

Blackcurrant (*Ribes nigrum* L.) Seeds – A Valuable Byproduct for Further Processing

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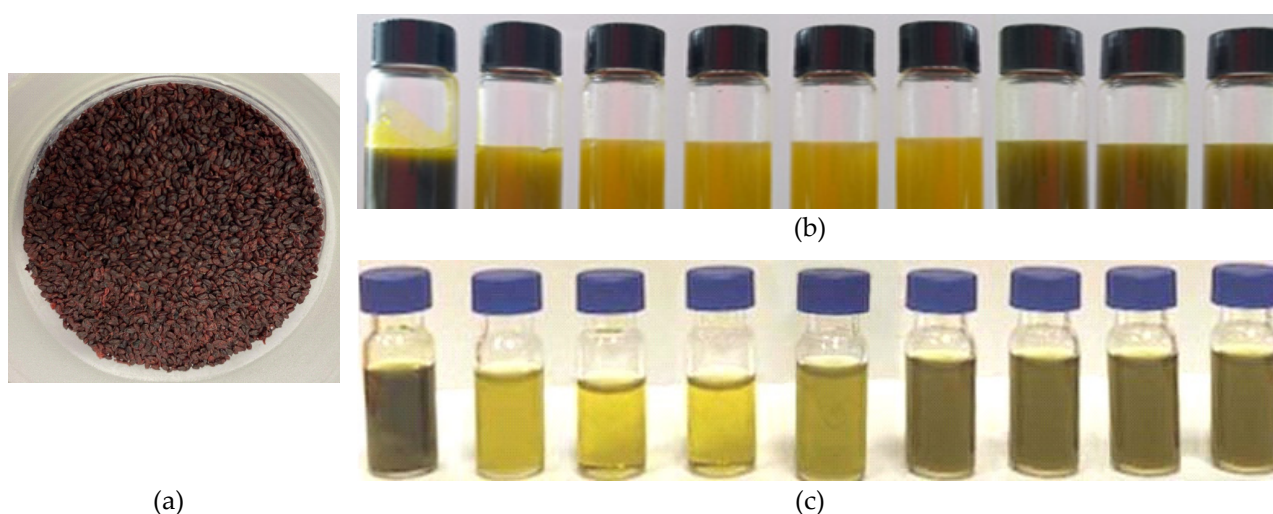


Figure S1. Blackcurrant seeds (a) and the example of samples of blackcurrant oil fractions obtained using CO₂ at pressure of 230 bar (b) and pressure of 330 bar (c).

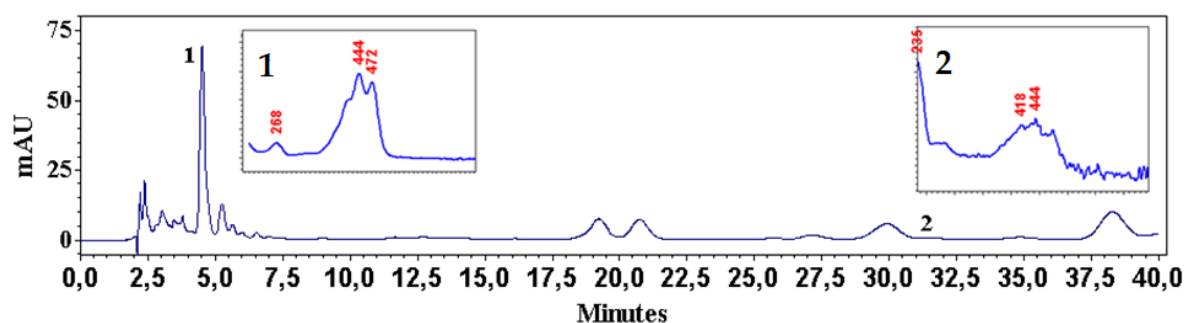


Figure S2. Chromatogram of oil sample obtained using CO₂ at pressure 230 bar (fraction F1) and representative UV-Vis spectra of identified compounds. 1- lutein, 2- β -carotene

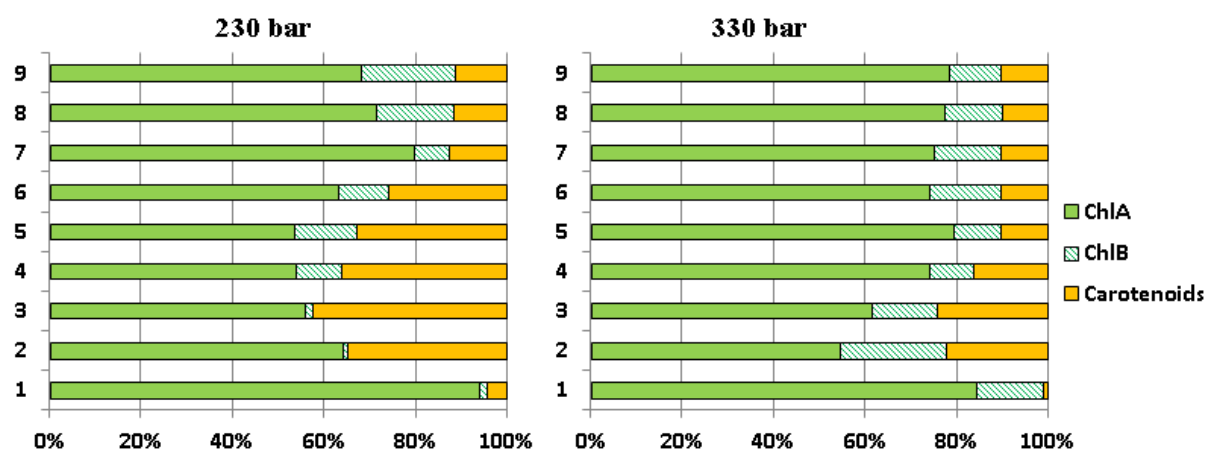


Figure S3. Percent distribution of pigments in oil fractions obtained using CO₂ at pressure of 230 and 330 bar.

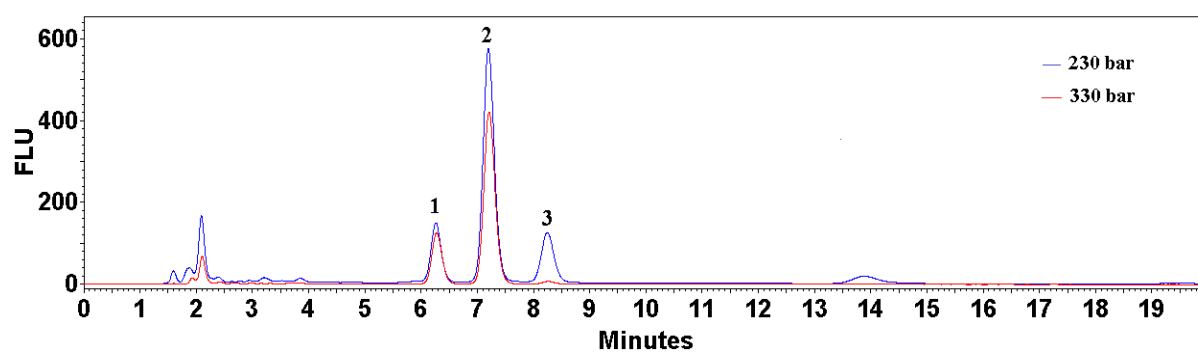


Figure S4. FL-chromatogram of fraction F1 the oil obtained using CO₂ at pressure 230 bar 1- δ tocopherol, 2- γ tocopherol, 3- α tocopherol

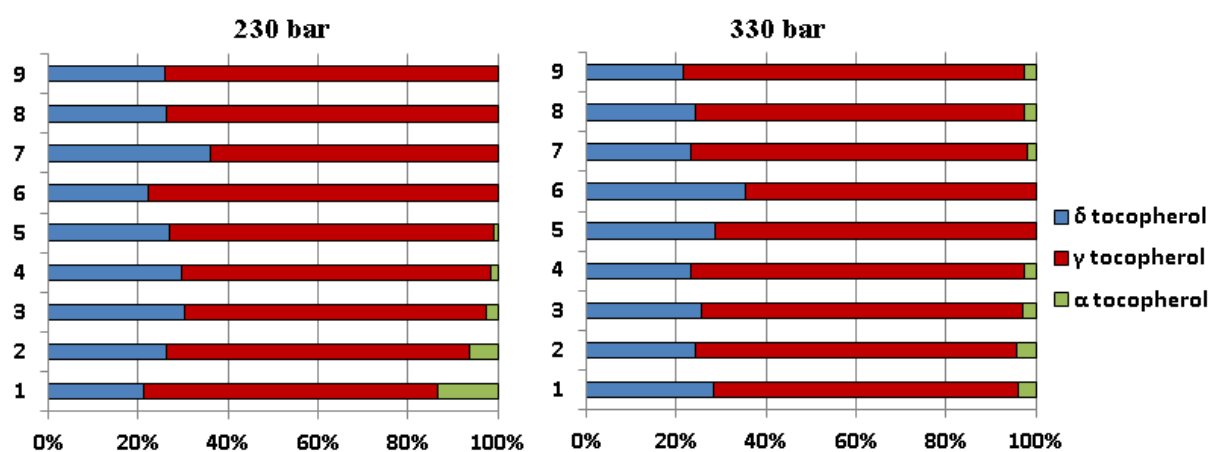


Figure S5. Percent distribution of tocopherols in oil fractions obtained using CO₂ at pressure of 230 and 330 bar.

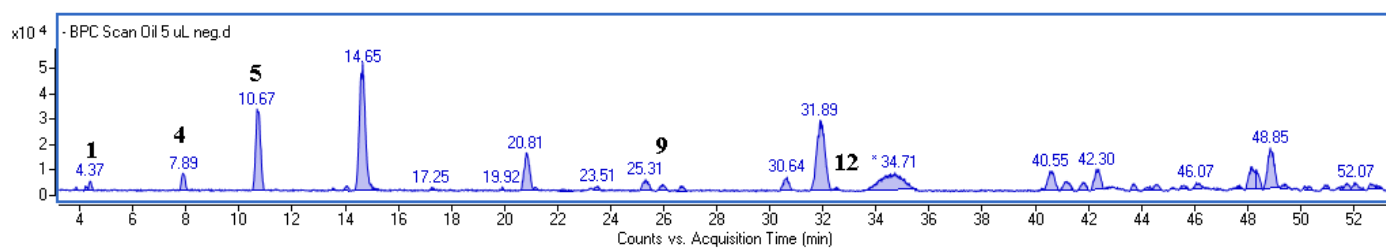


Figure S6. BPC chromatogram of oil sample obtained using CO₂ at pressure 230 bar (fraction F1). Numbering of components as in Table 3.

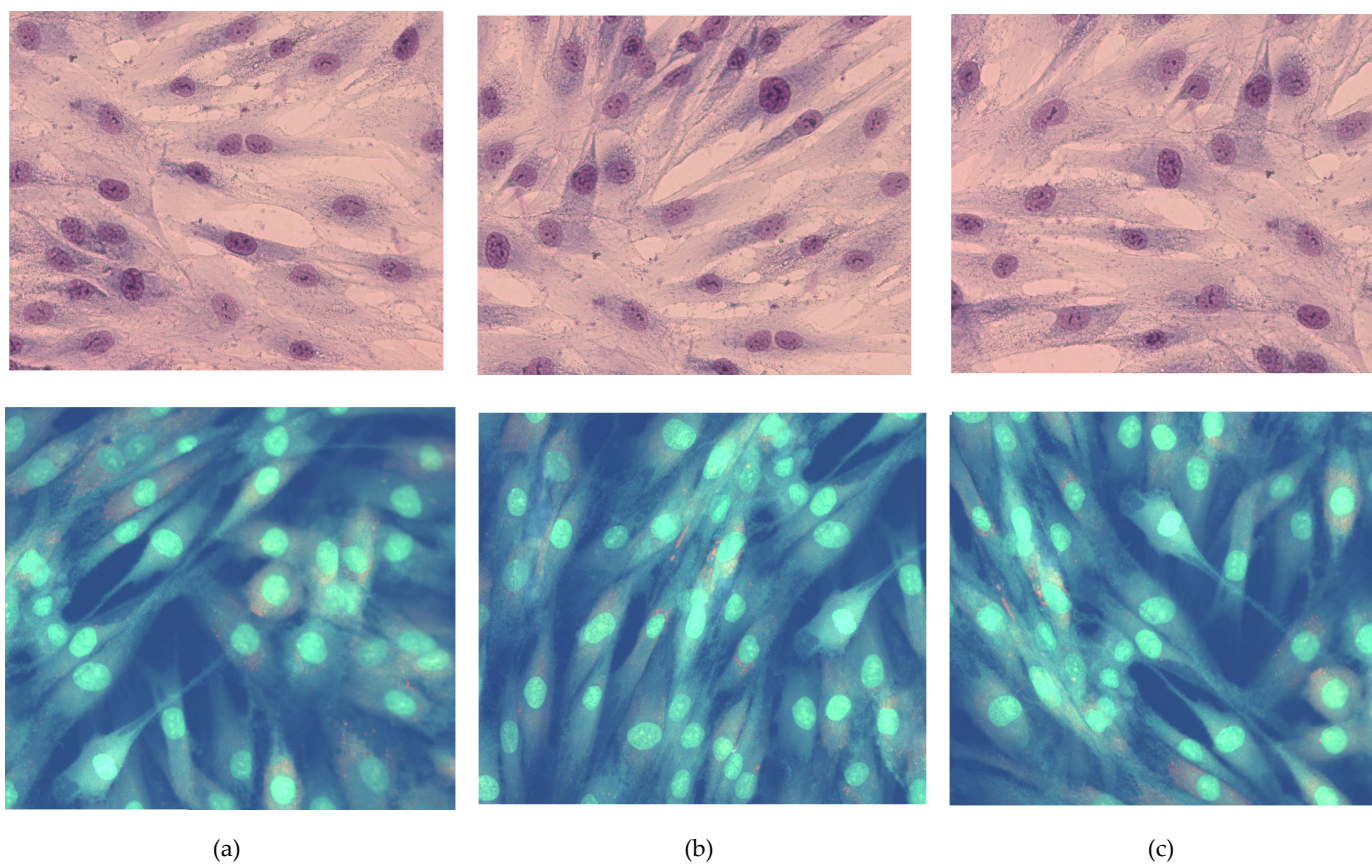


Figure S7. Image of human skin fibroblasts (HSF) cells: (a) control, (b) after 24-hour incubation with water/1,3-propanediol mixture (8/2 v/v) at a dilution of 1/80, (c) after 24-hour incubation with water/1,3-propanediol mixture (6/4 v/v) at a dilution of 1/80. May Grunwald-Giemsa and acridine orange staining (200x magnification).

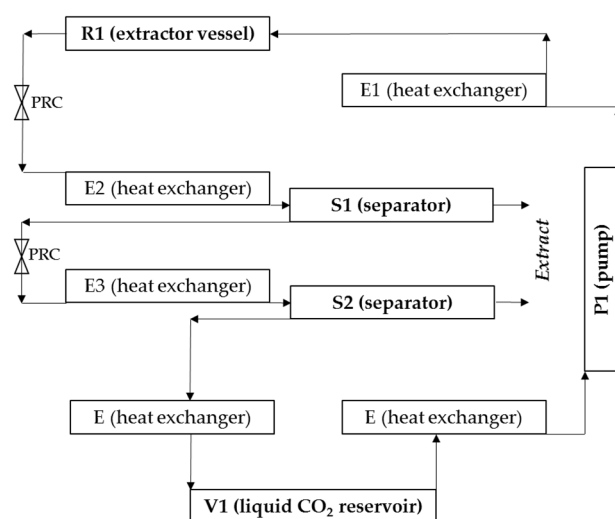


Figure S8. Block diagram of in-house built quarter-technical installation used in the study.

Table S1. UPLC-MS characteristic of compounds identified in methanol/water extract from blackcurrant seeds residues.

R _T [min]	[M-H] ⁺ (fragments)	Δppm	Formula	Identified	Ref
4.49	169.01451 (125)	1.55	C ₇ H ₆ O ₅	gallic acid	standard
6.00	299.07804 (137)	2.66	C ₁₃ H ₁₆ O ₈	hydroxybenzoic acid hexoside	[1]
6.72	315.07287 (153)	2.26	C ₁₃ H ₁₆ O ₉	dihydroxybenzoic acid hexoside	[1,2]
7.99	153.02004	4.60	C ₇ H ₆ O ₄	protocatechuic acid	standard
10.82	137.02490	3.49	C ₇ H ₆ O ₃	p-hydroxybenzoic acid	standard
15.75	197.03510	0.65	C ₉ H ₈ O ₄	caffeic acid	standard
19.15	593.15321 (285)	3.39	C ₂₇ H ₃₀ O ₁₅	Cyanidin rutoside	[3]
24.76	137.02477	2.55	C ₇ H ₆ O ₃	Salicylic acid	standard
25.68	625.14334 (316)	3.70	C ₂₇ H ₃₀ O ₁₇	Myricetin rhamnosylhexoside	[2]
26.24	479.08462 (316)	3.14	C ₂₁ H ₂₀ O ₁₃	Myricetin 3-O-galactoside	standard
29.85	447.09265 (285)	-1.42	C ₂₁ H ₂₀ O ₁₁	Kaempferol hexoside	[1]
31.57	609.14881	4.43	C ₂₇ H ₃₀ O ₁₆	Quercetin rutoside	standard
32.51	463.09022 (300)	4.35	C ₂₁ H ₂₀ O ₁₂	Quercetin 3-glucoside	standard
37.42	593.15261 (285)	2.38	C ₂₇ H ₃₀ O ₁₅	Kaempferol-3-rutinoside	standard
38.29	447.09391 (285)	1.39	C ₂₁ H ₂₀ O ₁₁	Kaempferol glucoside	standard
49.10	301.03681	4.75	C ₁₅ H ₁₀ O ₇	Quercetin	standard
56.51	285.04069	0.8	C ₁₅ H ₁₀ O ₆	Kaempferol	standard

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2. D'Urso, G.; Montoro, P.; Piacente, S. Detection and comparison of phenolic compounds in different extracts of black currant leaves by liquid chromatography coupled with high-resolution ESI-LTQ-Orbitrap MS and high-sensitivity ESI-Qtrap MS. *J. Pharm. Bio. Anal.*, **2020**, 179, 112926, <https://doi.org/10.1016/j.jpba.2019.112926>
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