

Supplementary material

Table S1–Constant SASD parameters.

F _{CO2}	F _{Feed}	T _{in}	T _{SM}	T _{hCO2}	T _{cCO2}	P _{SM}	d _{nozzle}
(mL/min)	(mL/min)	(°C)	(°C)	(°C)	(°C)	(MPa)	(μm)
25	3.5	100	80	80	–20	10	150

F_{CO2}: CO₂ flow rate; F_{Feed}: liquid feed solution flow rate; T_{in}: inlet drying gas temperature; T_{SM}: saturation temperature; T_{hCO2}: CO₂ oil bath temperature; T_{cCO2}: CO₂ cooling bath temperature; P_{sat}: saturation pressure

Table S2–Process yield and physicochemical characteristics of the SASD HPC powders

HPC (%w/v)	Yield, η (%)	D _{v,50} (μm)	span	Moisture Content (%H ₂ O/g _{powder})	a _{BET} (m ² /g)	SEM (shape/ surface)	XRPD (solid- state)
2.5	34	20.24	1.39	n.a.*	1.95	n.a.	Amorphous
5.0	66	19.95	1.44	4.3 ± 0.6	2.62	n.a.	Amorphous
7.5	49	18.26	1.52	4.6 ± 0.4	2.08	Irregular/ smooth	Amorphous
Raw	n.a.	n.a.	n.a.	2.5 ± 0.4	0.80	n.a.	Amorphous

* Test not performed due to the insufficient powder amount required for the characterization; n.a. = not available.

Table S3–Parameter level values used in 3² full factorial design.

		Level of factors used in the formulation		
Factor		–1	0	+1
A	C_solids (%w/v)	2.5	5.0	7.5
B	Ethanol (%v/v)	20	45	70

C_solids: solid contents

Levels: low (–1), medium (0) and high (+1).

Table S4–Standard experiment order matrix.

Exp. No.	A	B
1	–1	–1
2	–1	0
3	–1	+1
4	0	–1
5	0	0
6	0	+1
7	+1	–1
8	+1	0
9	+1	+1

Table S5–DPPH radical scavenging (%) of RSV tests.

C _{RSV} (μM)	raw RSV	RSV / 5.0 / 45	RSV / 7.5 / 20	RSV / 7.5 / 70
100	10.75 ± 0.08	7.30 ± 0.32	11.54 ± 0.34	9.79 ± 0.31
400	28.40 ± 0.75	15.22 ± 0.75	19.32 ± 1.33	22.33 ± 0.57
800	43.01 ± 0.73	24.54 ± 0.67	33.60 ± 3.36	34.90 ± 0.34
1200	48.57 ± 5.63	38.63 ± 4.29	48.27 ± 0.33	43.86 ± 0.28
1500	53.75 ± 5.74	37.25 ± 7.21	52.26 ± 1.01	47.60 ± 0.35
1800	66.22 ± 2.50	46.87 ± 0.46	55.45 ± 0.70	43.49 ± 2.81
2100	62.24 ± 1.32	49.64 ± 0.63	58.09 ± 0.50	49.92 ± 0.74

Table S6–DPPH radical scavenging (%) of GA tests.

$C_{\text{RSV}} (\mu\text{M})$	raw GA	GA / 5.0 / 45	GA / 7.5 / 20	GA / 7.5 / 70
50	11.31 ± 7.18	8.47 ± 1.54	15.18 ± 1.13	9.48 ± 4.58
120	31.50 ± 1.04	24.44 ± 7.98	41.67 ± 2.72	43.72 ± 1.83
190	60.67 ± 1.15	49.96 ± 8.20	75.95 ± 3.64	76.82 ± 4.25
260	79.00 ± 5.48	59.51 ± 13.75	82.97 ± 2.42	82.92 ± 1.25
330	88.54 ± 0.15	59.69 ± 14.34	85.46 ± 0.16	81.12 ± 3.55
400	89.17 ± 0.46	61.58 ± 10.72	75.47 ± 1.18	83.86 ± 0.52
470	90.00 ± 0.12	80.53 ± 3.46	76.10 ± 1.01	84.79 ± 1.25

Table S7–Input and released amount of RSV and GA from the *in vitro* release tests.

Sample	$C_{\text{input}} (\mu\text{g/mL})$	$\mu\text{g phenolic input/}$ 100mg DPF	$C_{\text{máx}}$ ($\mu\text{g/mL}$)	$\mu\text{g phenolic rel.}/$ 100mg DPF	%released
Raw RSV	40.9 ± 0.2	–	1.4 ± 0.4	–	3 ± 1
DPF RSV/5.0/45	40.714 ± 0.008	1017	8 ± 1	201 ± 32	20 ± 3
Raw GA	41.7 ± 0.7	–	37 ± 2	–	92 ± 3
DPF GA/5.0/45	40.354 ± 0.006	877	37.2 ± 0.2	818 ± 6	93.4 ± 0.8

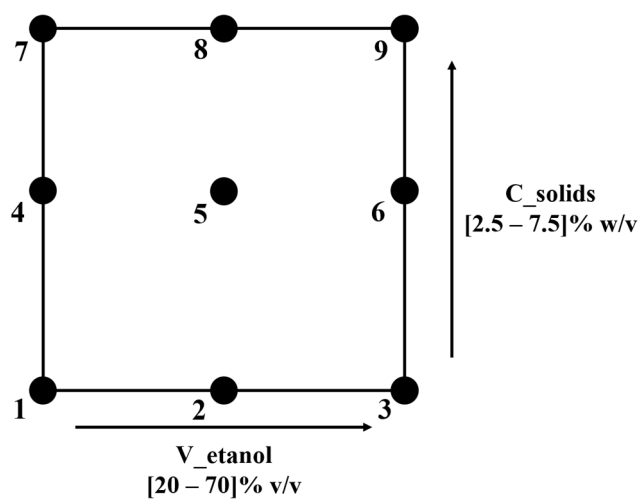


Figure S1–Schematic representation of the 3^2 full factorial DoE.

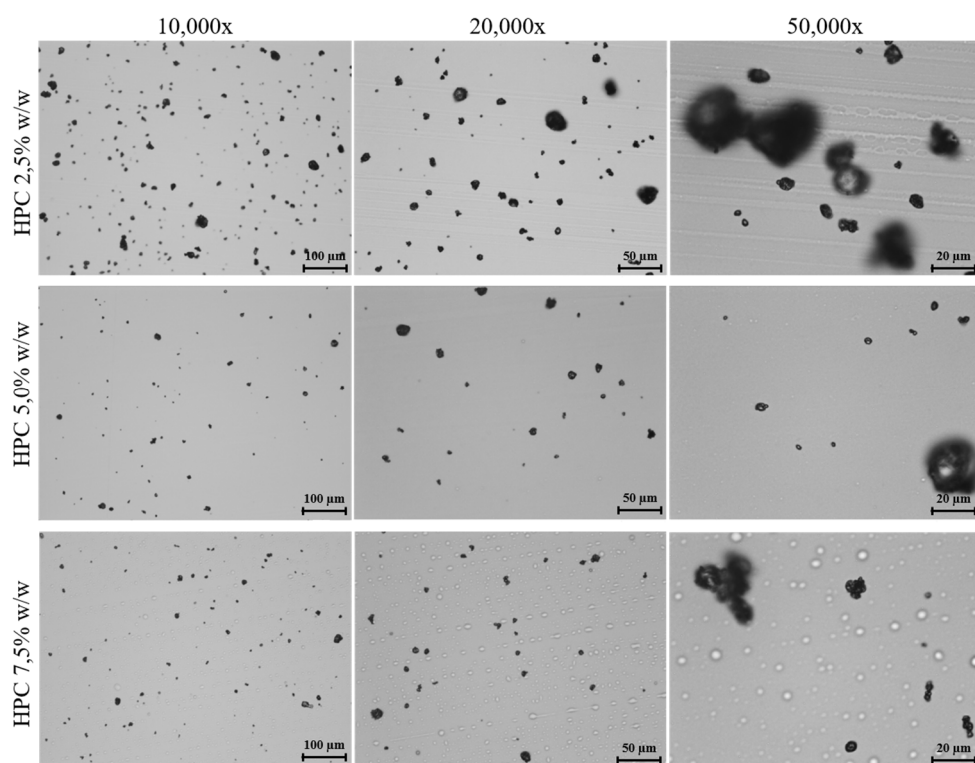


Figure S2–Morphology G3 images of the DPFs microparticles with 2.5, 5.0 and 7.5 %w/v of HPC at different image magnifications: 10,000×, 20,000× and 50,000×.

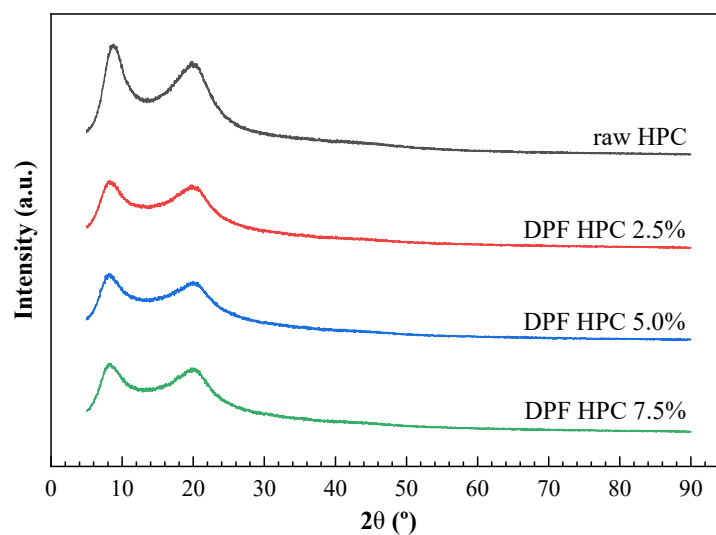


Figure S3—XRPD diffraction spectra of raw HPC powder and DPFs with 2.5, 5.0 and 7.5 %w/v HPC.

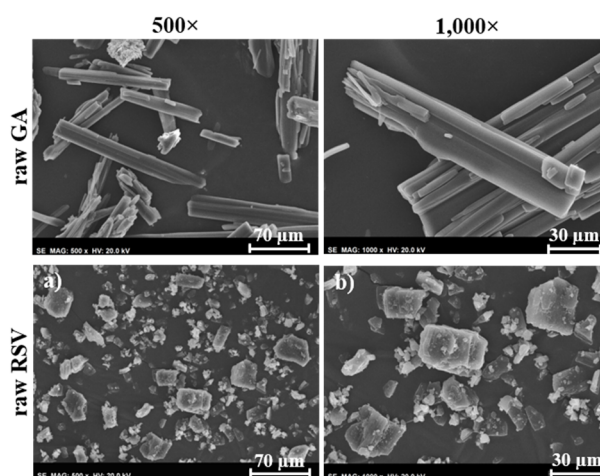


Figure S4—SEM images of raw GA and raw RSV at 500 \times and 1,000 \times magnifications.

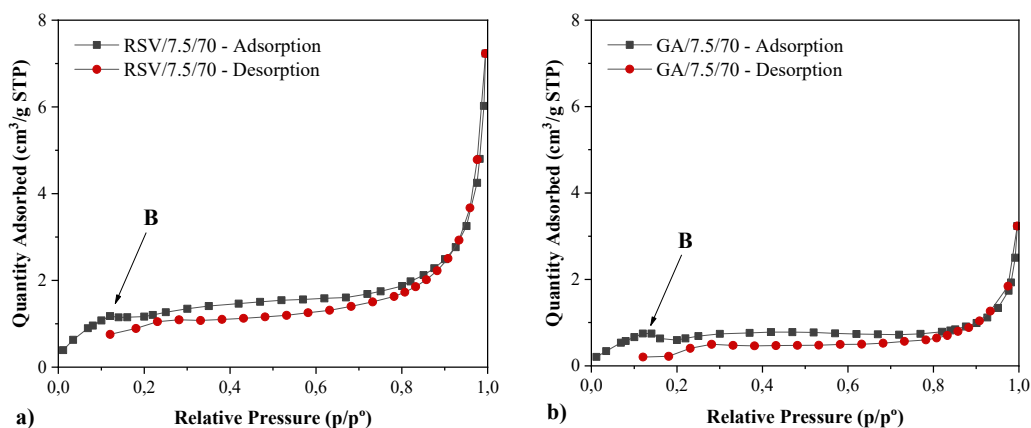


Figure S5–Isotherm plots for a) HPC/RSV and b) HPC/GA microparticles obtained by SASD.

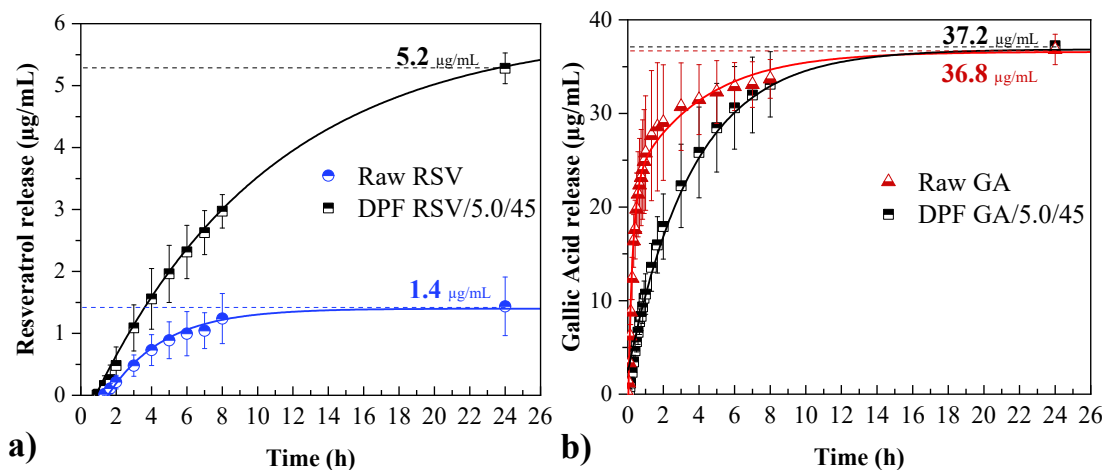


Figure S6–In vitro phenolic release profiles in pH 5.5 PBS at 32 °C for 24 hours from a) raw RSV and DPF RSV/5.0/45 samples and b) raw GA and DPF GA/5.0/45 samples, expressed in µg of phenolic per mL of solution.