Bilberry – wild superberry from Europe

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Climate laboratory, UiT & Bioforsk
- Location 69° 39’ N
- 6 day light and 4 dark phytotrons
- Temperature from +6 °C to 27 °C (0,5 °C to 27 in the dark rooms)
- Light intensity, quality and photoperiod can be adjusted
Main research interests:

• Wild/forest berries
• Biosynthesis of phenolic compounds and ascorbic acid
• Regulation of berry development
• Gene x environment interaction in anthocyanin production
• Genetic diversity
• Authenticity
Background

- About 50 wild berries are growing in the area of Nordic countries
  - 37 edible
  - 20 generally picked and utilized
- Most important lingonberry (*Vaccinium vitis-idaea*) bilberry (*V. Myrtillus*) and cloudberry (*Rubus chamaemorus*)
- Wild berries are traditional raw material for the area that could be utilized better
- From cultivated berries most important are strawberries, currants and rasberry
Bilberry \( (Vaccinium\ myrtillus\ L.) \)

- Belongs to the most common and most important wild berry species in boreal forest
- Contains high yields of antocyanin pigments
  - widely used in health products (eye health, cardiovascular and age related diseases, cancer, II type diabets)
- Export of Finland and Sweden around 13 000 tons/year
Bilberry is one of the best sources of anthocyanins.

HPLC profile of anthocyanins in bilberry: 15 different anthocyanidin glycosides + flavonols + proanthocyanidins.
Anthocyanin biosynthesis in bilberry

Jaakola et al. (2002) Plant Physiol. 130:729-739
Environmental and genetic regulation of anthocyanin biosynthesis in bilberry

- Many recent studies show that towards north bilberries contain higher levels of anthocyanins (Lätti et al. 2008, 2010, Åkerström et al. 2010, Martz et al. 2010)
- Also qualitative differences
- Role of climate?
Effect of light conditions and temperature on production and quality of bilberry

- 12 °C, 24 h light
- 12 °C, 24 h light + red light
- 12 °C, 12 h light
- 18 °C, 24 h light
- 18 °C, 24 h light + red light
- 18 °C, 12 h light

- 2 Northern clones
- 2 Southern clones

-> More anthocyanins in 18 °C, especially in northern clones
-> More delphinidins in 12 °C
-> More anthocyanins in 24h day length
-> More anthocyanins in northern clones

Authenticity

- Authenticity is an important part of the quality assurance
- There is demand for new methods
- Between species vs. inside same species
- Raw material vs. products
- DNA-based methods
- Flavonoid profile based methods
- Other methods


• Strengthen and draw attention to Nordic food and Nordic food culture.

• Create a common understanding for the value of Nordic ingredients and a vision for the development of Nordic food culture.

“Purity, freshness, simplicity”.

1. WP Networking
2. WP Marketing research
3. WP Quality aspects

Project coordination:
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Arctic Flavours
MTT

SWEDEN
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Umeå
Balsgård

NORWAY
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Biolink

ICELAND
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FINLAND
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Kiantama Oy / Biokia Oy
Lapin Liha Oy

SWEDEN
Norrmejerier
Olle Svensson AB
Polarica AB
Skogsmat I Uddehol AB

NORWAY
The Royal Norw. Society for Development

DENMARK
Danish Berry Board

UK
SCRI
Univ. Nottingham
Unilever

UK
SCRI
Univ. Nottingham
Unilever

DANMARK
Danish Berry Board

NORDIC INNOVATION CENTRE
Information collected of:
- Structure of wild berry industry in Nordic countries
- Raw material supply
- Importance of co-operation in marketing and brand development

http://www.oulu.fi/nordicbilberry/Wild%20berry%20marketing%20survey%20report.pdf
**Future prospects**

- Semicultivation/cultivation of bilberry  
  -> Selection of the best clones for breeding programs
- To develop new methods for annual crop yield estimations
- To develop better logistics for berry picking
- To focus also on other health beneficial compounds
- To utilize all plant parts
- To develop new methods for the authenticity and quality assurance
- Increased co-operation between all actors in the wild berry field
Thank you for the attention!