

Table S1. Composition of the digestive phases and enzymes used for the *in vitro* gastrointestinal digestion assay.

Simulated digestive phases at 1:1 (w/w)				
Reagents	Stock	Simulated oral phase	Simulated gastric phase	Simulated intestinal phase
% (v/v)				
KCl	0.5 M	2	5.6	2.16
KH ₂ PO ₄	0.5 M	4	0.18	0.32
NaHCO ₃	1 M	0.8	2.6	17
NaCl	2 M	0.2	2	3.2
MgCl ₂ (H ₂ O) ₆	0.15 M	0.2	0.4	0.44
HCl	1 M	0.8	0.6	0.2
NaOH	1 M	0.2	-	0.32
MilliQ water	-	91.8	88.62	76.36
pH		6.8	1.3	8.2
Addition of enzyme % (v/v)				
Amylase	75 U/ml	5	-	-
Pepsine	2500 U/ml	-	4-8*	-
Lipase	25 U/ml	-	4	-
Pancreatin	100 U/ml	-	-	12
Bile salt	10 Mm	-	-	6

Table S2. Antioxidant capacity of *Opuntia ficus-indica* var. *Colorada* pulp extracts and individual standards by the methods LOX-FL, ORAC and TEAC.

Sample	Antioxidant capacity*		
	LOX-FL (μmol Trolox eq/mg)	ORAC (μmol Trolox eq/mg)	TEAC (μmol Trolox eq/mg)
<i>Opuntia ficus-indica</i> var. <i>Colorada</i> pulp extract	3.7 ± 0.2	51.6 ± 1.9	48.4 ± 2.1
Indicaxanthin	104 ± 2	17.3 ± 0.7	9 ± 2.1
Piscidic acid	0.29 ± 0.0	3.56 ± 0.2	6.43 ± 0.74
Isorhamnetin glucosyl-rhamnosyl-pentoside 2 (IG2)	1.9 ± 0.1	30.2 ± 1.2	140 ± 7

*Based on the study previously published by Gómez-Maqueo et al. 2021.

Table S3. Particle size (nm) and zeta potential (mV) of TW and SC double emulsion systems with encapsulated extracts from *O. ficus-indica* var. *Colorada* pulps during 20 days conservation at 7°C.

Conservation	OFC pulp extract content*	Particle size (nm)		Zeta potential (mV)	
		TW ¹	SC	TW ¹	SC
Day 0	1	283 ± 10 ^a	2694 ± 42 ^b	-34.7 ± 2.4 ^a	-43.2 ± 4.8 ^a
	2	297 ± 21 ^a	2286 ± 64 ^b	-40.6 ± 1.3 ^a	-38.2 ± 0.9 ^a
	3	368 ± 8 ^a	2622 ± 86 ^b	-34.8 ± 2.5 ^a	-39.5 ± 0.7 ^a
Day 1	1	265 ± 7 ^a	2821 ± 73 ^b	-37.4 ± 2.1 ^a	-46.2 ± 0.3 ^a
	2	376 ± 12 ^a	3190 ± 8 ^b	-38.5 ± 1.1 ^a	-38.7 ± 1.2 ^a
	3	330 ± 2 ^a	2989 ± 33 ^b	-33.6 ± 5.5 ^a	-40.4 ± 1.3 ^a
Day 3	1	266 ± 4 ^a	2911 ± 25 ^b	-33.9 ± 0.5 ^a	-41.7 ± 1.1 ^a
	2	387 ± 4 ^a	2977 ± 87 ^b	-32.7 ± 0.4 ^a	-37.6 ± 0.2 ^a
	3	352 ± 9 ^a	3008 ± 11 ^b	-34.2 ± 3.9 ^a	-35.5 ± 1.3 ^a
Day 5	1	265 ± 3 ^a	3267 ± 42 ^b	-32.8 ± 2.1 ^a	-38.5 ± 0.4 ^a
	2	236 ± 4 ^a	3373 ± 64 ^b	-31.2 ± 0.5 ^a	-37.4 ± 0.3 ^a
	3	331 ± 5 ^a	-	-34.1 ± 3.4 ^a	-
Day 10	1	253 ± 1 ^a	-	-24.8 ± 0.7 ^a	-
	2	215 ± 4 ^a	-	-29.0 ± 0.1 ^a	-
	3	314 ± 3 ^a	-	-33.4 ± 0.6 ^a	-
Day 15	1	270 ± 4 ^a	-	-26.0 ± 1 ^a	-
	2	236 ± 4 ^a	-	-21.8 ± 0.6 ^a	-
	3	338 ± 2 ^a	-	-31 ± 0.3 ^a	-
Day 20	1	295 ± 7 ^a	-	-25.9 ± 0.8 ^a	-
	2	327 ± 5 ^a	-	-22.2 ± 0.6 ^a	-
	3	389 ± 7 ^a	-	-29 ± 0.23 ^a	-

Superscript letters indicate statistically significant differences ($p \leq 0.05$) between the different samples of the double emulsion systems on storage. Analysis were conducted in triplicate (n= 3).

*Content of *Opuntia ficus-indica* fruit pulp extract in the emulsions as follows: (1) 1 g of OFC pulp extract; (2) 2 g of OFC pulp extract; and (3) 3 g of OFC pulp extract

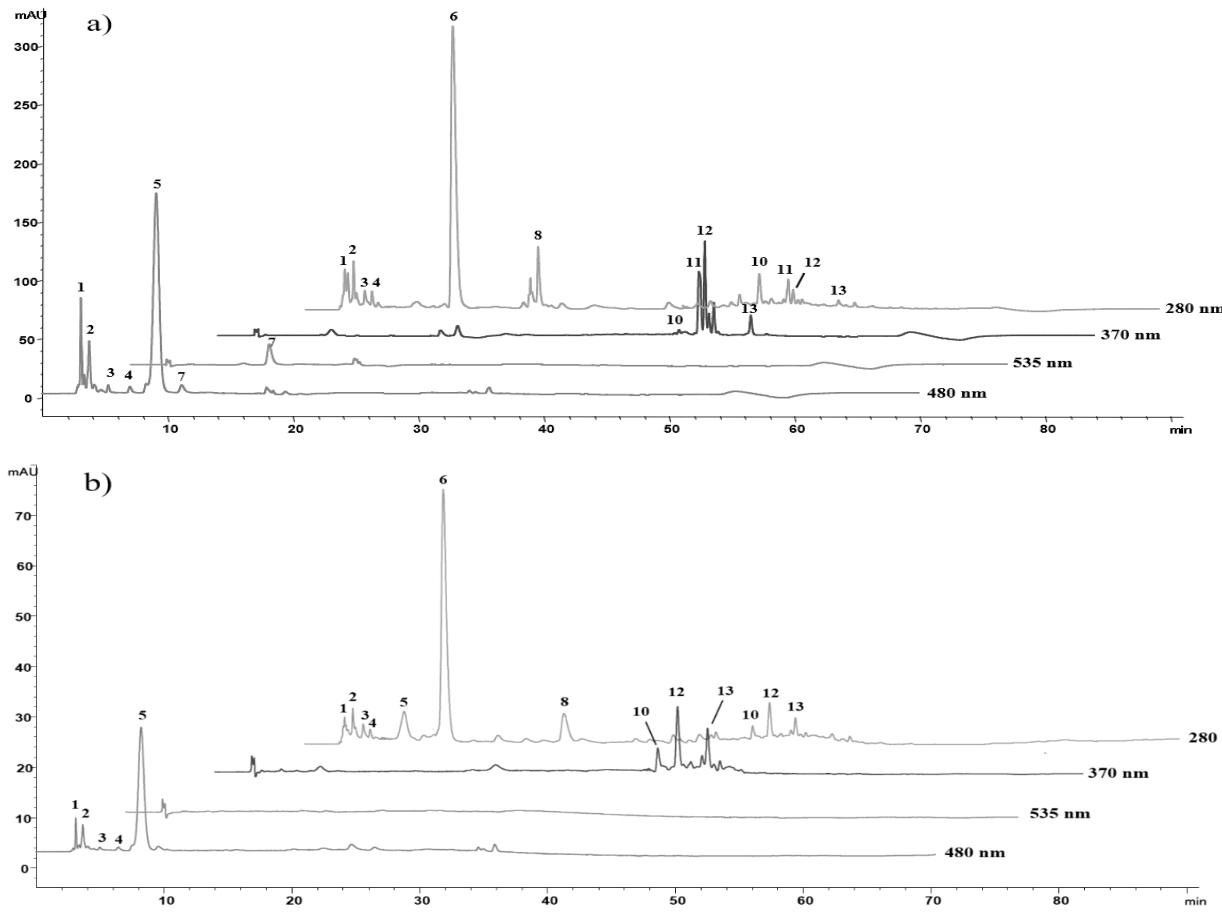


Figure S1. HPLC C18 chromatograms of betalains and phenolic compounds from *Opuntia ficus-indica* var. *Colorada*, analysed at 480 nm (betaxanthins), 535 nm (betacyanins), 370 nm (flavonoids) and 280 nm (phenolic acids) wavelengths, where a) belongs to the non-encapsulated OFC pulp extract and b) to the encapsulated OFC pulp green extract

in TW2 double emulsion system (based on Tween 20, containing 2 g of OFC pulp green extract).

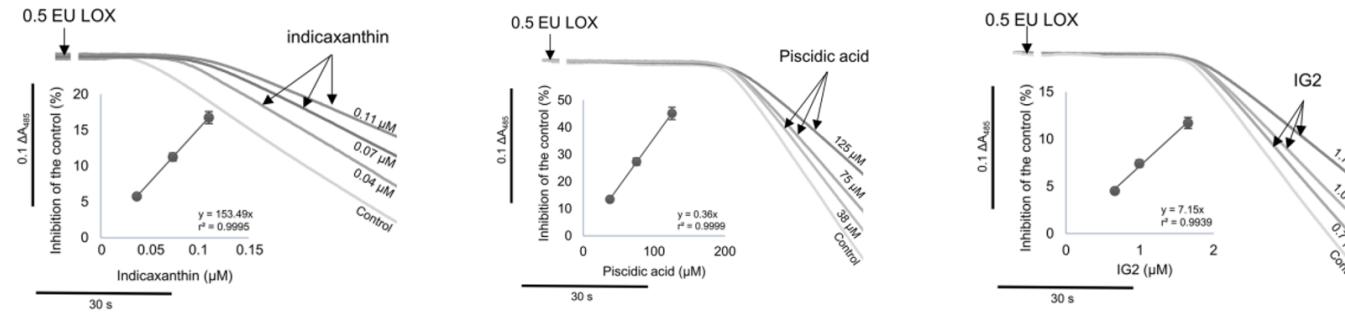


Figure S2. Inhibition of the LOX-FL by indicaxanthin, piscidic acid and isorhamnetin-glucoxyl-rhamnosyl-pentoside 2 (IG2).

*Based on the study previously published by Gómez-Maqueo et al. 2021.

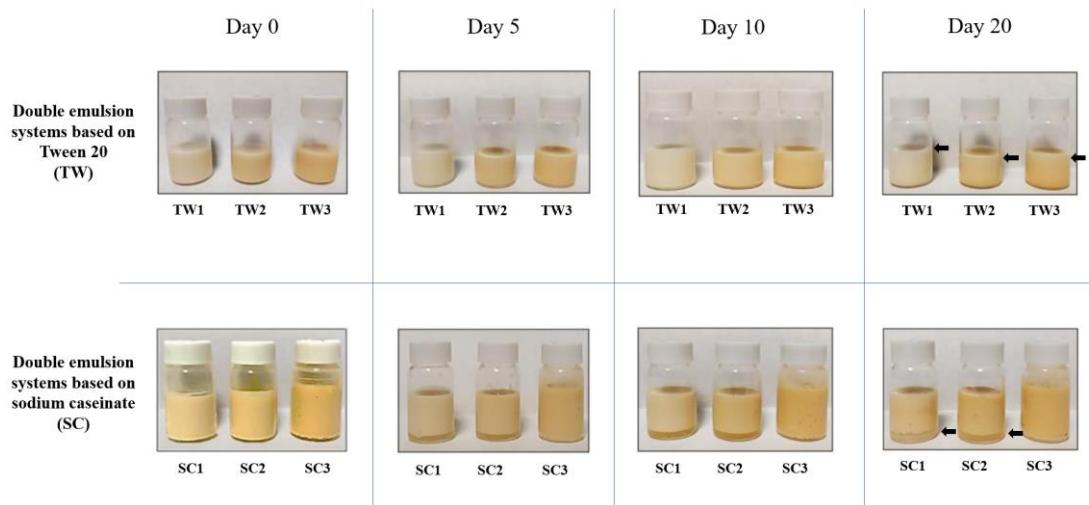


Figure S3. Visual inspection of the double emulsions systems based on Tween 20 (TW) and sodium caseinate (SC) with encapsulated *O. ficus-indica* var. *Colorada* pulp extracts during 20 days storage at 7°C.