

Development of new products;
healthy food, dietary products and
augmented nutritional value

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REGIONAL COUNCIL
OF LAPLAND



European Union
European Regional Development Fund

Leverage from
the EU
2014–2020

Nutrition and life

Dietary recommendation, Romania: Guidelines for a healthy diet (Romanian: *Reguli pentru o alimentație sănătoasă*) 2006; <http://www.ms.ro/?pag=185>,
<http://www.fao.org/3/a-as693o.pdf>,

Romania's President, Klaus Iohannis, has signed into law a requirement upon medium to large sized supermarkets to ensure that at least 51% of their shelf space is stocked with local produce. The President's signature is the last stage in the journey of this piece of legislation that has angered and perplexed the food industry. <http://www.eurofoodlaw.com/country-reports/analysis-romanias-radical-plans-to-change-food-policy-117169.htm>

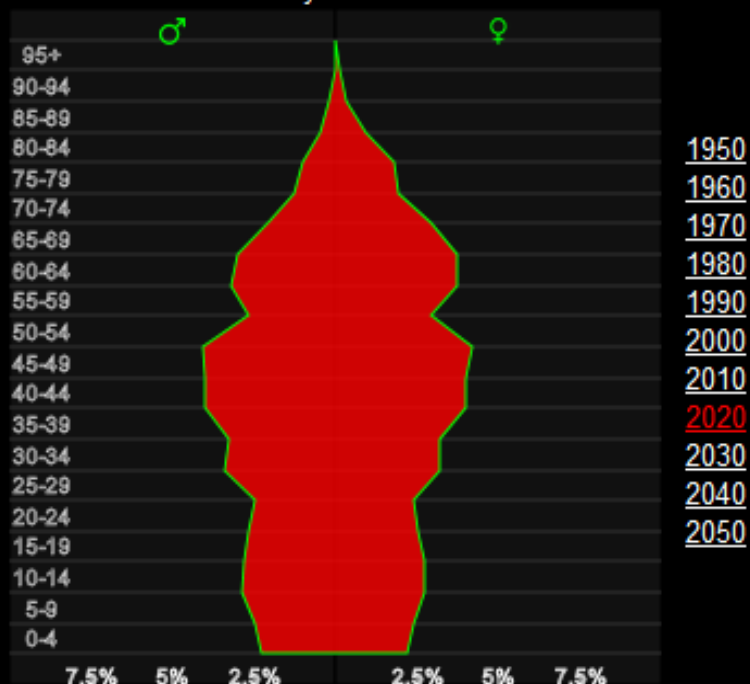
Life Expectancy in Romania

Male	Female	Average
71.4	78.8	75.0

Romania Population Pyramid

18,847,505

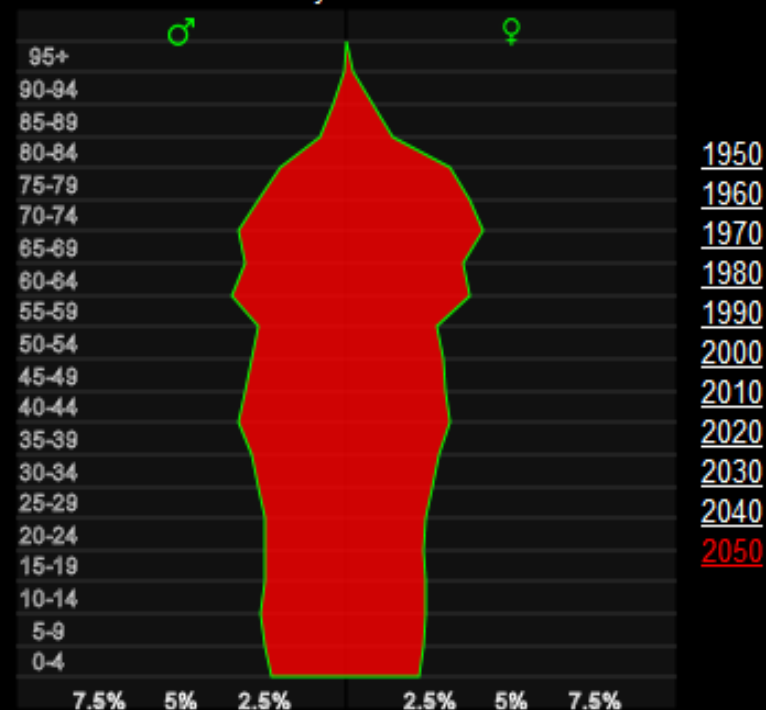
Play Pause



Romania Population Pyramid

15,206,524

Play Pause



Cause of death

Top 5 Romania:

1. Coronary Heart Disease
2. Stroke
3. Hypertension
4. Liver Disease
5. Lung Cancers

Food and Health

“Know your food – we are what we eat”

Causes for premature death (McGinnis 2004):

- | | |
|-------------------------------------|-------|
| • Living habits | 40 %* |
| • Genetics | 30 % |
| • Socioeconomics and education | 15 % |
| • Access and quality of Health Care | 10 % |
| • Physical environment | 5 % |

*40 percent, or nearly half of all deaths, could be explained by factors that were preventable given current knowledge, many of which were behavioural in nature. These preventable factors included tobacco, diet and activity patterns, alcohol, microbial agents... <https://www.ncbi.nlm.nih.gov/books/NBK279974/>

Safety above all:

- Safe: production, harvest, refining and packaging
- Safe: transport and sale (logistics and temperature)
- Safe: consumption, product info contents analysed and contains what it should and nothing more

Contamination from:

- Soil and water (heavy metals, poisonous compounds, stones, sand, bio-materials(dead insects, larvae, Tubulinea (Amoebozoa, familiar amoebae(Amoeba, Arcella, and Difflugia)) , fertilisers, chemical products, pesticides or product manufacturing
- non-wanted growth (fungi, yeast, fermentation, bacterial) and toxins,
- animal, human contacts (viral, bacterial contamination)

Dietary and specialised foods

- Allergies
- Food intolerances (FODMAP (Fermentable, Oligo-, Di-, Mono-saccharides and Polyols), milk protein, milk sugar, Trehalose (mushrooms), self-expressed 'allergies, irritations and symptoms)
- Food item restrictions (Gluten Enteropathy; gluten free products)
- Diabetes Mellitus management (GI, Glycaemic load, Dietary fibres)
- Functional foods(https://en.wikipedia.org/wiki/Functional_food)
- 'Medical food': cholesterol management, soluble dietary fibers

Productisation and Branding

- Health Claims...
- raw material production vs. refining & value creation
- analysed market: competitors, consumers, consumption and pricing
- single product – product line/portfolio
- Brand and its management
- export

Specialised products; Healthy foods – augmented nutrition

- Energy nutrient manipulation; Low carb, low GI, high protein
- Pre¹ and probiotics²
- Nutritional active food ingredients: Vitamins, antioxidants, Plant sterols, Polyphenols and other active ingredients in food
- ORAC values (oxygen radical absorbance capacity³,) and theory Telomere elongation – Immortal Cells; longer and healthier lives... ⁴ In humans, average telomere length declines from about 11 kilobases at birth to less than four kilobases in old age, with average rate of decline being greater in men than in women.

¹https://en.wikipedia.org/wiki/Prebiotic_%28nutrition%29;

²<https://en.wikipedia.org/wiki/Probiotic>

³ https://en.wikipedia.org/wiki/Oxygen_radical_absorbance_capacity

⁴ <https://en.wikipedia.org/wiki/Telomere>

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Plant Genetics

- Crop selection and manipulation
- Non-Native species
- GM foods
- GMO contamination
- Bioethics

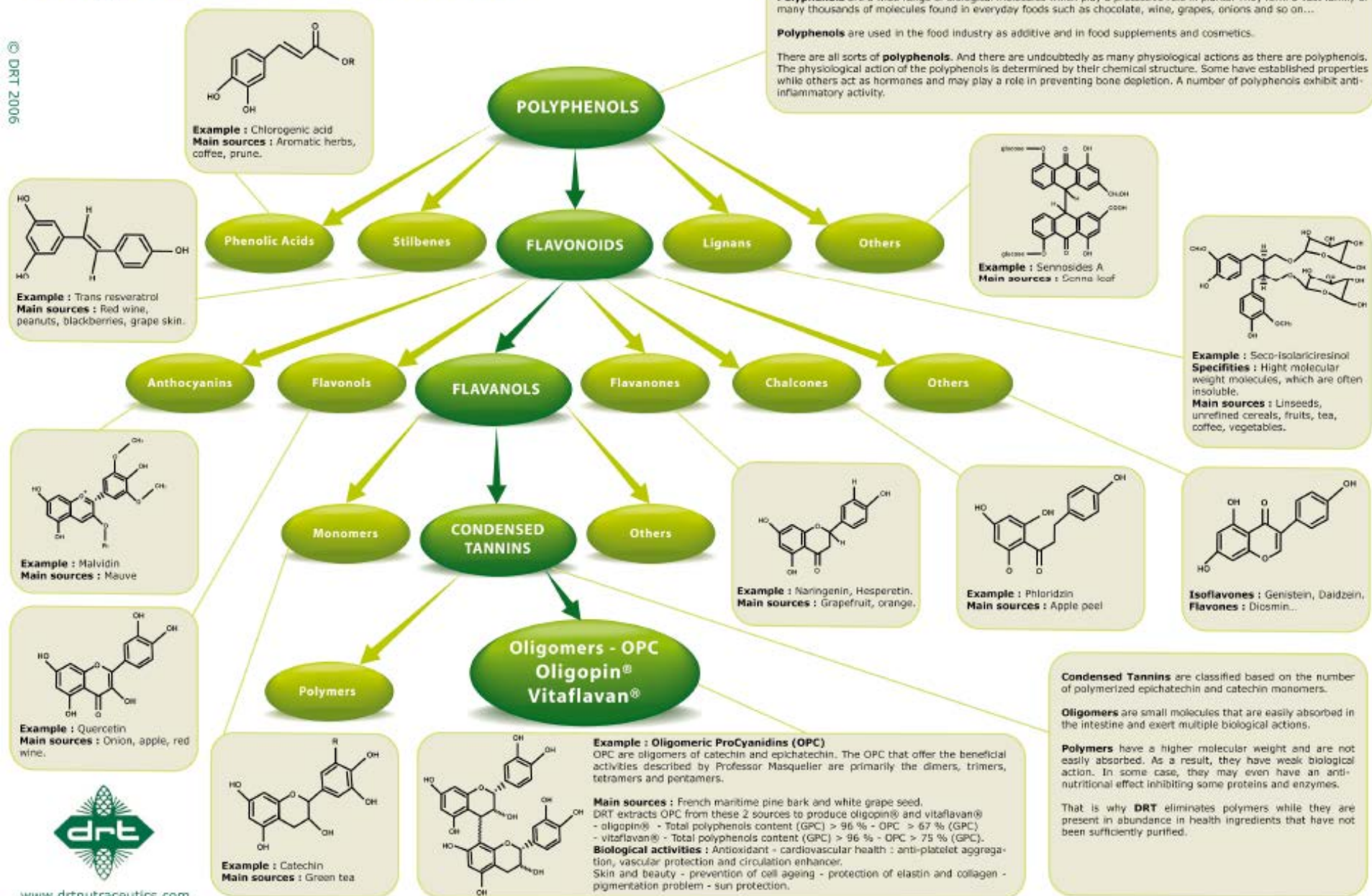
Polyphenols classification

© DRT 2006

Polyphenols are a wide range of biological molecules which play a protective role in plants. They form a vast family of many thousands of molecules found in everyday foods such as chocolate, wine, grapes, onions and so on...

Polyphenols are used in the food industry as additive and in food supplements and cosmetics.

There are all sorts of **polyphenols**. And there are undoubtedly as many physiological actions as there are polyphenols. The physiological action of the polyphenols is determined by their chemical structure. Some have established properties while others act as hormones and may play a role in preventing bone depletion. A number of polyphenols exhibit anti-inflammatory activity.



www.drtnutraceuticals.com

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<http://www.opc-1-2-3.com/polyphenol-classification.html>

Condensed Tannins are classified based on the number of polymerized epicatechin and catechin monomers.

Oligomers are small molecules that are easily absorbed in the intestine and exert multiple biological actions.

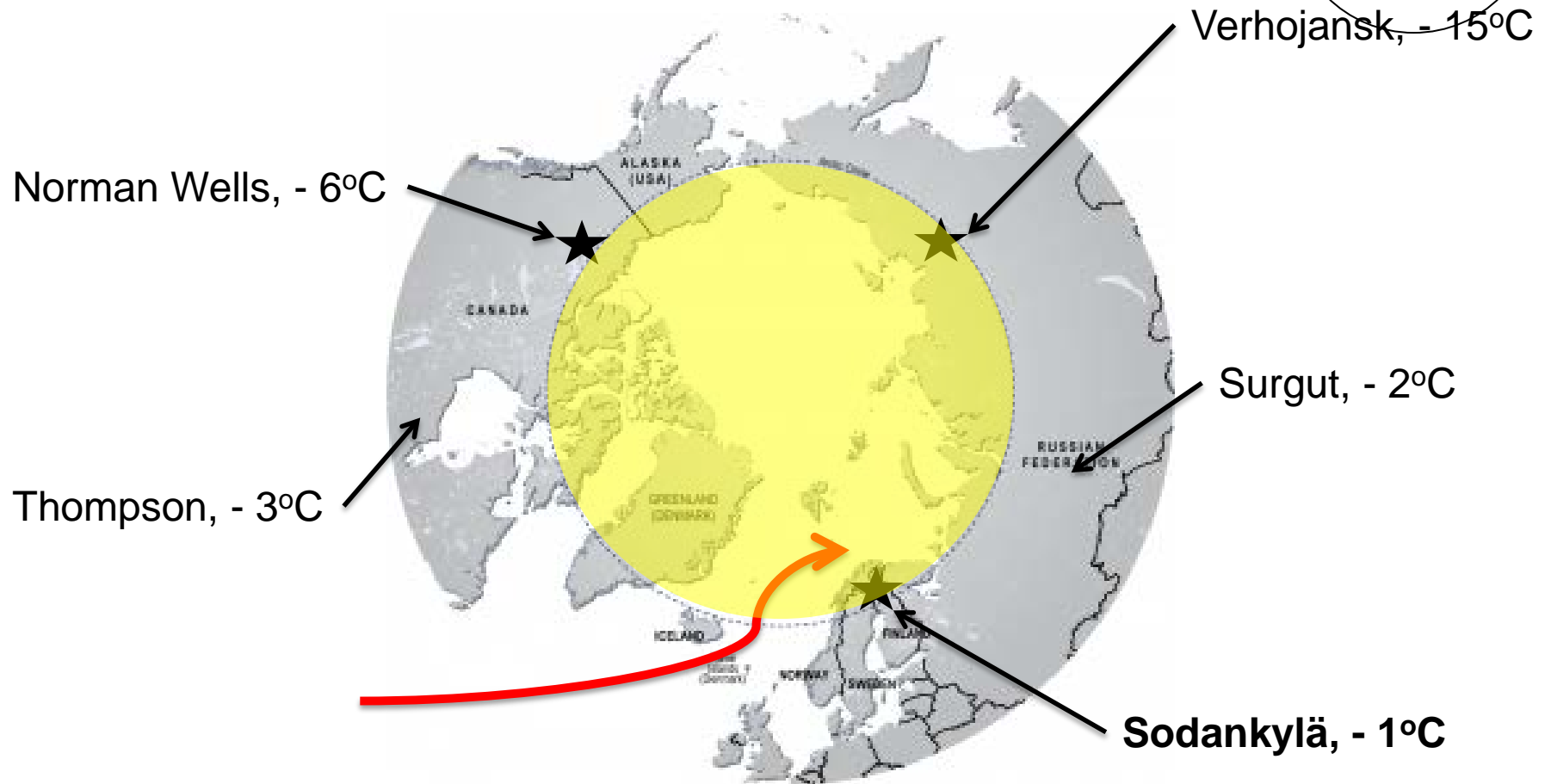
Polymers have a higher molecular weight and are not easily absorbed. As a result, they have weak biological action. In some cases, they may even have an anti-nutritional effect inhibiting some proteins and enzymes.

That is why **DRT** eliminates polymers while they are present in abundance in health ingredients that have not been sufficiently purified.

Phytochemicals – Phenols and Polyphenols

Phytochemicals in food: https://en.wikipedia.org/wiki/List_of_phytochemicals_in_food

- Our foods contain complex mixtures of polyphenols main sources being fruit and vegetables, green tea, black tea, red wine, coffee, chocolate, olives, and extra virgin olive oil and also herbs and spices, nuts and algae.
- Polyphenols are also found in animals, such as insects and crustaceans (crabs, lobsters, crayfish, shrimp, krill) where polyphenols play a role in the exterior shell and their pigmentation.
- Some polyphenols are specific to particular food (flavanones in citrus fruit, isoflavones in soya, phloridzin in apples); whereas others, such as quercetin, are found in all plant products such as fruit, vegetables, cereals, leguminous plants, tea, and wine.
- **Not all is healthy:** some polyphenols are considered antinutrients, compounds that interfere with the absorption of essential nutrients, especially iron and other metal ions, but also by binding to digestive enzymes and other proteins.
- **Traditional use:** Many herbal teas and other water based mixes
- Potential health effects: Research is carried out in several clinical fields from infection management, cancer prevention to cardiac disease, however there are **no** recommended Dietary Reference Intake for Polyphenols.



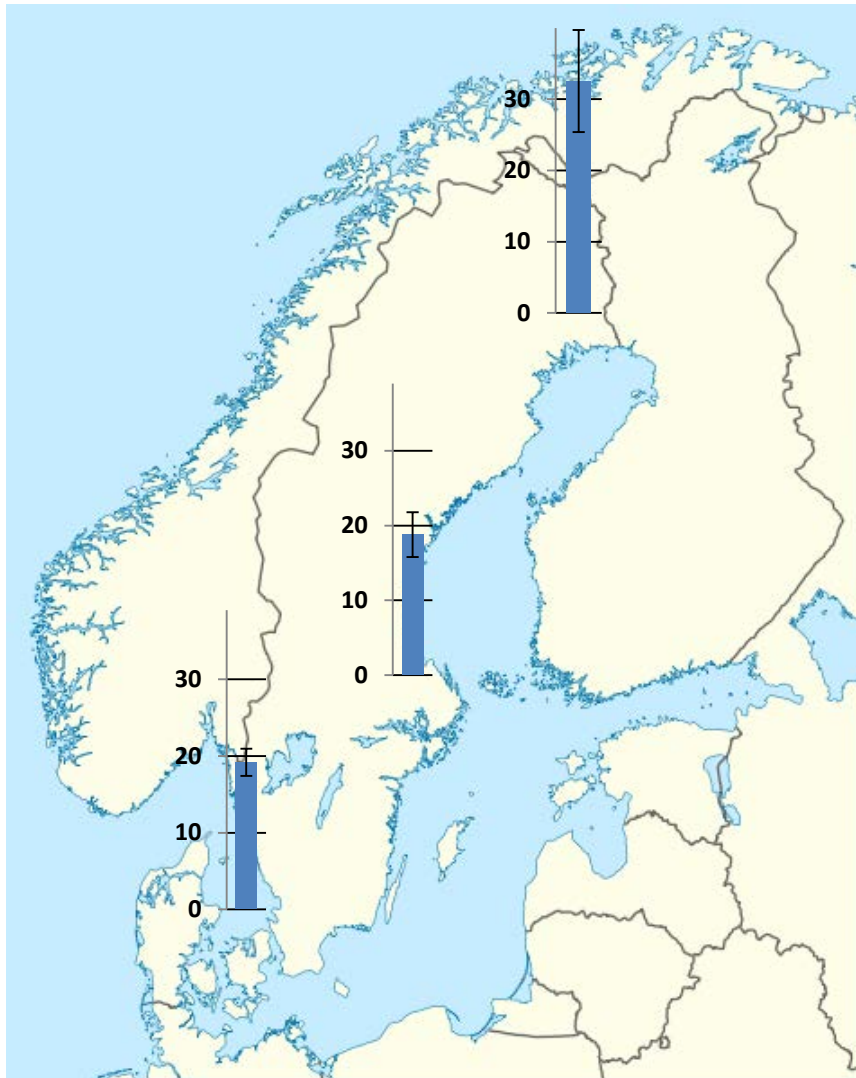
The Lapland combo

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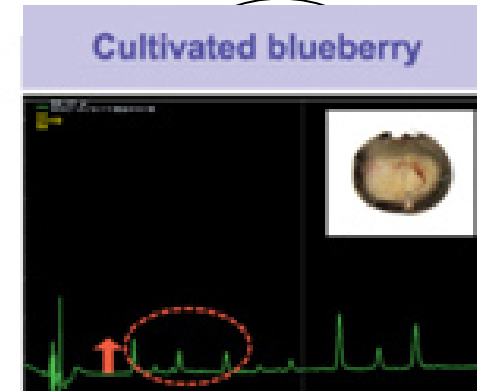
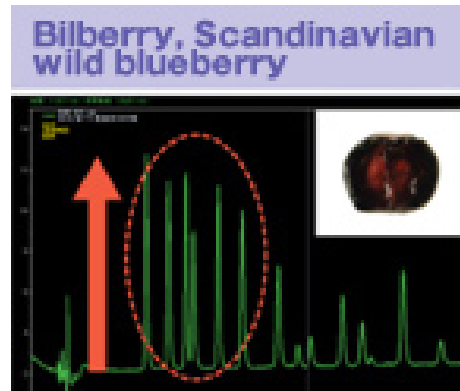
- Temperature conditions, especially differences between daytime and nocturnal temperature
- +
- Arctic solar radiation during growing season, especially dusk / dawn conditions
- +
- Nutrient poor forest soil
- +
- Pristine environment
- +
- Highly developed infrastructure

= the highest quality natural products in the world

Berries, the natural antioxidants

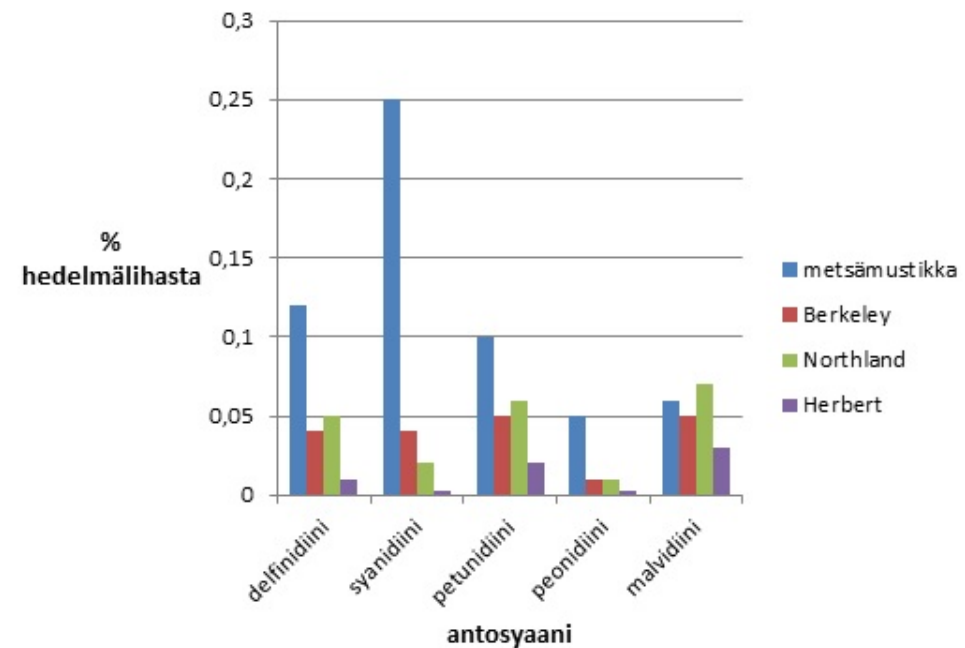


Total anthocyanidin (mg g⁻¹) in
bilberries (Åkerström et al 2010)



The peaks show the amounts of different types of anthocyanins
(Data from WAKASA SEIKATSU laboratory)

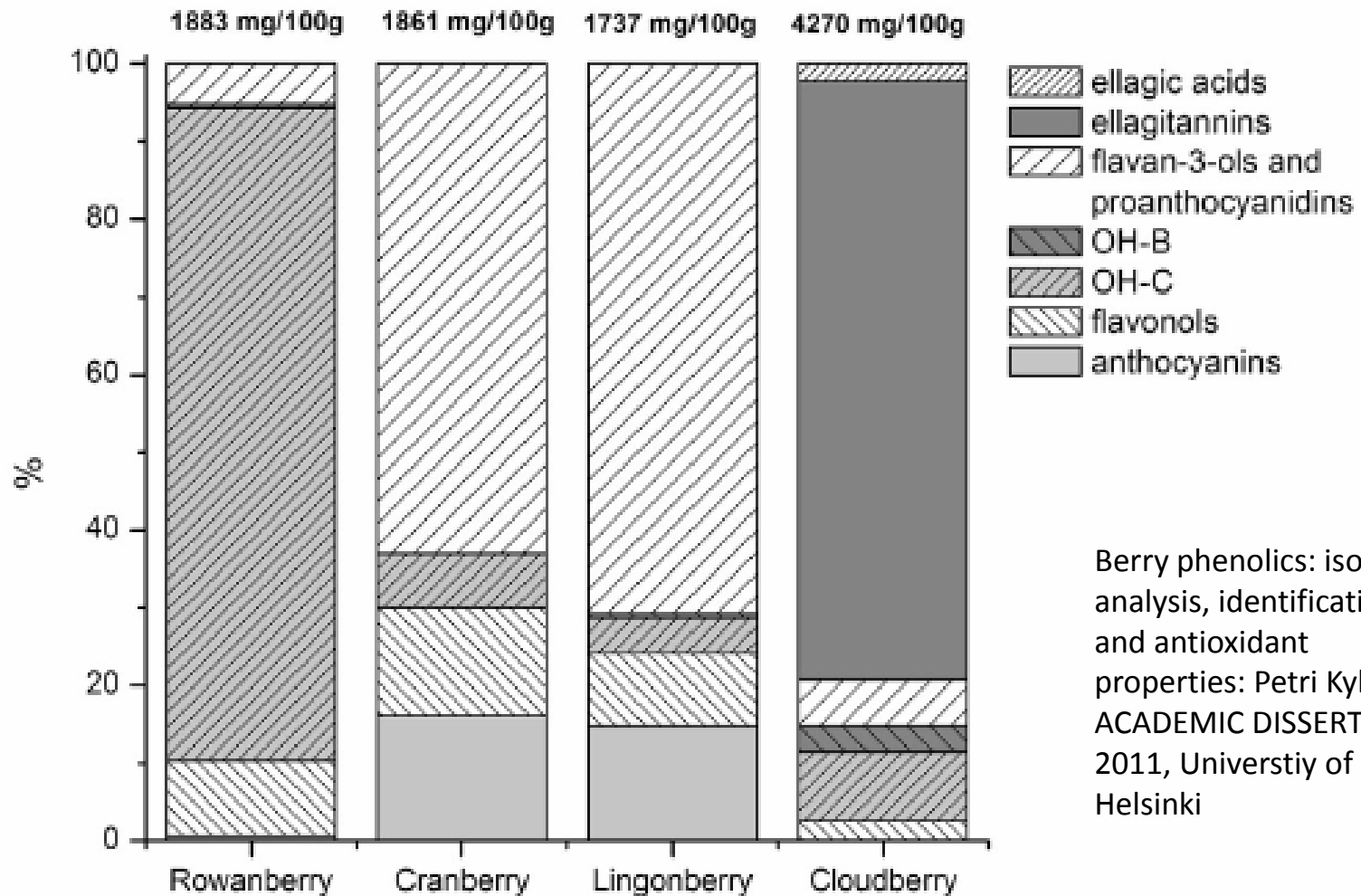
Eri antosyaanien osuus (%) marjan hedelmälihasta
metsämustikassa ja kolmessa pensasmustikan lajikkeessa



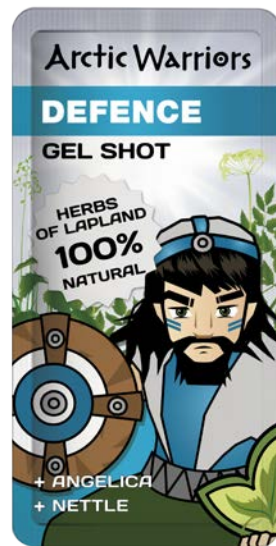
Crowberry (*Empetrum nigrum* L.) wild berry occurring widely throughout the northern hemisphere.

- 15 anthocyanins; 15 (11 structure elucidated) in all samples in order to profile-specific anthocyanin compositions throughout Finland.
- Significant variation in the concentrations of different anthocyanins between and within crowberry populations were found suggesting that the **synthesis of anthocyanins is modified by site-specific environmental conditions**.
- The suitability of the crowberries as a potential source of health-promoting ingredients for incorporation into pharmaceutical and food industrial products is highlighted in this work due to the diverse anthocyanin profile.

*Variation in the anthocyanin concentration of wild populations of crowberries (*Empetrum nigrum* L subsp. *hermaphroditum*). Koskela AK, Anttonen MJ, Soininen TH, Saviranta NM, Auriola S, Julkunen-Tiitto R, Karjalainen RO.*



Berry phenolics: isolation, analysis, identification, and antioxidant properties: Petri Kylli
ACADEMIC DISSERTATION, 2011, University of Helsinki



Nurturance cream
500 euro / kg

Extract concentrate
50 euro / kg



Packed freezed berries
8 euro / kg



Berries 1 euro / kg

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Thank You - multumesc

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*Supporting materials and pictures, unless otherwise indicated,
by courtesy of Arktiset Aromit*

*(www.arktisetaromit.fi/fi/arktiset+aromit/tutkimukset/) Arctic Warriors
and Rainer Peltola Rainer Peltola, Senior Research Scientist,
Natural Resources Institute of Finland*

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