

Phenolic compounds in blackcurrant leaves and berries grown without pesticides

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INTRODUCTION

The content of phenolic compounds (flavonoid glycosides and phenolic carboxylic acids) in blackcurrant leaves might be related to resistance against mildew and other pests (Trajkovski 1974). The purpose of this study was to develop an analytical method for separation and quantification of phenolic compounds, and to apply this method for analysing different blackcurrant varieties.

MATERIALS AND METHODS

Four varieties of *Ribes nigrum* L.; Ben Lomond, Farleigh, Bri 8315-25 and Titania were grown without use of pesticides. Leaves were collected at 3 times during the growing season, at the 22. of May, the 4. of June and 27. of June 1997. Berries were collected at maturity. Samples were frozen immediately after collection.

Freeze-dried material was extracted with water-acetonitrile-TFA (49,5:50:0,5 % v/v). HPLC was performed with a Diode array detector Merck L-7450 and a Develosil ODS-HG; 250-4,6 mm column. Eluent A: water-acetonitrile-TFA (49,5:50:0,5 % v/v) and eluent B: water-acetonitrile-TFA (91,5:8:0,5 % v/v). The phenolic compounds were quantified at their absorption maxima which was 320 nm for the flavonoids and the phenolic acids, and 535 nm for the anthocyanins.

RESULTS

As many as 80 different phenolic compounds were present in the extract of blackcurrant leaves, but the main part only in very low concentration. The seven major compounds were chosen and named A, B, C... in the leaves and M, N, O... in the berries. Fig 1 displays the concentration of the phenolic compounds in the leaves of 'Farleigh', 'Bri 8315-25', 'Titania' and 'Ben Lomond'. Large variations is seen between the four varieties. Generally the highest concentration of phenolics is seen in variety 'Bri 8315' and the lowest in variety 'Farleigh' this is especially evident for compound A, B, C and F; and this pattern was the same for the two later sampling dates. Compound A, B and C are all phenolic acids.

Comparing first collection date (end of May) to last collection date (end of June) a clear decline in the concentration of compound A, B and C is observed, but the distribution between the varieties remains the same. Compound D, E, F and G are largely unaltered from end of May to end of June (data not shown).

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Data for pest infection level have been collected for growing season 1997 but these data have not yet been evaluated. Data from growing season 1996 is shown in Table 1.

Table 1. Infection of yellow pine blister rust (growing season 1996) rated on a scale 1-10,

1 = no infection. Data were collected in September 1996.

variety	Farleigh	Bri 8315	Titania	Ben Lomond
rust level	8,7	2,2	6,3	7,3

'Farleigh' had the most severe rust infection level and 'Bri 8315' had clearly the lowest infection level. Could this be related to the described major differences in concentration of compound A, B, C and F between 'Farleigh' and 'Bri 8315'? Further investigations are necessary to answer this question.

REFERENCES

- Trajkovski, Viktor. Resistance to *Sphaerotheca mors-uvae* (Schw.) Berk. in *Ribes nigrum* L. Swedish J. Agric. Res. 1974, 4: 99-108.

Fig 1. Phenolics in blackcurrant leaves, collected 22. may

