Source to taps investigation of natural organic matter in non-disinfected drinking water distribution systems

Supplementary materials
Number of pages: 3; number of tables: 1; number of figures: 3

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S1. Sampling locations details

Table S1. Details regarding sampled locations. Due to the uncertainty regarding water flows, distances are to be considered as geographical distance from DWTPs outlet and do not consider distribution network structure. The letters A, B and C indicate the drinking water treatment plant (DWTP), while the letter P indicates the sampling point along the distribution network. The letters "r" and "t" stand for "raw" and "treated" water.

Location name	Type	Distance to DWTP A [m]	Distance to DWTP B [m]	Distance to DWTP C [m]
Ar	DWTP inlet	-	640	3400
At	DWTP outlet	-	640	3400
Br	DWTP inlet	640	-	3200
Bt	DWTP outlet	640	-	3200
Cr	DWTP outlet	3400	3200	-
P01	Water fountain	700	130	3100
P02	Water fountain	800	280	2960
P03	Water fountain	610	180	3410
P04	Water fountain	550	210	3420
P05	Water fountain	430	460	3610
P06	Water fountain	1320	700	3100
P08	Water fountain	3670	3420	530
P09	Water fountain	2200	1970	1250
P10	Water fountain	1880	1500	1780
P12	Premise plumbing	1270	1600	4650
P13	Premise plumbing	180	465	3400

Figure S1. Map of the investigated drinking water distribution system and sampling locations.

S2. Evaluation of sample filtering

To evaluate the effect of samples filtration, three samples were measured in duplicate without filtration and after filtration with 0.45 µm PTFE Millex-FH filter (Millipore, USA), using the same settings as the ones used for the other samples in the monitoring campaign. Before their use, filters and filter syringes were rinsed with around 150 mL of MilliQ water (Millipore, USA). The duplicated EEMs were averaged to reduce measurement noise. Then, the averaged EEM of each unfiltered sample was subtracted to the corresponding averaged EEM of filtered sample. Finally, the estimated differences were averaged and plotted as in Figure S2. Outside the areas affected by Raman and Rayleigh scatter, the EEMs differences do not indicate the presence of light scatter in the unfiltered samples. Conversely, the presence of a broad peak of positive values (Ex < 290 nm, Em < 375) suggested the introduction of fluorophores during sample handling (e.g., due to leaching from plastic materials or cell lysis[1]), with values amounting up to 30% of the fluorescence measured in the non-filtered samples. The absence of significant negative values indicates how no fluorescent NOM was removed during filtration,[2] confirming the negligible turbidity found in previous monitoring campaigns. Given these results, to minimize sample handling and potential contamination, it was decided to measure samples directly as collected.

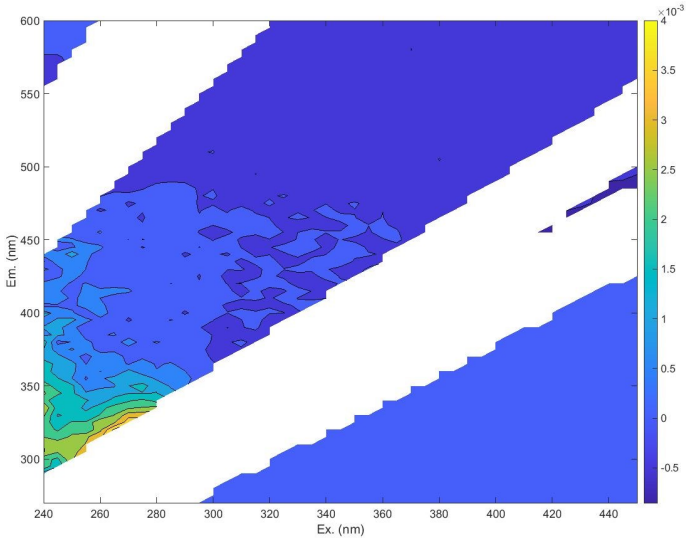

Figure S2. Average difference between the fluorescence intensity [R.U.] of the EEMs measured in filtered and unfiltered samples.

S3. Fluorescent components characteristics

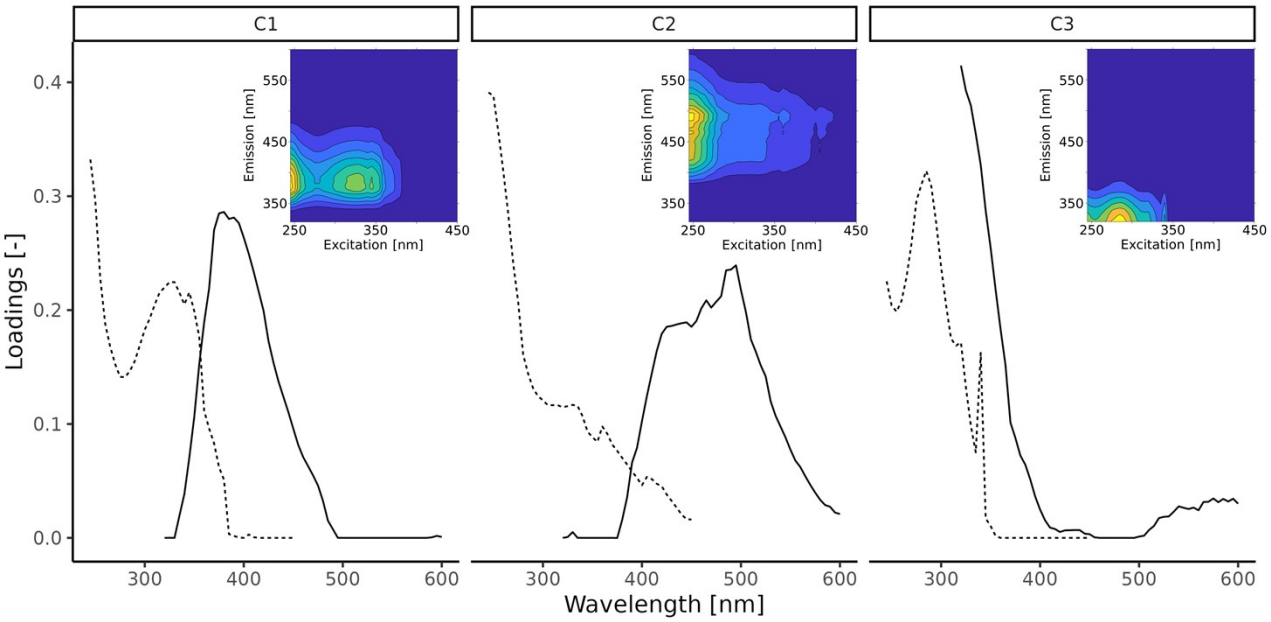

Figure S3. Excitation and emission spectra of the identified PARAFAC components. Dotted lines represent excitation spectra, while solid lines emission ones.

References

1 P. G. Coble, J. Lead, A. Baker, D. M. Reynolds and R. G. M. Spencer, Eds., *Aquatic Organic Matter Fluorescence*, Cambridge University Press, 1st edn., 2014.

2 A. Baker, S. Elliott and J. R. Lead, Effects of filtration and pH perturbation on freshwater organic matter fluorescence, *Chemosphere*, 2007, **67**, 2035–2043.