

# Supplementary Materials: Carotenoids from Persimmon (*Diospyros kaki* Thunb.) Byproducts Exert Photoprotective, Antioxidative and Microbial Anti-Adhesive Effects on HaCaT

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**Table S1.** Gradient conditions used for carotenoid analysis.

Time (min)	Flow (mL/min)	Flow Rate	
		A (%)	B (%)
Initial	0.5	40	60
3	0.5	70	30
22	0.5	70	30
26	0.5	90	10
41.5	0.5	90	10
3.5	0.5	40	60

LC column: YMC Carotenoid HPLC Column, C30, 4.6 × 250 mm, 5 µm (Teknokroma Analítica, Sant Cugat del Vallès, Barcelona, Spain); Column oven temperature at 25 °C; Mobile phase A: methanol/acetone (60/40); Mobile phase B: acetone/water (60/40).

**Table S2.** MS Parameter settings used for carotenoid analysis: LCMS8050TM (Shimadzu).

ESI	Positive
Capillary (kV)	4.5
IF Temperature (°C)	300
DL Temperature (°C)	200
BH Temperature (°C)	300
Desolvation gas flow (L/min)	5
Nebuliser gas flow (L/min)	3
Desolvation Temperature (°C)	526
Scan Range (m/z)	100–1000

**Table S3.** Annotation and detection conditions for carotenoid analysis.

Peak	Carotenoid	Ret. Time	$\lambda_{\max}$ (nm)	[M + H] <sup>+</sup> (m/z)	Fragment Ions (m/z)	CE	Relative Concentration (%)	Franz Cells
1	(All-trans)-lutein	2.224	450/654	552	492,539,268,519	-15	7.306	-
2	zeinoxanthin	2.704	444/455	552	414,485,495,506,493,552	-15	0.740	-
3	(cis)-lutein	3.304	361/455	552	466,184,186,266,235,425	-35	3.063	-
4	luteoxanthin	5.628	400/421	586	528	-15	1.936	-
5	(all-trans)-violaxanthin	6.028	403/471	586	527,568,529,549	-15	1.893	-
6	(cis)-violaxanthin	8.336	319/406	586	364,265,309,295,528	-35	2.005	-
7	(all-trans)-antheraxanthin	10.420	420/470	586	528,474,406,568	-35	8.510	-
8	(cis)-antheraxanthin	13.832	319/438/	586	527,298,540,518	-15	10.319	-
9	$\beta$ -cryptoxanthin 5,6-epoxide	25.952	420/445	536	176,282,325,386,271	-15	4.157	-
10	5,6-epoxy- $\alpha$ -carotene	27.772	418/445	552	328,280,56,127,110,331,551	-35	1.265	-
11	(all-trans)-zeaxanthin	30.488	417/651	586	527,461	-15	0.852	-
12	(cis)- $\alpha$ -cryptoxanthin	30.724	399/490	552	109,187,304,349,494	-15	0.030	+
13	(cis)- $\beta$ -cryptoxanthin	31.176	319/421	552	305,459,96,524,177	-15	3.239	+
14	(cis)- $\alpha$ -carotene	31.612	319/490	536	223,268,307,280	-15	0.702	+
15	(cis)- $\beta$ -carotene	31.928	319/401	536	223,268,307,280	-15	1.221	+
16	(all-trans)- $\alpha$ -carotene	32.364	409/490	536	186,363,162,210	-15	1.784	+
17	(all-trans)- $\beta$ -carotene	33.216	490/683	536	478,535,400	-15	3.137	+
18	(All-trans)- $\beta$ -cryptoxanthin	36.764	452/683	553	495,426,460,201,307	-15	44.805	-
19	(all-E)-lycopene	37.808	319/490	536	356,444,192	-15	1.467	-
20	(cis)-lycopene isomer	41.888	319/399	536	318,468,477,223,382	-15	0.529	-