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Lipid and polyphenol composition in *Vaccinium* wild berries and cultivars

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Introduction

Cultivated and wild berries from forests and bogs of Northern Europe are an excellent source of biologically active natural substances such as antioxidants, vitamins and fatty acids. Since berries are an essential part of diet and their processing is a major direction in food industry, it is necessary to analyse these valuable phytochemicals in berries. **The aim** of this study was to perform a comparative analysis of lipids, total polyphenols, flavonoids and other groups of extractives in genus *Vaccinium* wild berries and cultivars.

Materials

Latvian berries collected in summer & autumn 2017

- blueberries (*Vaccinium myrtillus* L.)
- highbush blueberries (*Vaccinium corymbosum* L.)

cultivars:

- North blue
- Duke
- Chippewa
- Blue ray
- Blue gold
- Blue crop
- Polaris
- Patriot

- bog bilberries (*Vaccinium uliginosum* L.)
- lingonberries (*Vaccinium vitis-idaea* L.)
- American cranberries (*Vaccinium macrocarpon* L.)
- bog cranberries (*Vaccinium oxycoccos* L.)

Methods

- Berry lipids were extracted with chloroform, derivatized with N,O-bistrifluoroacetamide and analysed using gas chromatography – mass spectrometry
- Polyphenols and anthocyanins, extracted using 70% ethanol and formic acid, were analysed by high performance liquid chromatography-mass spectrometry

Results

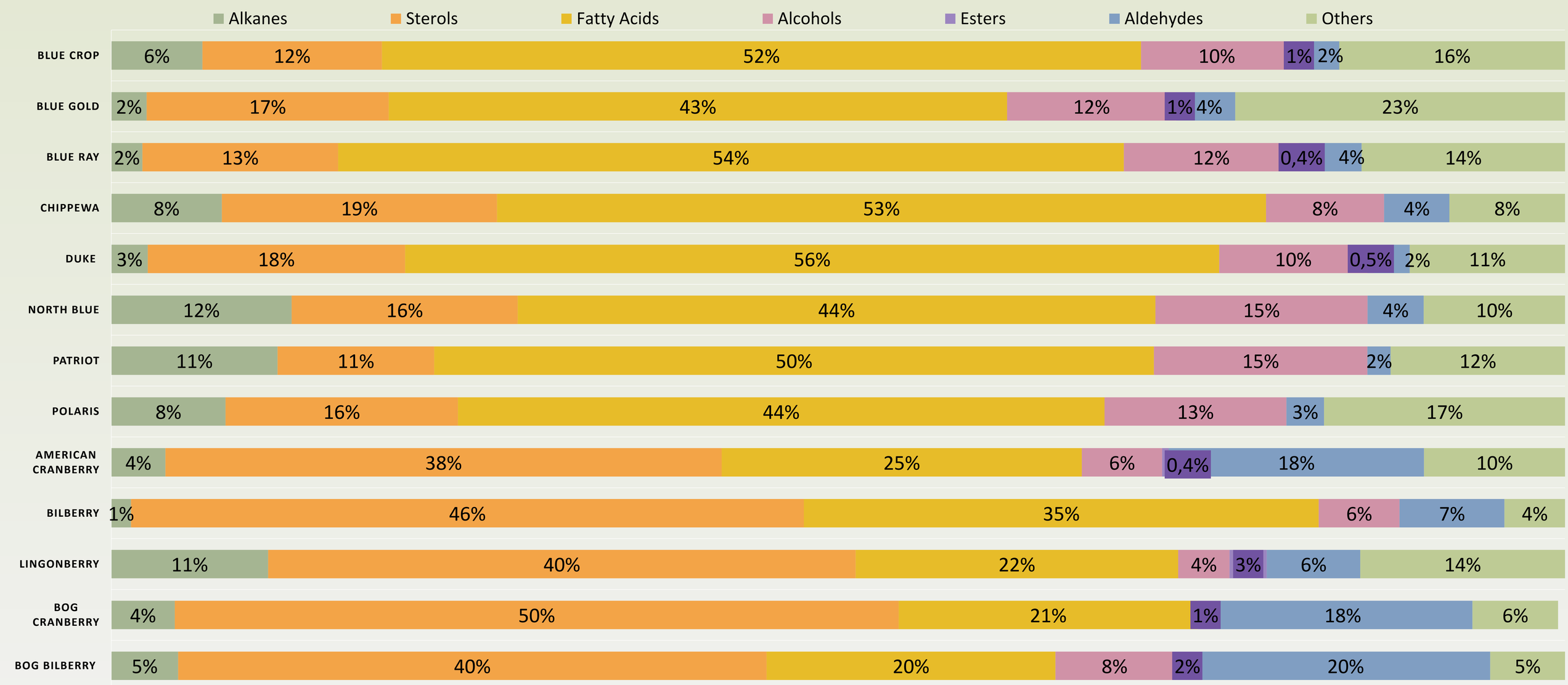
Table 1: Fatty acid content in genus *Vaccinium* berries g/100 g of lipid extract (n/f - not found)

Fatty acids	Bilberry	Blueberry	Lingon-berry	Bog cranberry	American cranberry
Capric	n/f	n/f	n/f	n/f	n/f
Lauric	0.24	n/f	n/f	n/f	n/f
Palmitic	1.73	0.53	0.59	1.67	0.76
Linoleic	3.87	1.45	1.90	2.45	2.71
Linoelaidic	4.29	3.89	3.29	2.37	2.67
Elaidic	n/f	n/f	n/f	n/f	n/f
Stearic	0.41	n/f	0.27	0.34	0.25
Arachidic	0.76.	0.34	0.49	0.46	0.39
Behenic	n/f	0.34	1.36	0.87	0.72
Lignoceric	1.96	1.48	4.26	0.96	2.50
Pentacosanoic	n/f	0.17	n/f	n/f	n/f
Cerotic	n/f	1.94	1.59	0.34	0.69
Montanic	3.76	3.41	1.82	1.87	2.49
Triacontanoic	0.68	1.13	3.79	3.56	2.75
Sinapic	n/f	n/f	n/f	n/f	0.27

Table 2: Anthocyanin content in genus *Vaccinium* berries g/100 g of berry powder (n/f - not found; <LOQ – below quantification limit)

Anthocyanins	Bilberry	Blueberry	Lingonberry	Bog cranberry	American cranberry
Delphinidin-3-O-galactoside	0.119	0.196	0.109	0.039	0.092
Delphinidin-3-O-glucoside	0.688	0.342	0.169	0.338	0.305
Delphinidin-3-O-arabinoside	0.604	0.810	0.054	0.048	n/f
Delphinidin-3-O-xyloside	0.357	0.085	0.074	0.146	0.115
Malvidin-3-O-xyloside	0.127	0.170	0.215	0.168	0.113
Malvidin-3-O- glucoside	0.278	0.176	0.402	0.229	0.190
Malvidin-3-O-acetyl-glucoside	<LOQ	0.007	0.001	<LOQ	<LOQ
Petunidin-3-O-galactoside	0.129	0.133	0.155	0.074	0.070
Petunidin-3-O-glucoside	0.029	n/f	0.001	0.014	0.012
Petunidin-3-O-acetyl-glucoside	0.005	0.010	0.0005	<LOQ	0.0003
Cyanidin-3-O-galactoside/glucoside	0.206	0.083	0.050	0.291	0.066
Cyanidin-3-O-arabinoside/ xyloside/cyanidin aldopentose-hexoside	n/f	0.180	0.014	0.210	0.502
Cyanidin-3-O-acetyl-glucoside	n/f	<LOQ	<LOQ	n/f	n/f
Peonidin-3-O-arabinoside/xyloside	0.052	0.149	0.024	0.368	0.536
Peonidin-3-O-acetyl-glucoside	n/f	n/f	n/f	n/f	n/f

Table 3: An apportionment of genus *Vaccinium* berry extractives obtained from GC-MS analysis



Conclusions: overall, the cultivated highbush blueberries (*Vaccinium corymbosum* L.) were found have the highest amounts of lipids, while being much less rich in polyphenols than other *Vaccinium* berries. Bog bilberry (*Vaccinium uliginosum* L.) had the highest amount of polyphenols, whereas blueberries (*Vaccinium myrtillus* L.) had the least amount of lipids

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