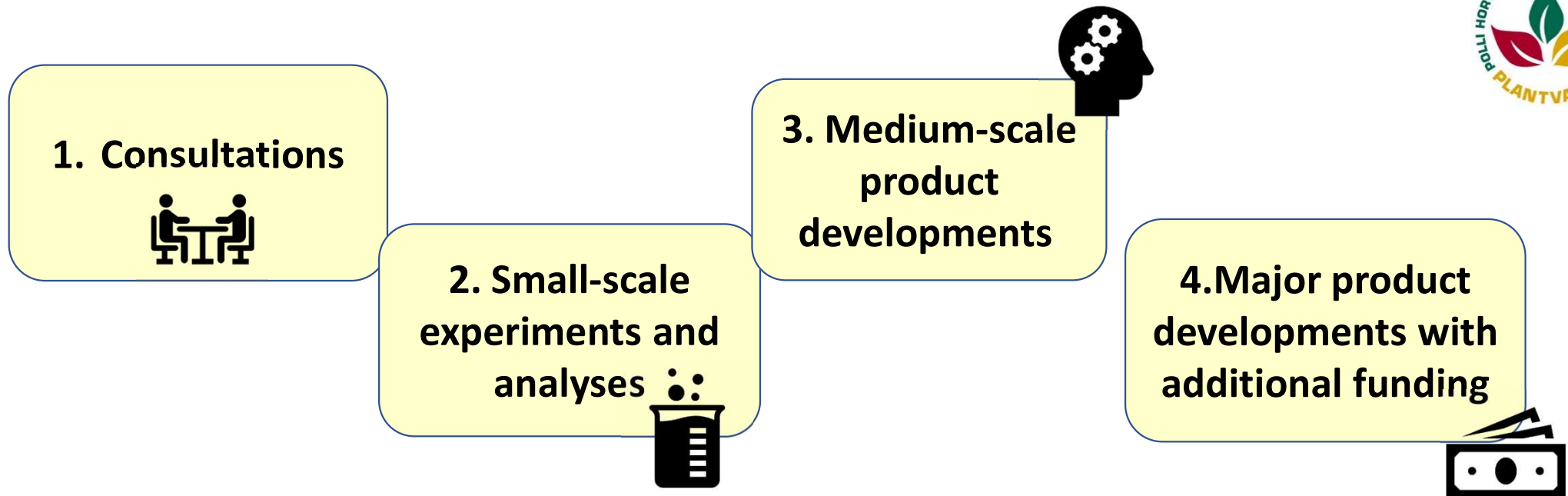
Apple puree mixing 2x300 l

Research and product development services

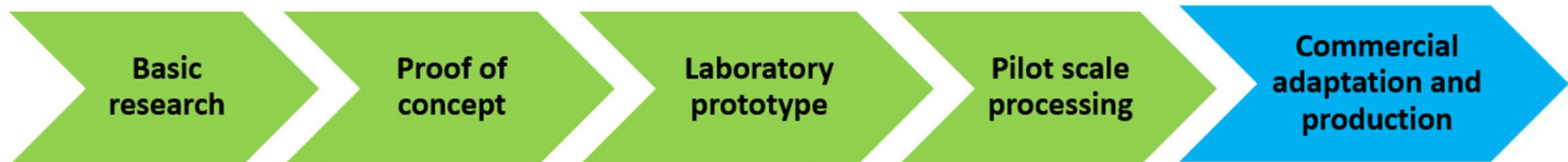
- Laboratory and pilot scale extraction of bioactive compounds of plant origin raw material
- Optimization of extraction processes
- Infrared- , spray- and freeze drying
- Mixing and homogenization of food and non-food products
- Development of food and non-food products
- Quality analyses
- **Consulting and project management**



Services for entrepreneurs



Innovation process



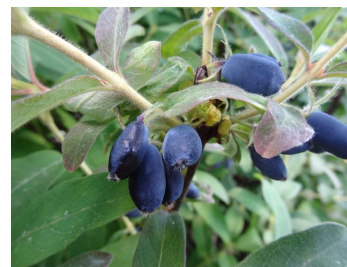
„Development of cultivation, harvesting and processing technologies for new fruit and berry cultures “



- Seedri Puukool OÜ + Polli Horticultural Research Centre
- 01.07.2016 – 31.12.2022, PRIA MAK 2014-2020, measure 16.2.

The main aim: from plant to product

- Cultivars, propagation, cultivation technologies, mechanical harvesting, fruit quality, product development



ResTA14 „TAIMLOOMTOIT“ 2021-2023

Polli HRC, Chair of Food Science and Technology, Chair of Veterinary Biomedicine and Food Hygiene



European Union
European Regional
Development Fund



Investing
in your future

Local raw material



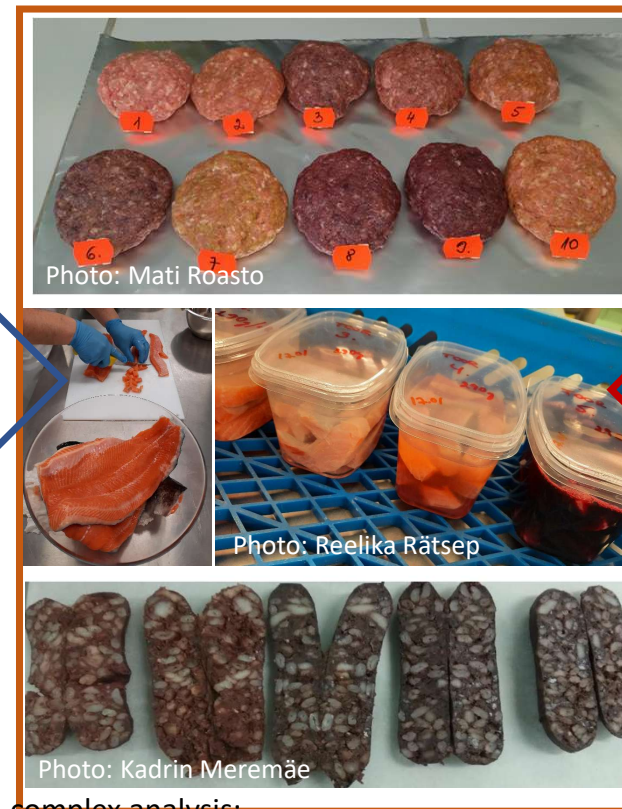
Valorisation of
processing by-products



Bioactives' rich
pomaces



Enriched meat and fish products



ANALYSES

Microbiology
Freshness
Cooking loss
Lipid oxidation
Sensory
evaluation



Keywords: plant based; animal-based; full valorisation; food safety and quality; complex analysis; new methods; value-added products.

ERR Jupiter, <https://jupiter.err.ee/1608975788/tahelepanu-tegemist-on-teadusega>

Baltic Cider



- *Terroir* – the environment as a whole in which a particular wine (cider) is produced, including factors such as soil, topography and climate.
- Impact of technologies + human factor
- Common apples cultivated in Estonia and Latvia + local varieties and selections
- Local producers – local stories
- Enhance local tourism and entrepreneurship

Discover Baltic Cider Explore Cideries Ciders News & Events About us



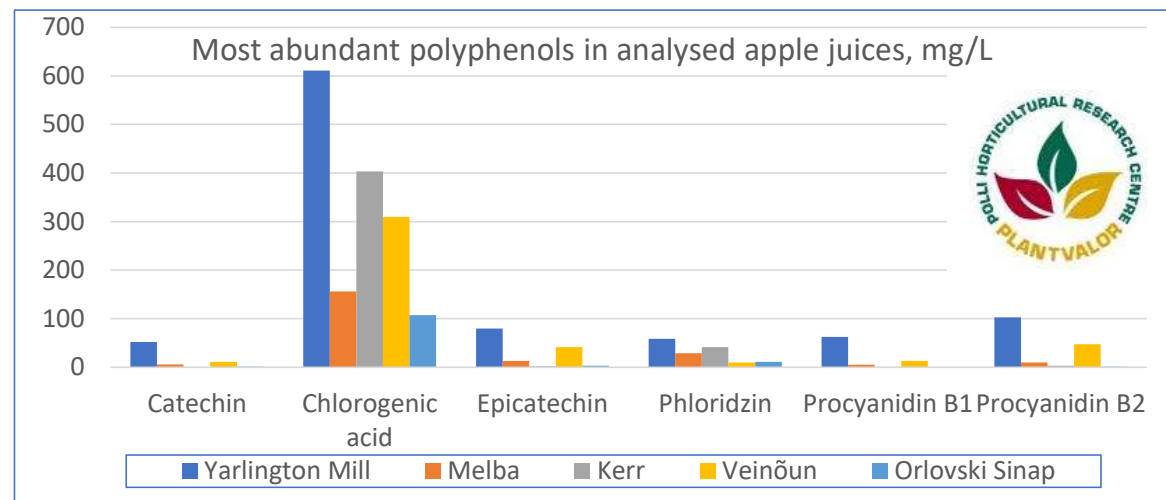
DISCOVER THE UNIQUE FLAVORS, TRADITIONS, AND CRAFT OF BALTIC CIDER MAKERS!

Experience the authentic taste of real cider from the Baltic Sea countries:

Latvia
Estonia
Finland

Baltic Cider is carefully crafted from fresh apple juice grown in local orchards. Find out how Baltic Cider is made, what defines its unique character, and explore its internationally award-winning varieties. Cideries in Latvia, Estonia, and Finland warmly welcome visitors.

Interreg Central Baltic Programme Co-funded by the European Union
Interreg Co-funded by the European Union
Estonia – Latvia

Interdisciplinary circular bioeconomy: use of horticultural by-products (biomass of sea buckthorn and black currant leaves and shoots) as phyto- and prebiotic additives in feed mixtures for aquaculture animals (rainbow trout and crayfish)

- National Level Project in collaboration with researchers from the Chair of Aquaculture
- helps aquaculture animals **increase growth and improve health indicators**;
- affects the composition of the **intestinal microbiota and the expression of genes** related to immune response and stress tolerance;
- allows for a **reduction in the use of medicated feeds containing antibiotics** and
- helps to **prevent the development of antimicrobial resistance** in fish and the presence of antibiotic residues in marketed fish meat.



CROSSPATHS – international collaboration

<https://www.crosspaths.eu/project>



Funded by
the European Union

1. Enhanced International Collaboration and Visibility
2. Strengthened Human Resources and Skills
3. Sustainable and Innovative Research Practices
4. Long-Term Impact and Sustainability
5. Community and Economic Benefits

1. Joint ERDF platform development
2. Trainings, networking
3. Autumn Schools to young researcher
4. Joint Research project proposals
5. Better international visibility



UNIVERSIDADE
CATOLICA
PORTUGUESA



Estonian University
of Life Sciences



WAGENINGEN
UNIVERSITY & RESEARCH



Thank you!

