

Supplementary Information

Photodegradation of the main synthetic musk (HHCB) in water: Kinetic study and influencing factors

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Table S 1. The main physicochemical properties of water samples.

Parameters	Riverine	WWTPs effluent
Colour	colorless	yellow
T °C	12.2	13.4
pH	7.52	7.81
Dissolved Oxygen Concentration (mg L ⁻¹)	8.46	10.23
Conductivity (µs cm ⁻¹)	628	1273
Total Organic Carbon (mg L ⁻¹)	4.87	7.92
NO ₃ ⁻ (mg L ⁻¹)	4.05±0.01	2.02±0.06
Suspended matter (mg L ⁻¹)	1.90	6.74
Total Alkalinity as CaCO ₃ (mg L ⁻¹)	167±6	186±4
Chloride (mg L ⁻¹)	88.3±0.5	252.6±4.4
Turbidity (TRB, FNU)	2.12	5.33

Table S 2. Intensity of irradiance level for Xenon Arc Lamp depending on different range of wavelength.

Wavelength (nm)	Irradiance (µW cm ⁻²)
UV C (200 - 280 nm)	23
UV B (281 - 315 nm)	2
UV A (315 - 380 nm)	35
Visible (380 - 780 nm)	510
Total (200 - 1100 nm)	1573

Table S 3. pH measurement of experimental solution (n.d. not determined).

Matrix	Experiment	pH	
		Sunlight	UVC
Ultrapure water (UPW)	UPW	6.2	5.5
	Humic Acid	6.5	5.8
	Humic Acid/ISP	6.3	5.7
	Humic Acid/TMP	6.8	5.7
	H ₂ O ₂	6.8	5.7
	H ₂ O ₂ /ISP	6.4	5.8
	CO ₃ ⁻²	11.0	11.0
	CO ₃ ⁻² /ISP	11.0	10.9
	CO ₃ ⁻² /H ₂ O ₂	n.d.	10.9
	CO ₃ ⁻² /H ₂ O ₂ - ISP	n.d.	11
	NO ₃ ⁻	6.2	5.6
	NO ₃ ⁻ /ISP	6.0	5.5
	PN	5.5	5.5
Riverine water		7.5	
WWTPs effluent water		7.8	

Table S 4. Analytical performance of GC-MS: linearity (R^2 , coefficient of determination), detection limits (LOD, $n = 28$), quantification limits (LOQ, $n = 17$), precision (RSD, $n = 10$).

	R^2	LOD, $\mu\text{g L}^{-1}$	LOQ, $\mu\text{g L}^{-1}$	RSD (%), $34 \mu\text{g L}^{-1}$	RSD (%), $340 \mu\text{g L}^{-1}$
Galaxolide (HHCB)	0.9884	0.38	1.26	2	2
Galaxolidone (HHCB-Lactone)	0.9736	0.36	1.20	2	3

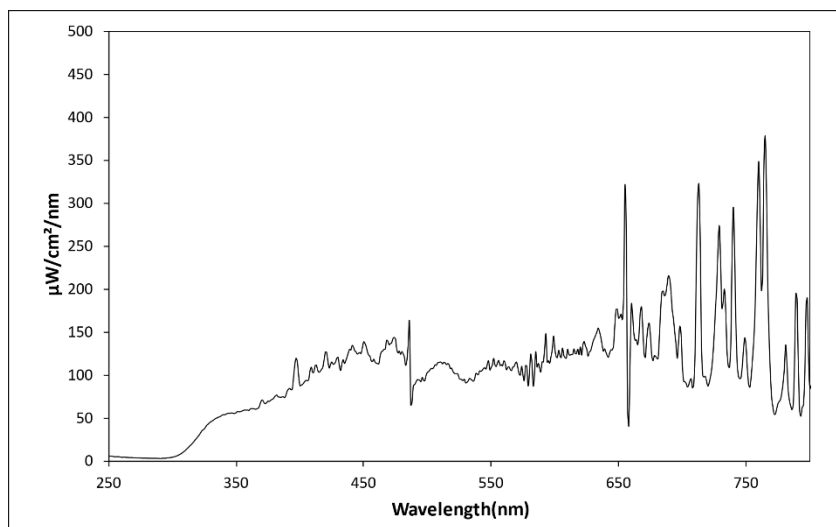


Fig. S 1. Absolute light intensity as a function of the wavelength for the Xenon Arc Lamp.

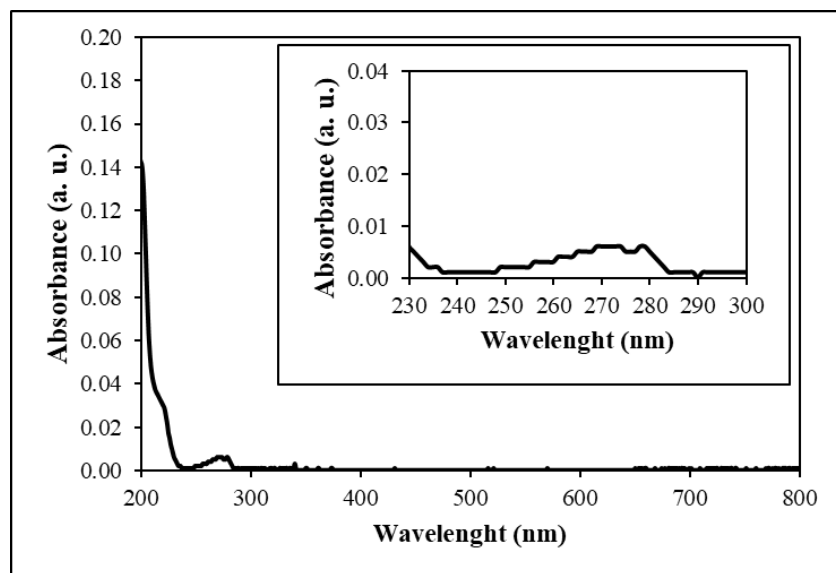


Fig. S 2. UV-Vis absorption spectra of HHCB ($4.42 \mu\text{M}$) in ultrapure water (UPW).

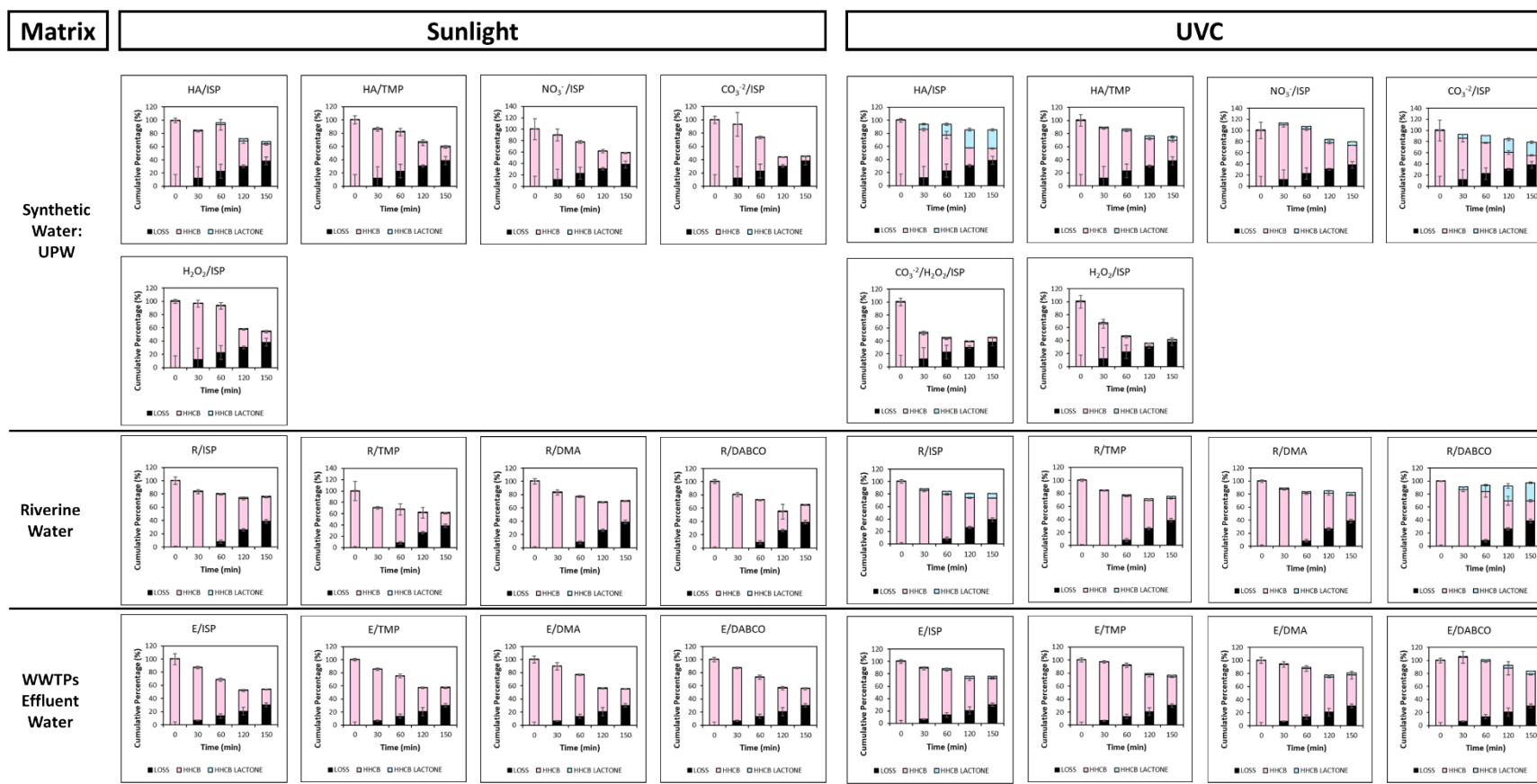


Fig. S 3. Mass Balance calculated cumulative HHCB and HHCB Lactone percentage against sunlight and UVC light in the presence of quenchers in ultrapure water (UPW), Riverine water (R), WWTPs Effluent Water (E). LOSS represents the lost percentage of HHCB concentration during dark control experiments in absent of the light based on initial time. Humic acid (HA), 2-Propanol (ISP), 2,3,6-Trimethylphenol (TMP), N, N-dimethylaniline (DMA), 1,4-diazabicyclo [2.2.2] octane (DABCO). Data are mean \pm SD of 3 replications.

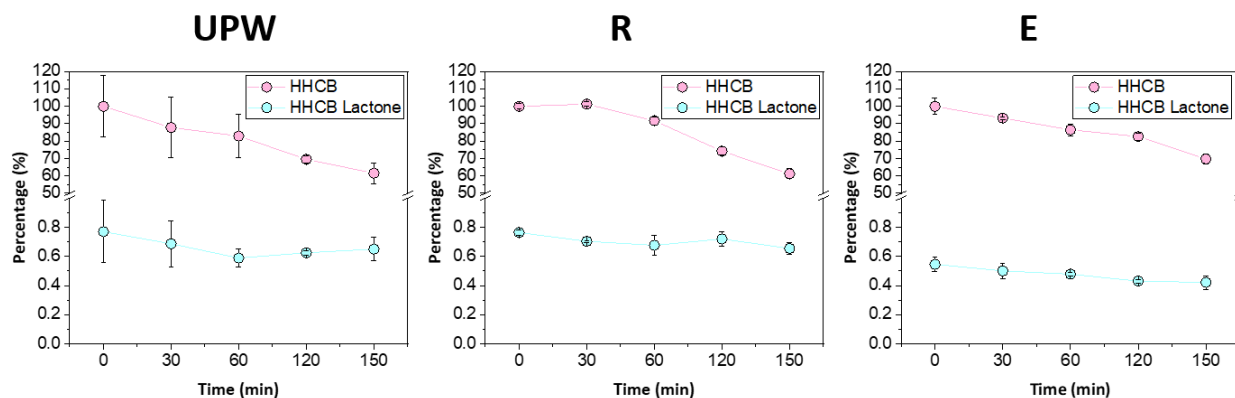


Fig. S 4. Percentage of HHCB and HHCB Lactone in the absence of the light (Dark Control) in ultrapure water (UPW), riverine (R) and WWTPs effluents €. Calculated based on initial concentration of HHCB. Data mean \pm SD of 3 replications.

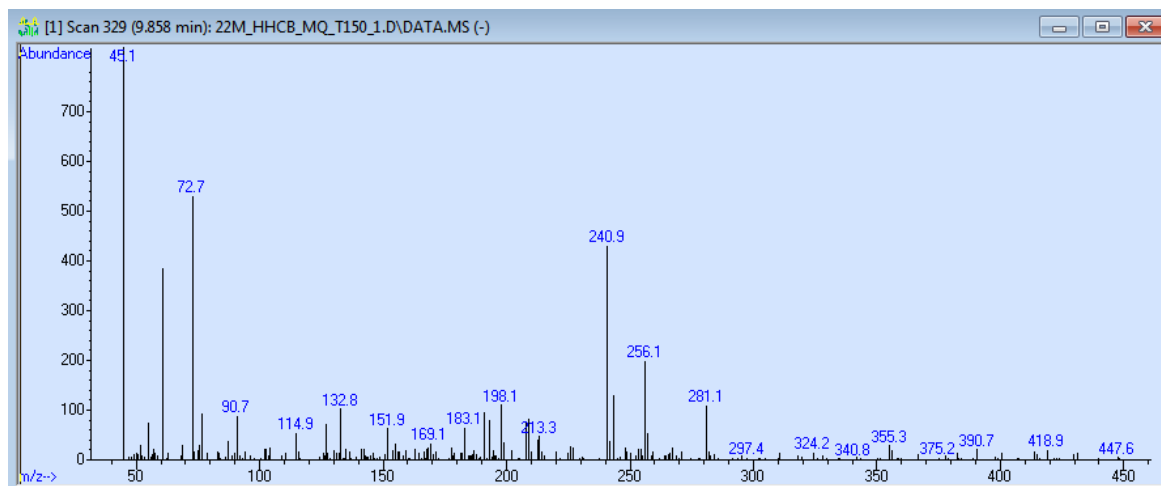


Fig. S 5. Mass Spectra of TP-2 for t150_{min} (first replication) in ultrapure water (UPW) under UVC.

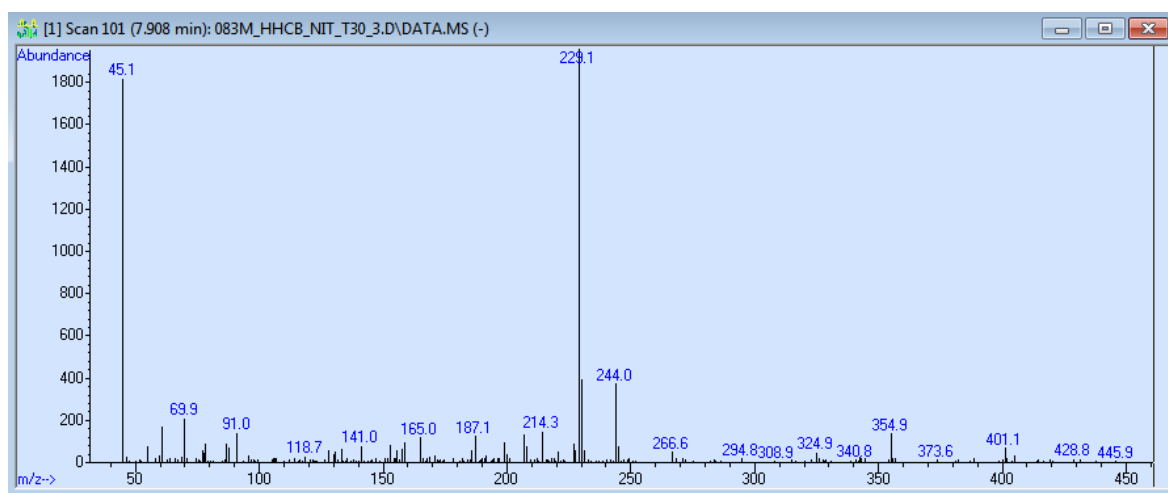


Fig. S 6. Mass Spectra of TP-3 for t30_{min} (third replication) in ultrapure water (UPW) in the presence of NO₃⁻ under UVC.