Table S1. Gradient for 5-CQA determination

Time (min)	Eluent A (%)	Eluent B (%)	Flow rate (ml/min)
0	100	0	1,0
4	85	15	1,0
20	60	40	1,0
40	45	55	1,0

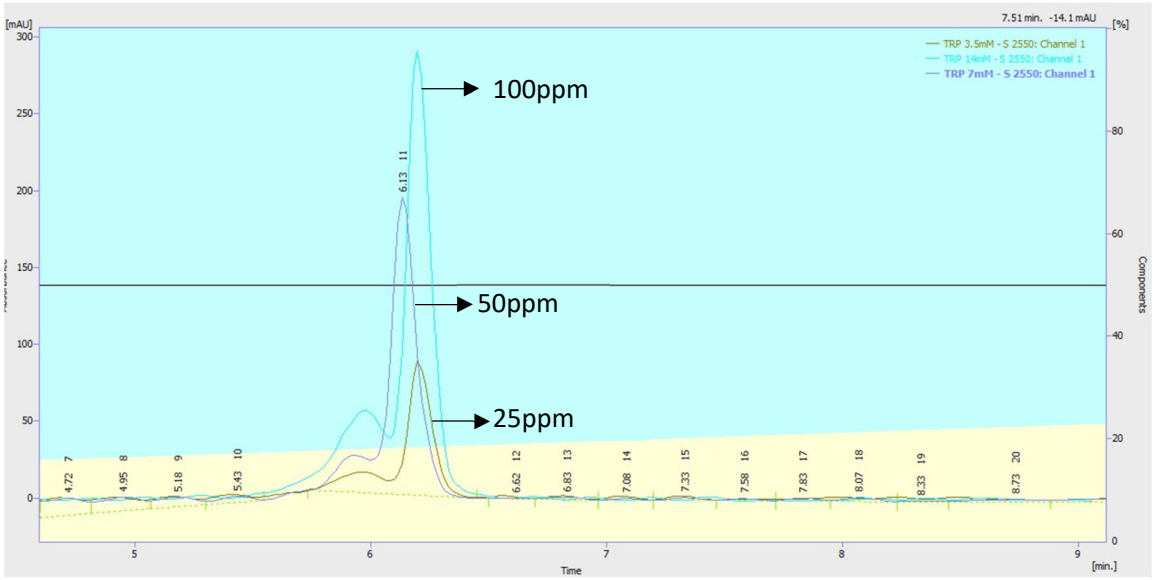

Figure S1: Comparative chromatogram of TRP at different concentrations

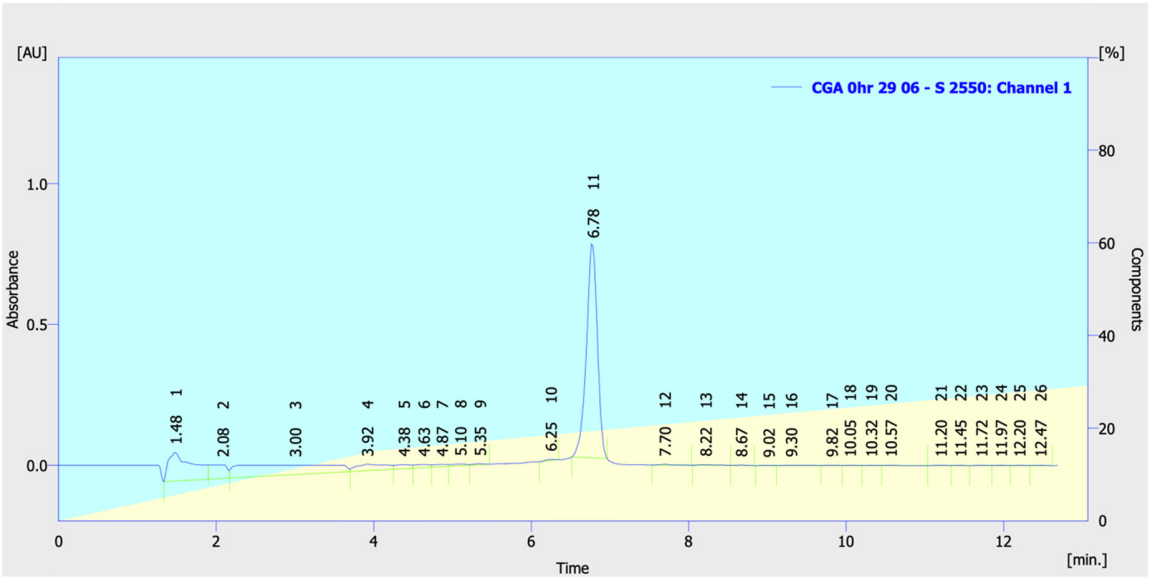

Figure S2: 5-CQA chromatogram

Table S2: Initial Rate Method results

[A] (mM)	[B] (mM)	r (M min^{-1})
1	7	$1{,}34x10^{-5}$
0,5	7	$2{,}43x10^{-6}$
1	14	$1{,}06\ x10^{-5}$

*A= 5-CQA B=TRP

Table S3: Rate constant calculation

t (min)	$[C_A]$ (M)	k (min^{-1}) n=1	k (M^{-1} min^{-1}) n=2
70	$6{,}15\ x10^{-5}$	0,0398	217,71
130	$2{,}31\ x10^{-5}$	0,0289	324,45
165	$1{,}59\ x10^{-5}$	0,0255	401,49
255	$1{,}25\ x10^{-5}$	0,0171	303,60
315	$9{,}46\ x10^{-6}$	0,0148	332,421
390	$8{,}09\ x10^{-6}$	0,0123	314,41
Average		-	315.68

Figure S3. Color development of different molar ratios: from left to right: 5-CQA:TRP 1mM-5mM, 1mM-3,5mM, 3,5-7mM, 7mM-7mM and 7mM-3,5mM

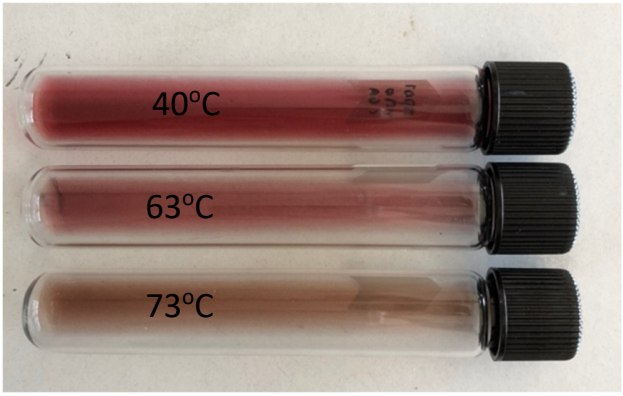

Figure S4. Color of the product pigment at different reaction temperatures

Figure S5. Color of samples at the end of each reaction at different pH (7, 7.5, 8 and 9.5)

Table S4: Color determination of final product after completion of the reaction at each different pH.

pH	L*	a*	b*	ΔE
9.5	22.63	46.26	30.44	-
6.5	30.64	58.64	40.22	17.68
7	31.50	56.66	41.84	17.79
8	25.69	54.73	36.40	10.80
9	23.42	48.34	32.65	3.13

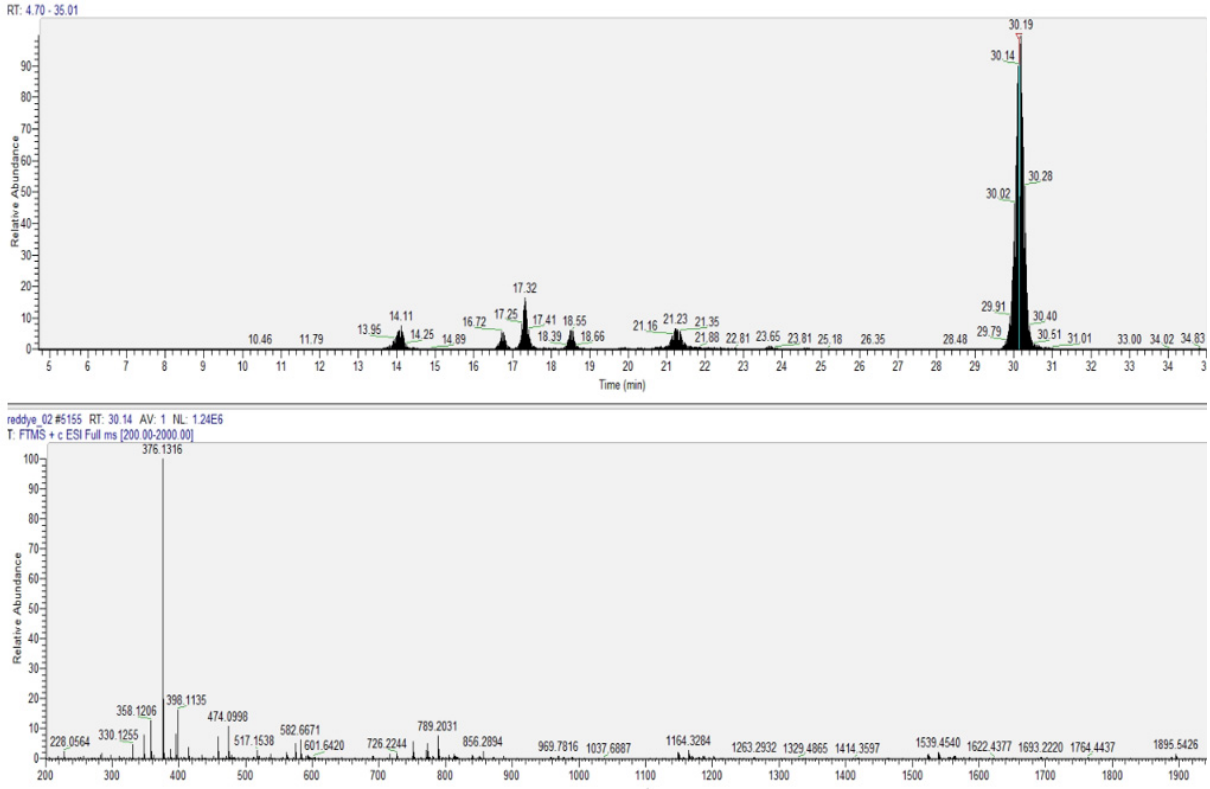

Figure S6. Spectrum of the red pigment solution at 30min

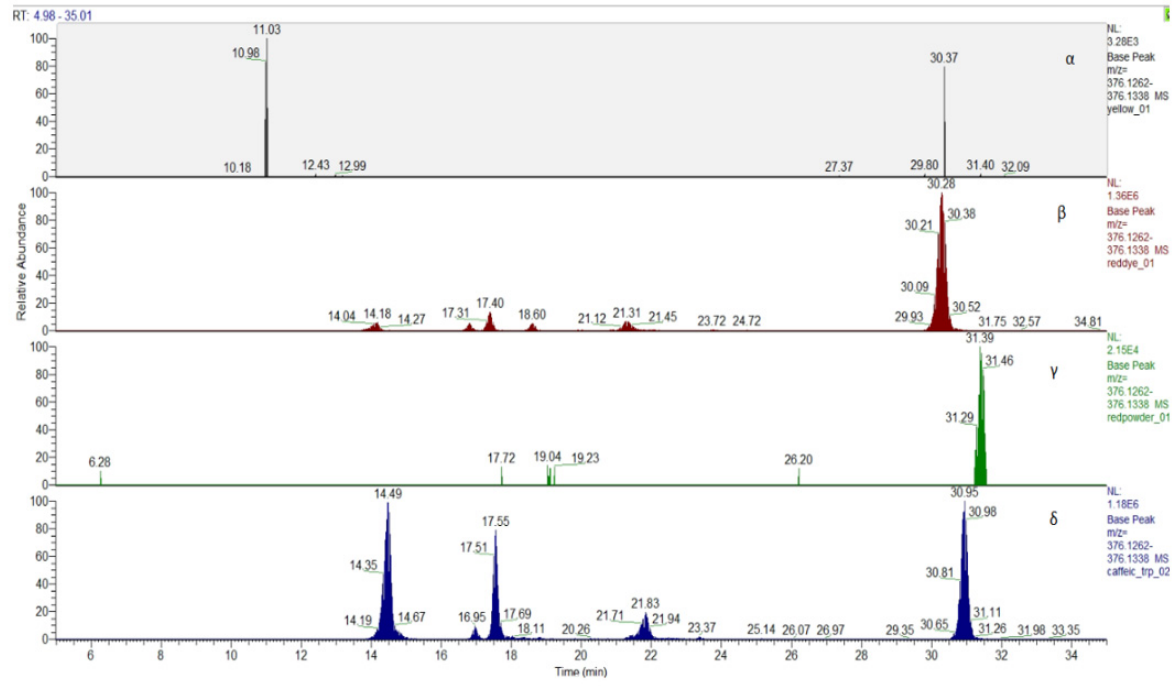

Figure S7. Peak 376,13m/z in the spectra of: a) t=15min of the reaction of CGA-TRP, b) Final product of the reaction, c) Spray dried powder, d) Final reaction of caffeic acid-TRP

An LTQ Orbitrap Discovery equipped with a Eurospher II 100-5 C18P column was used for the MS analysis. LC conditions were as follows:

1. Mobile phase A: 0.2M CH_3COOH
2. Mobile phase B: ACN
3. Mobile phase C: MeOH

Time (min)	Mobile phase A ***(%)***	Mobile phase B ***(%)***	Mobile phase C ***(%)***	***Flow (mL/min)***
0	100	0	0	0.5
11	85	15	0	0.5
56	60	40	0	0.5
70	0	0	100	0.5

MS analysis conditions:

Parameter	**Value**
Source Voltage	3kV
Seath gas flow	60arb
Auxiliary gas flow	8arb
Sweep gas flow	1arb
Capillary Temperature	350°C
Capillary Voltage	25V
Multipole 00 offset	5V
Multipole 0 offset	8V
Front lens	6.25V
Normalized collision energy	35%