

## Optimisation of phenolic compound extraction from *Vaccinium* spp. berry press residues

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Wild berries from forests and bogs of Northern Europe are an excellent source of natural antioxidants represented by different phenolic compounds. The berries of *Vaccinium* species have been used in traditional medicine and as food, their health benefits have been recently recognized for possible use in modern medicine in treating and preventing diseases as well as for development of nutraceuticals<sup>1</sup>. For example, cranberry juice containing proanthocyanidins is known to prevent urinary tract infections caused by uropathogenic *E.coli* adhesion to the walls of urinary tract epithelia<sup>2</sup>.

The composition of various berries from *Vaccinium* species was studied: blueberry (*Vaccinium myrtillus* L.), bilberry (*Vaccinium uliginosum* L.), highbush blueberry (*Vaccinium corymbosum* L.), lingonberry (*Vaccinium vitis-idaea* L.), cranberry (*Vaccinium oxycoccos* L.). After the cold pressing of berry juice the berry press-residues are usually discarded as waste. However, this berry processing by-product contains numerous biologically active substances- flavanols, anthocyanins, phenolic acids, procyanidins etc.<sup>3</sup> The aim of this study was to extract a complex of phenolics from press residues of *Vaccinium* berries and to optimise extraction conditions. To achieve this aim different extraction methods were tested (maceration, Soxhlet extraction, ultrasound treatment, microwave assisted extraction, supercritical CO<sub>2</sub> extraction with ethanol as co-solvent). Berry phenolics have been extensively studied<sup>4</sup>, however, this work concentrates on industrial or semi-scale application using methods and solvents that can be applied in food industry. Further, various solvents for extraction have been studied, and as best solvent system acidified, aqueous lower alcohols have been identified. Response surface methodology was employed to further optimise the concentration of solvents used and maximize the amount of extracted polyphenols. The extraction efficiency was characterised using the amount of total phenolics, total anthocyanins, total sugars, proanthocyanidins and dry residue. The anthocyanin composition in the extracts was characterised using UHPLC-PDA. The optimised extraction procedure allows to obtain high yields of various berry phenolics, specifically, anthocyanins that can be used in food industry as part of food supplements and nutraceuticals.

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