Polli Horticultural Research Centre: from genetic resources to value-added products

Aret Vooremäe

Estonian University of Life Sciences
Institute of Agricultural and Environmental Sciences
Horticultural background of Polli

• Agricultural school was founded in Polli manor in 1920
• National institute of apiculture and horticulture was established in 1945
• Since 1995 Polli Horticultural Research Centre is the subunit of the Estonian University of Life Sciences
• SciencesResearch has been focused on providing cultivars and growing technologies suitable for the region.
• 255 Estonian fruit and berry varieties, 104 are originated from Polli
• The genetic resources collections of fruits and berries of over 1100 accessions
Project “GoodFruit”

Increasing competitiveness of Estonian and Latvian food industry based on new and improved local fruit and berry product development.

Duration: June 2008 – July 2012

Partners:
- Pure Horticultural Research Centre (Latvia)
- NGO Kandavas Partneriba (Latvia)
- Berry Farming Ltd (Estonia)
- Piladzi Farm (Latvia)
- Lases Farm (Latvia)
- Silvanols Ltd (Latvia)
Storage- and experimental processing facility: before and after
Experimental fruit and berry processing facility

Before 2009

After 2009

Linking Estonia and Latvia
Part-financed by the European Regional Development Fund

Eesti Maäülkool
Estonian University of Life Sciences
Postharvest capabilities

- 3 CA storages (each 60 t, glycol cooling, central management and data registration)
- 15 CA test chambers
- 1 regular cold storage (35 t)
- 1 deep freeze (-18 to -20 C) storage 138 m², (74 t up to 100 t)
- fast freezer 1t berries in 3 hours (-32 C)
Postharvest research

- Testing different storage gas mixtures for local fruit and berry varieties
- Research to preserve postharvest quality and nutrient value
Processing capabilities

- 310m² processing unit for various products

Production capacity per day:
- 2-3 tons of Apple juice
- 1000 litres of different berry juices
- 2-3 tons of purees
- Infrared vacuum drier enables to process 60-80 kg berry by-products within two days

Ca 40 regular customers/producers from Estonia, Latvia and Finland
Fields of activity

- Unclarified juice processing
- 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)
Seminars and workshops for entrepreneurs
Competence Centre for Knowledge-Based Health Goods and Natural Products (PlantValor)

Main field of activity and niche lies in the research and development of health goods and natural products using modern, high-technology methods, including extraction of bioactive ingredients of plant origin, that are used in

• functional foods,
• eco-cosmetics,
• household chemicals,
• pharmaceuticals etc.
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
Solid-liquid extraction of biomaterials

- Research of plant extracts and usage in food and non-food products
- Freeze and spray drying
- Knowledge transfer
Supercritical fluid extraction of biomaterials

- Research of SFE biomaterials and compounds:
  - plant materials, insects etc.
  - valuable seedoils, plant flavors, fragrances
- Research of pilot scale SFE and SFF process
- Knowledge transfer

Number of Supercritical Fluids-Plants regional
Total Volume > 500 l

Source: Schuetz Consultina 2005

Pilot scale SFE

Valuable seedoils
Dehydration and particle formation

- Research of spray dried and freeze dried extracts
- Evaluation of drying processes

Spray drying

Freeze drying

Spray dried beetroot juice
Product development of value added food

- Development multicomponent food and food supplements
- Mixing, homogenization, filtration, heat treatment, aseptic packing
Analytical capability

- FT-IR methods
- HPLC DAD and -MS/MS multi-method

[Chart showing the concentration of various anthocyanins in different plant samples.]
Full range of product development services for the users of plant origin raw material

- New cultivars suitable for the region
- Collection and database of genetic resources with over 1000 items
- 50 ha experimental plots

Since 1945
FRUIT AND BERRY BREEDING; CULTIVATION AND PLANT PROTECTION TECHNOLOGIES

- New cultivars suitable for commercial use
- Propagation and marketing plants
- Competence of cultivation and post-harvest

Since 2008
FRUIT AND BERRY PROCESSING; STORAGE TECHNOLOGIES

- CA and cold storage technologies
- Primary processing technologies
- Preservation technologies of primary processed products

Initiated 2010
FRUIT AND BERRY SURPLUS PROCESSING; EXTRACTION OF BIOACTIVE INGREDIENTS; BIOCHEMICAL ANALYSIS

- Storage services
  - Product development
  - Pilot scale production
  - Competence of primary processing possibilities of fruits and berries

- Storage and processing influence on bioactive compounds
- High-tech extraction methods
- Valorisation and processing methods

- Valorisation of plant-origin raw material
- Development of value-added products
- Ingredients for development of natural health products
- Competence of EFSA health claims

COMPETENCE TOOLS AND SUPPORT SERVICES FOR AGRICULTURAL START-UPS

- Market research
- Innovative initiatives on the research of food-chain
- Technology transfer

- Incubation services for start-ups
- Storage and logistics
- Common marketing
- Product development

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• Competence of EFSA health claims
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• Technology transfer
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Thank You!

Aret Vooremäe
aret.vooremae@emu.ee
Estonian University of Life Sciences
Institute of Agricultural and Environmental Sciences