Organ specific diversity in content of polyphenols among black currants (Ribes nigrum L.)

Michael Vagiri[1], Anders Ekholm[1], Eva johansson[2] and Kimmo Rumpunen[1]

1. The Swedish University of Agricultural Sciences, Department of Plant breeding and Biotechnology- Balsgård, Fjälkestadsvägen 459, SE-291 94 Kristianstad, Sweden

2. The Swedish University of Agricultural Sciences, Department of Agrosystems, Box 104, SE-230 53 Alnarp, Sweden

Michael.rajeev.vagiri@slu.se

Introduction

Many parts of black currant plants (buds, leaves and fruits) are rich sources of beneficial polyphenols with health promoting properties. For this reason extracts of blackcurrants with high antioxidant capacity are desired for functional foods.

Although buds and leaves cannot be consumed as they are, they can be conditioned as food supplements or added to food preparations or juice. The important phenolic compounds that occur in black currants are e.g. anthocyanins, glycosides of myricetin, quercetin, kaempferol, catechins, isorhamnetin and phenolic acids.




Conclusions

- In buds, content of epigallocatechin, catechin and epicatechin was higher in 'Ben Finlay' and SCRI-8944-13. Rutin was higher in 'Poesia' and 'Titania' with chlorogenic acid and quercetin being lowest among the cultivars tested.
- Content of the glycosides of quercetin, kaempferol and isorhamnetin were in-between for all the cultivars.
- Fruits contained high levels of anthocyanidins with cyanidin-3-*O*-rutinoside being dominant, whereas the catechins seemed to be the lowest.
- 'Ben Finlay' has high content of total phenols in buds, the lowest content was obtained for 'Poesia'. There was significant differences between the two latitudes.
- There was a large diversity among seedlings within breeding populations (Fig.3) in the content of total phenols which was in the same range as in fruits. This diversity is useful for breeding.

Objectives

The objective of the present study was to biochemically characterize different organs of the black currant plant, at different latitudes, for the content of specific and total polyphenols and estimate the diversity among cultivars.

We studied flavonols, phenolic acids, catechins and anthocyanidins.

Material and methods

Samples were collected in the south (Baslgård) (latitude 56º06'25.75'' N, altitude 19m) and north (Öjebyn) (latitude 65º21'19.02'' N, altitude 9m) of Sweden. The samples were freeze dried, ground and three replicates for each sample were re-extracted with 1.5 mL of 50% ethanol (v/v) using ultra sonic bath for 15 min. The extracts were then centrifuged for 10 min. The extracts were analyzed with HPLC-DAD and a Synergy Hydro-RP 80A (250x 4.60 mm, 4 micron) column to separate and quantify major phenolic compounds. Total phenols were determined according to Folin-Ciocalteu method.

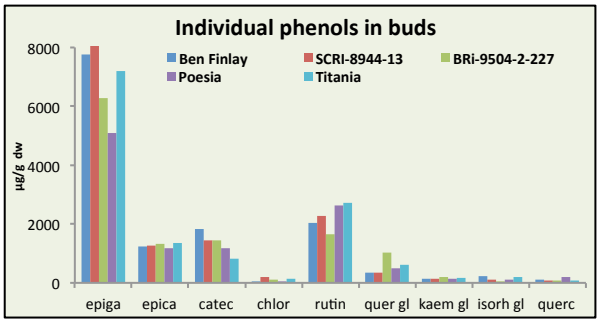

Fig 1. Diversity in the concentration (**µg/g dw)** of specific polyphenols in buds among different black currant genotypes

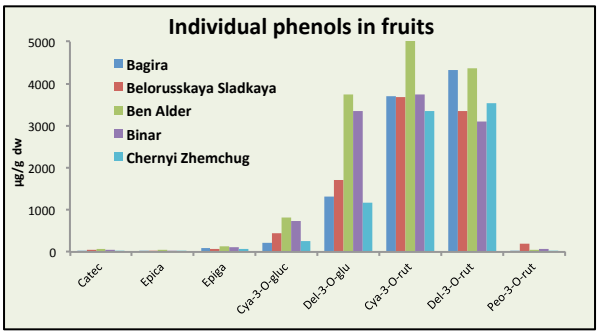

Fig 2. Differences in concentration (**µg/g dw)** of specific polyphenols in fruits collected from different cultivars

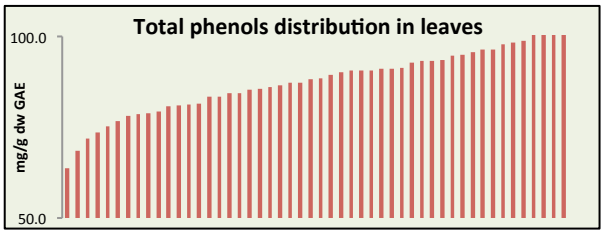

Fig 3. Distribution of concentration (mg/g GAE dw) of total phenols in leaves of seedling population of 50 individuals from population BRi-0701

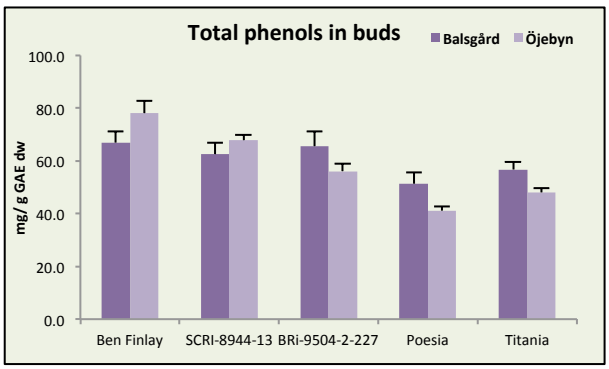

Fig 4. Diversity in the content of total phenols (mg/g GAE dw) in buds collected from the south (Balsgård) and north (Öjebyn) of Sweden

Stiftelsen Lantbruksforskning

The Interreg IVB North Sea Region Programme

Future-proofing berryfruit CLIMAFRUIT