



ANALYTICAL REPORT

Client	Blackcurrants New Zealand Ltd
Sample(s) Analysed	Five frozen berry samples were analysed for individual anthocyanins, total anthocyanins, and vitamin C content by HPLC and for antioxidant capacity using the ORAC _{FL} , FRAP and Folin-Ciocalteu assays.
Date Received	11 July 2007
HortResearch Ref	EA56
Results	Refer to page 2 for result tables
Comments	<p>ORAC_{FL} Method: Based on Ou et al (Journal of Agriculture and Food Chemistry 49: 4691-4626 2001) an improvement on the method developed by Cao et al (Clinical Chemistry 41: 1738-1744 1995). FRAP Method: Based on protocol used by Scottish Crops Research Institute (Deighton, et al., 2000) as adapted from Benzie and Strain (1996). Folin-Ciocalteu Method: Based on protocol of Coseteng and Lee (1987). Anthocyanin and Vitamin C concentrations were determined by reversed-phase HPLC.</p> <p>Standards: Trolox (water soluble vitamin E analogue); gallic acid; cyanidin-3-glucoside; ascorbic acid</p> <p>FRAP & ORAC reported as mmol of Trolox equivalents per 100g of fruit. Folin-Ciocalteu reported as mmol of gallic acid equivalents per 100g of fruit. Total vitamin C (combined ascorbic acid and dehydroascorbic acid) reported as mg per 100g of fruit. Total anthocyanins reported as mg of cyanidin-3-glucoside equivalents per 100g of fruit. Individual anthocyanins reported as µg of cyanidin-3-glucoside equivalents per gram of fruit.</p>
Analyst	Dan Comeskey
Checked	Tony McGhie
Date	Tuesday, 17 July 2007

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	NZ Blackcurrant Ben Rua	NZ Blackcurrant Ben Ard	Swedish Bilberry	European Bilberry	Canadian Blueberry
FRAP mmol TE/100g	5.22	5.55	3.75	2.85	1.35
ORAC mmol TE/100g	9.51	12.15	12.04	10.20	6.00
Folin-Ciocalteu mmol GAE/100g	660	688	617	502	271
Total Vitamin C mg/100g	191	175	1.4	0.7	5.1
Total Anthocyanins mg/100g	517	584	526	431	135

Anthocyanin µg/g	NZ Blackcurrant Ben Rua	NZ Blackcurrant Ben Ard	Swedish Bilberry	European Bilberry	Canadian Blueberry
Delphindin-galactoside	n.d.	n.d.	685	482	132
Delphindin-glucoside	369	899	688	460	84
Delphinidin-rutinoside	2325	2049	n.d.	n.d.	n.d.
Cyanidin-galactoside + Delphindin-arabinoside	n.d.	n.d.	1163	894	n.d.
Delphindin-arabinoside	n.d.	n.d.	n.d.	n.d.	155
Cyanidin-glucoside	153	456	557	500	12
Petunidin-galactoside	n.d.	n.d.	210	179	75
Cyanidin-rutinoside	2120	2252	n.d.	n.d.	n.d.
Cyanidin-arabinoside	n.d.	n.d.	417	362	14
Petunidin-glucoside	n.d.	n.d.	417	322	78
Petunidin-arabinoside	n.d.	n.d.	207	183	66
Malvidin-galactoside	n.d.	n.d.	390	407	220
Malvidin-glucoside	n.d.	n.d.	422	396	163
Malvidin-arabinoside	n.d.	n.d.	85	94	197
Minor Anthocyanins	208	180	16	29	151
Total Anthocyanins	5175	5836	5257	4310	1348