APPRAISING BLUEBERRY RESIDUES AS A NATURAL SOURCE OF BIOACTIVE COMPOUNDS

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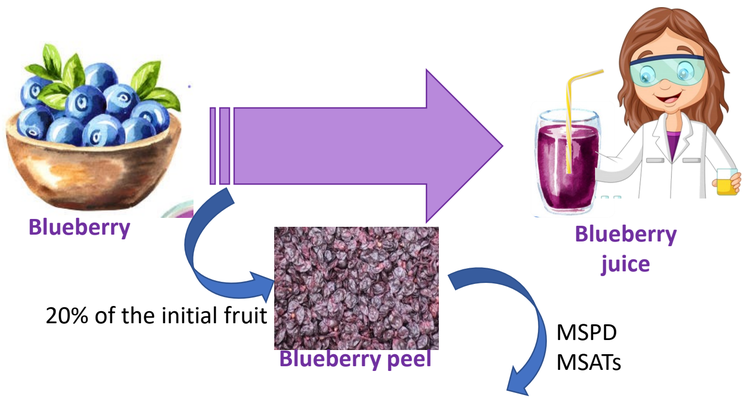
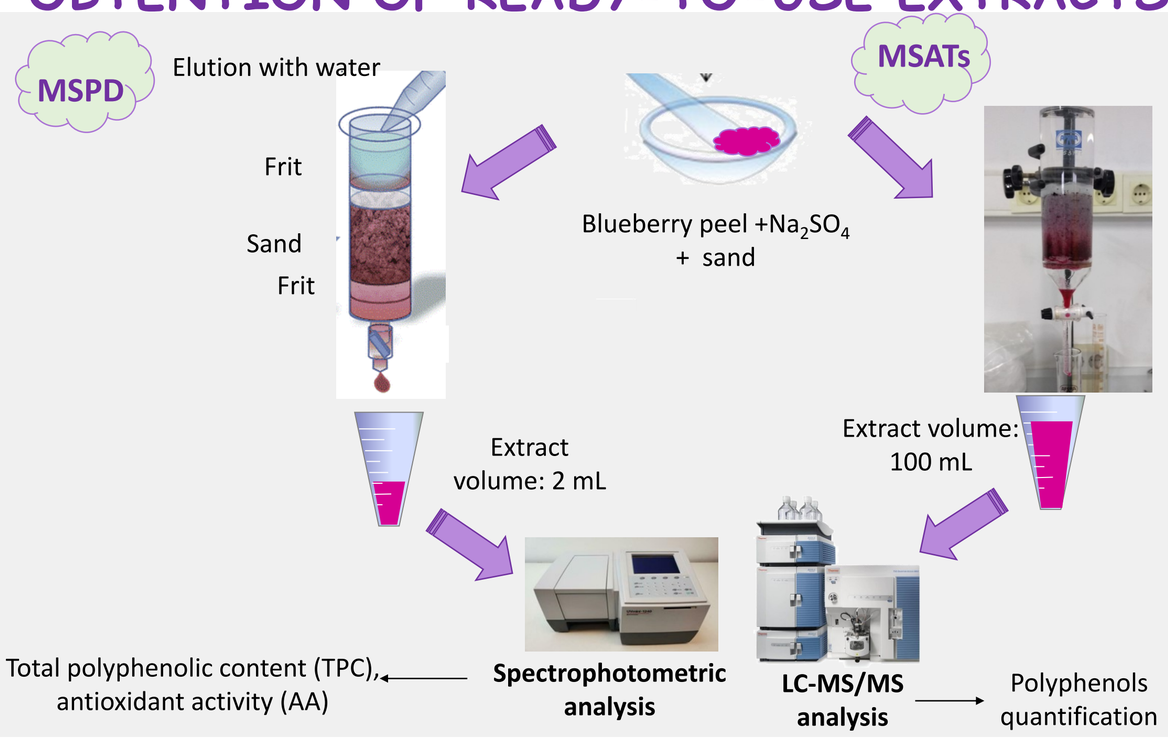
INTRODUCTION



Extracts rich in bioactive compounds to be used in other applications

The main solid by-product of the blueberry juice processing is peel, representing up to 20% of the initial fruit weight. Its excessive accumulation causes a seasonal management and environmental problem. The main objective of this work is to perform a deep characterization of the blueberry peel residues, and their derived extracts. To obtain extracts, environmentally friendly procedures, matrix solid-phase dispersion (MSPD) and Medium-scale Ambient Temperature Systems (MSATs), have been employed. Physical, mechanical, and chemical characteristics of the raw material (blueberry), as well as the total polyphenolic content (TPC) and antioxidant capacity of the corresponding by-products and derived extracts were assessed. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) was employed to quantify individual phenolic compounds.

OBTENTION OF READY-TO-USE EXTRACTS

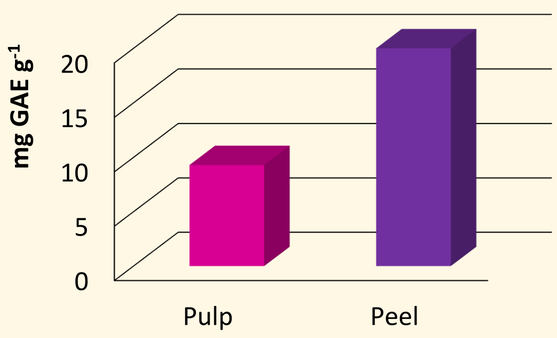


Advantages of using MSPD and MSATs to obtain blueberry peel extracts

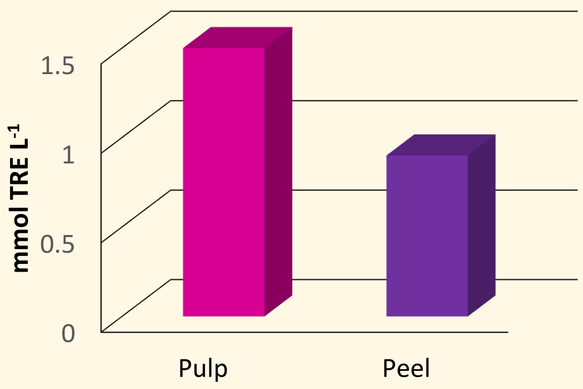
- Environmentally friendly methodology, fullfilling with the GAC principles (water as extractant).
- No further steps are needed before analysis, since simultaneous extraction and clean-up is Performed in a single step.
- Low-cost material and low reagents consumption.
- Zero energy consumption
- Ready-to-use extracts in other applications

PHYSISCOCHEMICAL PARAMETERS

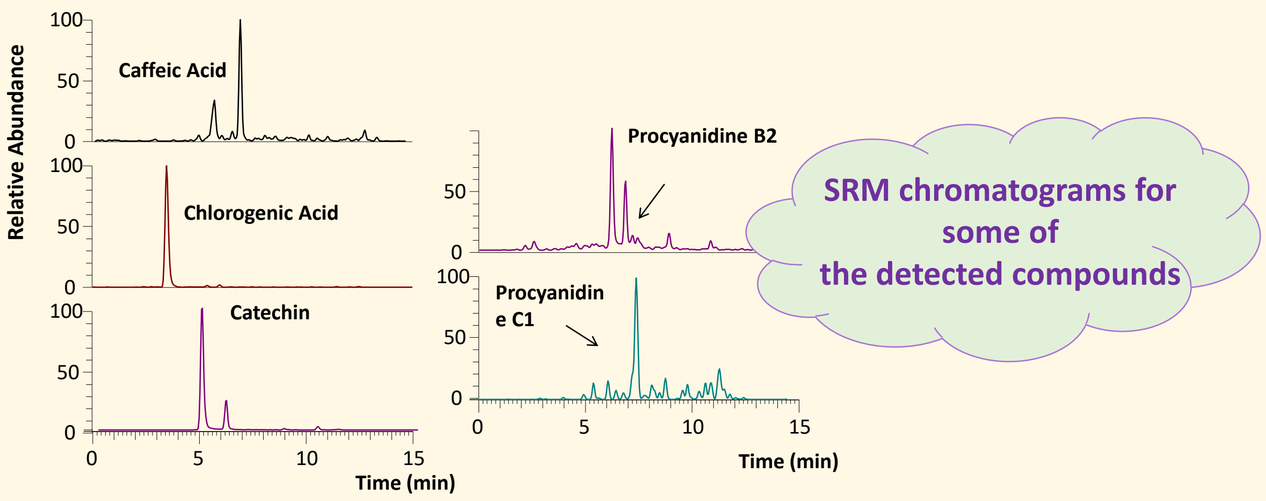
Total polyphenolic content (TPC)



Antioxidant activity (AA)



TPC content was clearly higher in the peel extracts, whereas results were similar for AA in both extracts



CHARACTERIZATION OF BIOACTIVE COMPOUNDS

Polyphenols Group	Compound name	Liquid extract* Concentration (µg/g dw)	Solid extract* (freeze-dryed) Concentration (µg/g dw liophilized)
Hydroxycinnamic acids	Caffeic Acid	1.4 ± 0.3	0.18 ± 0.01
	Clorogenic Acid	1225 ± 331	107 ± 15
	∑ Non-Flavanoids	**1226**	**107**
Flavan-3-ols	Catechin	37 ± 10	1.2 ± 0.6
	Epicatechin	4.8 ± 0.2	0.6 ± 0.2
	∑ Flavan-3-ols	**42**	**2**
Flavan-3-ols oligomeric derivatives	Procyanidine A1	107 ± 14	3.6 ± 0.1
	Procyanidine B2	77 ± 29	3 ± 1
	Procyanidine C1	551 ± 251	21 ± 10
	∑ Procyanidines	**735**	**60**
Flavonols	Quercetin	144 ± 40	19 ± 3
	Isoquercetin	517 ± 165	44 ± 7
	Rutin	65 ± 35	5 ± 1
	Myricetin	23 ± 7	3.3 ± 0.4
	∑ Flavonols	**749**	**71**
Anthocyanidins	Delphinidin	1327 ± 278	25 ± 8
	Cyanidin	780 ± 74	27 ± 5
	Petunidine	1526 ± 411	37 ± 9
	Peonidin	85 ± 29	6 ± 1
	Malvidin	2353 ± 1125	204 ± 84
Anthocyanins	Petunidin-3-O-glucoside	318 ± 141	24 ± 11
	Cyanidin-3-glucoside	510 ± 193	48 ± 20
	∑ Anthocyani(di)ns	**6899**	**371**
	∑ Flavanoids	**1526**	**133**
	Σ BIOACTIVE POLYPHENOLS	**9651**	**611**

* Results showed for MSATs extraction

CONCLUSIONS

- Anthocyanins were the most abundant polyphenolic group of compounds in the blueberry peel extracts reaching concentrations up to 6899 µg g^{-1}dw.
- Other compounds with interesting properties such as quercetin and its derivatives (isoquercetin, rutin), caffeic and chlorogenic acids were also found at high concentration levels (1226 µg g^{-1}dw) in the obtained blueberry peel extracts.
- The ultimate goal of this work is investigating the utility of food processing wastes as raw materials to obtain extracts with added value to be used in new products with beneficial health properties.

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