Is there any difference between albino and ordinary bilberry (Vaccinium myrtillus)?

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INTRODUCTION

Rare forms of plants are known to excite gardeners and breeders. Some of the berry producing plants are also in the interest of the producers and processing facilities. These unique forms may possess characteristics which make them valuable, for example bigger crops or berry size, improved quality (nutritional or processing potential) of berries or extraordinary form or color of berry or plant.

Albino forms of bilberry (Vaccinium myrtillus L) (Picture 1.) are rare and are known only from few locations in Finland. High content of anthocyanins is characteristic for bilberry and it is arguable the most anthocyanin rich berry on the market. Anthocyanins give the distinctive dark blue color to the berries of bilberry. The high content of anthocyanins is related also to health benefits of bilberry.

Picture 1. Albino form of bilberry (*Vaccinium myrtillus* L)

AIM OF THE STUDY

To investigate and compare the quantity of :

- Main phenolic compounds (anthocyanins, chlorogenic acids, proanthocyanidins and other flavonoids)
- Sugars
- Organic acids

of ordinary blue and albino bilberry berries.

RESULTS

Expectedly content of phenolic compounds, which are associated with health benefits, is much lower in albino than in the blue colored bilberry (Table 1.). That was mostly due to the lack of anthocyanins in albino bilberries. There was no significant difference between the organic acid content in the berries but interestingly, the sugar content (glucose and fructose) was higher in albino than in ordinary bilberry.

Table 1. Chemical compounds identified from albino and ordinary bilberry (mg/100g; average ± sd, n = 2-3).

	Albino (tp/kp)	Ordinary (tp/kp)	p-values (two-way t-test)
anthocyanins (total), n=3		**694 ± 19 / 6340 ± 170**	**0.0002 / 0.0002**
chlorogenicacid, n=3	**18,7 ± 0,2 / 159 ± 2**	**23,5 ± 1,0 / 178 ± 7**	**0.014 / 0.051**
Proanthocyanidins (total), n=3	**280 ± 26 / 2390 ± 220**	**353 ± 26 / 3220 ± 240**	**0.0007 / 0.0005**
Average polymeratization rate (DP)	12.0	9.8	0.040
A-tyypin sidososuus (%)	3.8	3.3	0.108
flavonols (total), n=2	**1,17 ± 0,09 / 9,94 ± 0,73**	**0,50 ± 0,02 / 4,28 ± 0,16**	**0.126 / 0.112**
myricetin	0,34 ± 0,02 / 2,93 ± 0,19	0,95 ± 0,09 / 8,75 ± 0,84	0.083 / 0.079
quercetin	0,14 ± 0,01 / 1,21 ± 0,05	0,05 ± 0,01 / 0,50 ± 0,12	0.049 / 0.057
kaempferol	0,17 ± 0,01 / 1,47 ± 0,04	0,48 ± 0,01 / 4,41 ± 0,10	0.017 / 0.016
Isorhamnetin	0,51 ± 0,06 / 4,32 ± 0,49	0,49 ± 0,05 / 4,49 ± 0,53	0.878 / 0.854
sugars (total), n=2	**7220 ± 70 / 61500 ± 600**	**5490 ± 20 / 50100 ± 200**	**0.024 / 0.031**
Glucose	3400 ± 60 / 28200 ± 500	2430 ± 10 / 22200 ± 100	0.016 / 0.023
fructose	3900 ± 10 / 33300 ± 100	3050 ± 10 / 27900 ± 100	0.031 / 0.038
Organic acids (total), n=2	**1680 ± 40 / 14300 ± 300**	**2250 ± 100 / 20600 ± 900**	**0.145 / 0.119**
Oxalic acid	ND	32 ± 1 / 290 ± 10	
Citric acid	910 ± 10 / 7770 ± 100	1280 ± 60 / 11700 ± 600	0.130 / 0.111
Malic acid	450 ± 20 / 3850 ± 150	380 ± 10 / 3430 ± 70	0.205 / 0.311
Succinic acid	240 ± 10 / 2050 ± 20	500 ± 30 / 4600 ± 230	0.054 / 0.051
Acetic acid	70 ± 10 / 610 ± 70	61 ± 1 / 560 ± 10	0.502 / 0.676

DISCUSSION

Though the nutritional value in albino form is not necessary as good as in ordinary bilberry, the albino form of bilberry can be valuable for nurseries. For example Carl Fredrik Waern wrote already in 1834 about the use of albino lingonberry (*Vaccinium Vitis idae fructu albo*) in Baldersnäs garden in Sweden.

Albino bilberry´s organoleptic properties (except color) are the same as in colored bilberry, but it does not stain. Therefore it might have market value if cultivated for food industry as specialty berry.

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