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MEETING ABSTRACT

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Berries of *Vaccinium* spp.: a valuable source of polyphenols with potential for application in diverse pharmaceuticals

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Background: Plants are an important source for the development of new pharmaceuticals. As prospective source, plants traditionally used in food and ethnomedicine, can be considered, for example, berries of *Vaccinium* spp. (cranberries, lingonberries, blueberries and others). It has been demonstrated that these berries contain various polyphenols in high concentrations. Extracts of *Vaccinium* spp. berries have a role in developing novel pharmaceutically active ingredients [1].

Objectives: The aim of this study was to obtain polyphenolic extracts from 5 different *Vaccinium* spp. berries, evaluate antiproliferative activity against dermal fibroblasts and antimicrobial activity of these extracts.

Methods: Bog cranberries, lingonberries, American cranberries, bilberries and blueberries were harvested in the summer/autumn of 2016 in the bogs and forests of Latvia. Berry press residues were used for the extractions. Various extraction methods were tested (Soxhlet, microwave, ultrasound-assisted extraction etc.), composition of extraction solvent was optimized using response surface approach (RSM) [2]. Obtained optimal extracts were purified using XAD7-HP sorbent. The polyphenolic composition was described using HPLC-PDA and ORBITRAP-MS. DPPH, ABTS and FRAP were used to determine the antioxidative potential. Antimicrobial activity was determined using agar diffusion method. Dermal fibroblast cell cultures were employed to determine the effects of polyphenol extracts (cell proliferation and flow cytometry).

Results: Performed investigation of possibilities for the extraction of berry phenolics revealed ultrasound-assisted extraction to be the method of choice. Response surface methodology was used to identify the optimal solvent concentrations used for the extraction of total polyphenols and anthocyanins, ethanol and methanol acidified with trifluoroacetic acid gave the highest extraction outcome. In total, 37 individual polyphenols were identified and quantified, allowing to perform chemotaxonomic analysis. The prepared polyphenol concentrates (polyphenolic contents up to 56%) were described to have a high radical-scavenging activity, which was measured *in vitro* by cell cytometry; also, the extracts' ability to interrupt proliferation of dermal fibroblasts was observed. Moreover, the extracts show antimicrobial activity against various pathogenic microorganisms (*Bacillus*, *Micrococcus*, *Staphylococcus*).

Conclusions: A strategy to produce berry extracts with high polyphenol concentrations was created and optimized. Obtained polyphenol extracts showed outstanding antiradical and antimicrobial properties, in addition, antiproliferative properties were observed, demonstrating plausible anticancer features.

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Keywords: polyphenols – *Vaccinium* – antiradical activity – berries – lipids

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