

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

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Background: 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 [1]. 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.

Aim: 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.

Methods: during the summer and autumn of 2017 the following berries were collected in Latvia and analysed: blueberry (*Vaccinium myrtillus* L.), highbush blueberry (*Vaccinium corymbosum* L.) cultivars, i.e., North blue, Duke, Chippewa, Blue ray, Blue gold, Blue crop, Polaris and Patriot, bog bilberry (*Vaccinium uliginosum* L.), lingonberry (*Vaccinium vitis-idaea* L.), American (*Vaccinium macrocarpon* L.) and bog cranberry (*Vaccinium oxycoccos* L.). Berry lipids were extracted with chloroform, derivatized with N,O-bis(trifluoroacetyl)amide and afterwards analysed using gas chromatography – mass spectrometry [2]. Polyphenols and anthocyanins, extracted using 70% ethanol and formic acid, were analysed by high performance liquid chromatography-mass spectrometry [3].

Results: in the 6 types of the analysed berries 76 lipid compounds and 70 polyphenol compounds were identified and quantified. The lipid fraction contained such compound classes as fatty acids, sterols, triterpenoids, alkanes, phenolic and carboxylic acids, and carotenoids. All fresh berries contained high amounts of C₁₈ unsaturated fatty acids (up to 102 mg/100 g for blueberries) and phytosterols (86 mg of β -sitosterol/100 g of blueberries). Apart from that, amino acids and vitamins (mostly B group and vitamin C) were quantified as well.

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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References:

[1] Klavins, L.; Klavina, L.; Huna, A.; Klavins, M. Polyphenols, carbohydrates and lipids in berries of *Vaccinium* species. *Environmental and Experimental Biology*. 2015, 13, 147-158.

[2] Klavins, L.; Kviesis, J.; Steinberga, I.; Klavina, L.; Klavins, M. Gas chromatography-mass spectrometry study of lipids in northern berries. *Agronomy Research*. 2016, 14, 1328-1346.

[3] Klavins, L.; Kviesis, J.; Klavins, M. Comparison of methods of extraction of phenolic compounds from American cranberry (*Vaccinium macrocarpon* L.) press residues. *Agronomy Research*. 2017, 15(2), 1316-1329.

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