

Supporting Information

Removal of micropollutants with different physicochemical properties from natural potable water by heterogeneous catalytic ozonation

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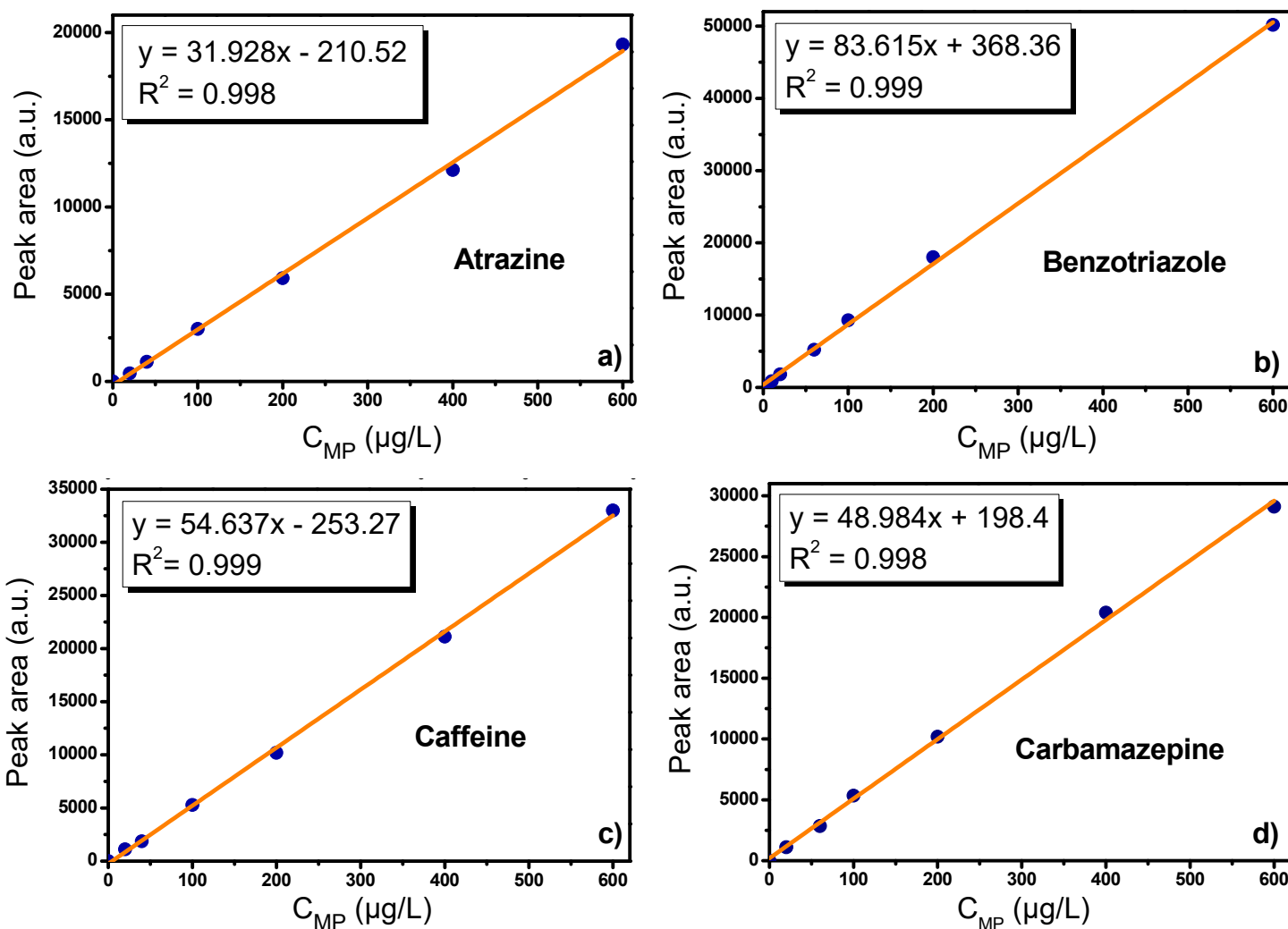


Figure S1. Linear calibration curve for the determination of (a) atrazine, (b) benzotriazole, (c) caffeine, (d) carbamazepine, (e) fluoxetine, (f) ibuprofen, (g) paracetamol and (h) p-CBA in the concentration range of 0-600 $\mu\text{g/L}$.

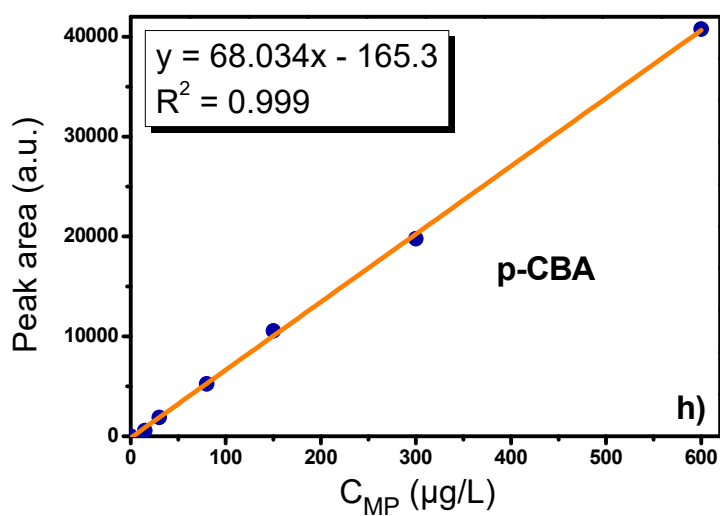
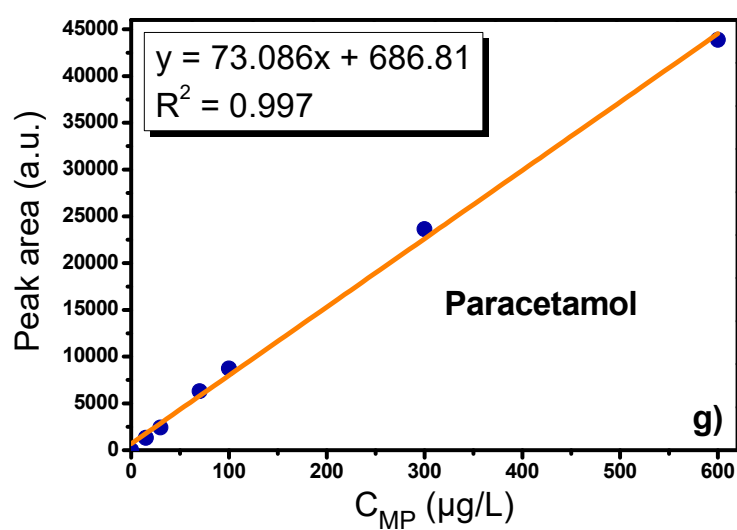
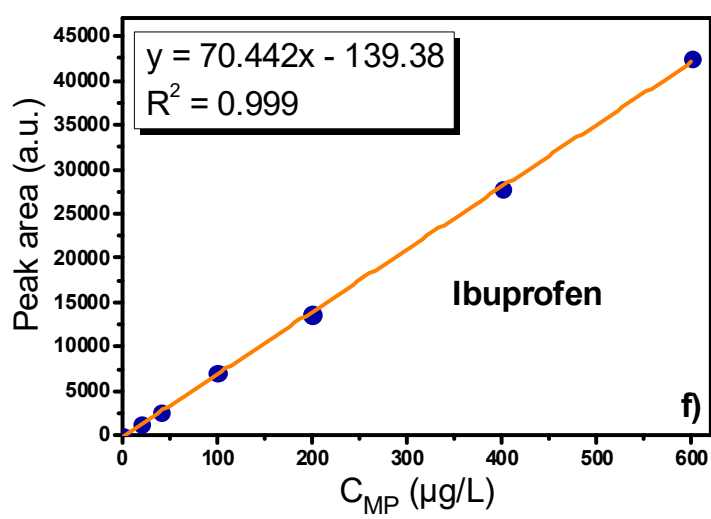
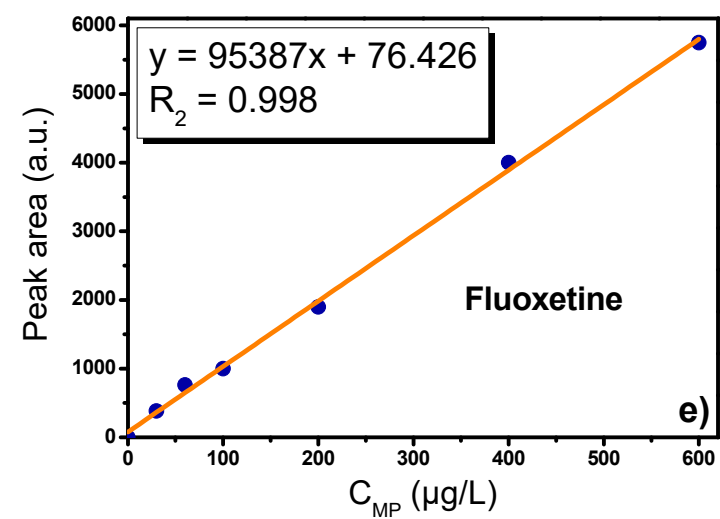


Figure S1 (continuous).

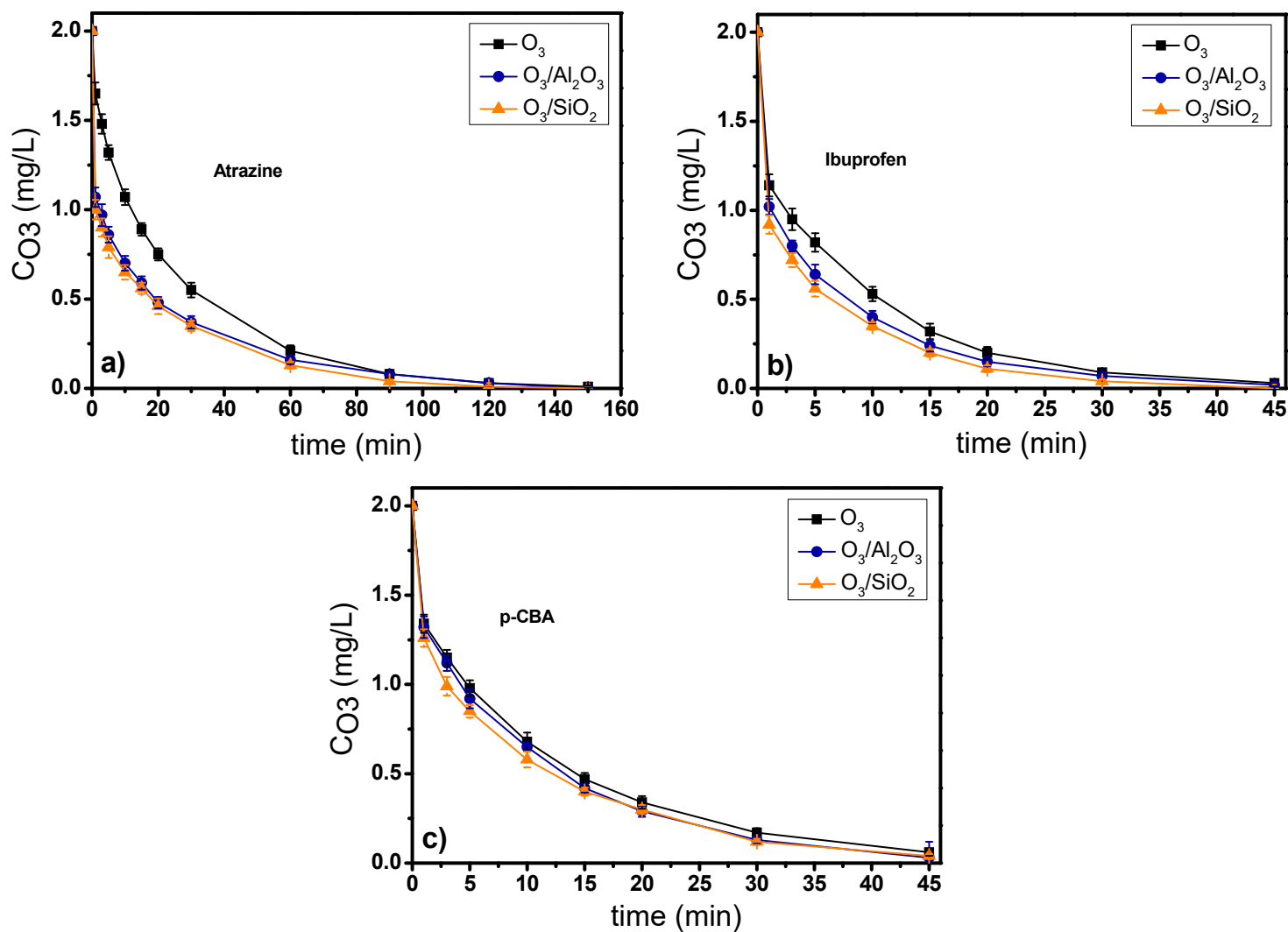


Figure S2. Ozone decomposition during catalytic ozonation of (a) atrazine, (b) ibuprofen and (c) p-CBA with the use of Al_2O_3 and SiO_2 as catalysts compared to single ozonation in natural potable water. Experimental conditions: C_{MP} 500 $\mu\text{g/L}$, C_{cat} 0.5 g/L, CO_3 2 mg/L, pH 7.8, T $23 \pm 2^\circ\text{C}$.

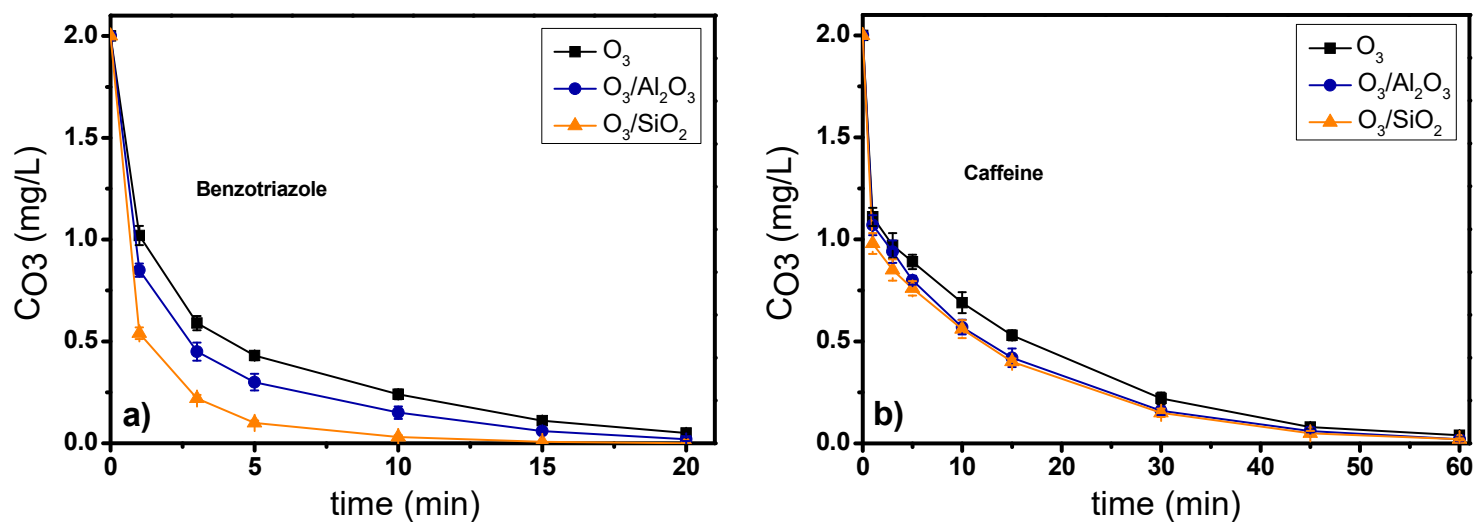


Figure S3. Ozone decomposition during catalytic ozonation of (a) benzotriazole, and (b) caffeine with the use of Al_2O_3 and SiO_2 as catalysts compared to single ozonation in natural potable water. Experimental conditions: C_{MP} . 500 $\mu g/L$, C_{cat} . 0.5 g/L, CO_3 2 mg/L, pH 7.8, T $23 \pm 2^\circ C$.

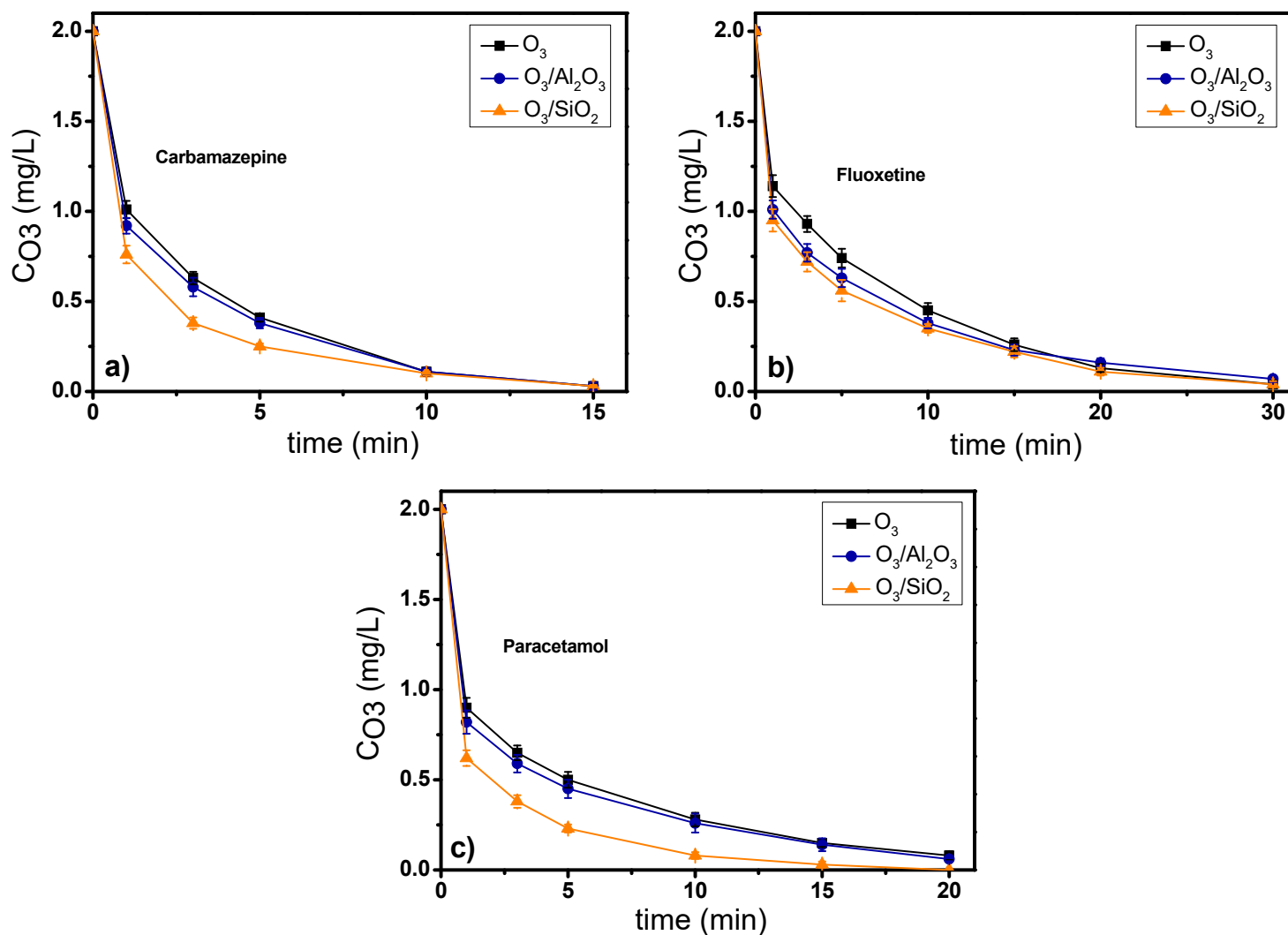


Figure S4. Ozone decomposition during catalytic ozonation of (a) carbamazepine, (b) fluoxetine and (c) paracetamol with the use of Al_2O_3 and SiO_2 as catalysts compared to single ozonation in natural potable water. Experimental conditions: C_{MP} 500 $\mu\text{g/L}$, C_{cat} 0.5 g/L, CO_3 2 mg/L, pH 7.8, T $23 \pm 2^\circ \text{C}$.

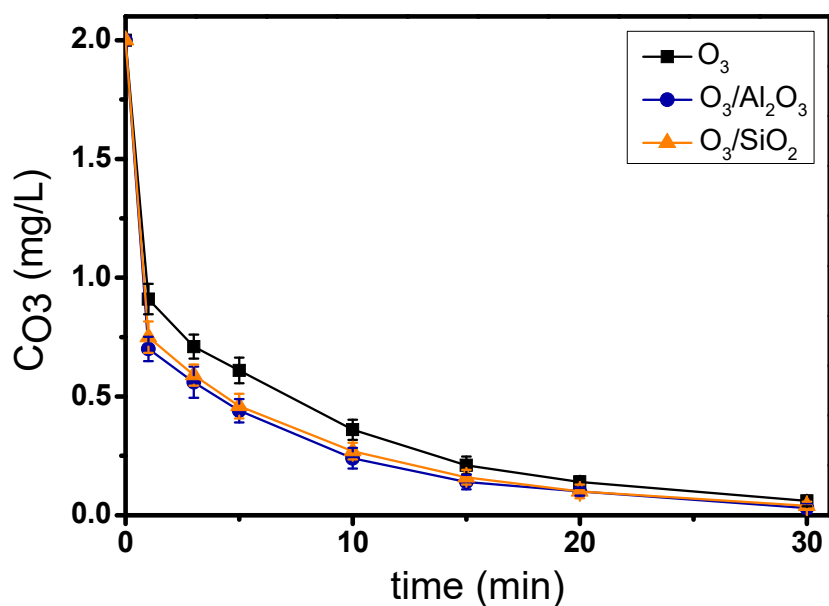


Figure S5. Ozone decomposition during catalytic ozonation of the mixture of the 8 examined micropollutants with the use of Al₂O₃ and SiO₂ as catalysts compared to single ozonation in natural potable water. Experimental conditions: C_{MP}. 50 µg/L, C_{cat}. 0.5 g/L, C_{O₃} 2 mg/L, pH 7.8, T 23±2° C.

Table S1. HPLC measurement parameters for the determination of the concentration of the examined 8 micropollutants.

Micropollutant	% Solvent ratio		Sample amount (µL)	Flow (mL/min)	Absorption (nm)
	<i>10 mM phosphoric acid</i>	<i>Acetonitrile</i>			
Atrazine	50	50	25	0.8	254
Benzotriazole	75	25	25	0.8	254
Ibuprofen	40	60	10	1.1	220
Carbamazepine	60	40	25	0.8	254
p-chlorobenzoic acid	60	40	25	0.8	254
Fluoxetine	62	38	50	1.0	214
	<i>Water</i>	<i>Methanol</i>			
Caffeine	75	25	20	1.0	275
Paracetamol	90	10	25	1.0	243

Table S2. 1st order reaction rate constants of ozone decomposition during catalytic ozonation with the use of SiO₂ and Al₂O₃ as catalysts for ozone concentration 2 mg/L in experiments with one probe compound.

Micropollutant	O ₃			O ₃ /SiO ₂			O ₃ /Al ₂ O ₃		
	k (min ⁻¹)	Equations	R ²	k (min ⁻¹)	Equations	R ²	k (min ⁻¹)	Equations	R ²
Atrazine	0.033	y = -0.033x – 0.252	0.999	0.037	y = -0.037x – 0.685	0.991	0.038	y = -0.038x – 0.753	0.996
Benzotriazole	0.150	y = -0.150x – 0.669	0.992	0.308	y = -0.308x – 1.208	0.991	0.186	y = -0.186x – 0.819	0.990
Caffeine	0.058	y = -0.058x – 0.514	0.997	0.067	y = -0.067x – 0.632	0.999	0.066	y = -0.067x – 0.563	0.999
Carbamazepine	0.220	y = -0.220x – 0.507	0.991	0.226	y = -0.226x – 0.843	0.999	0.245	y = -0.245x – 0.491	0.995
Fluoxetine	0.102	y = -0.102x – 0.470	0.999	0.108	y = -0.108x – 0.675	0.999	0.103	y = -0.103x – 0.625	0.999
Ibuprofen	0.084	y = -0.084x – 0.516	0.992	0.084	y = -0.084x – 0.950	0.991	0.185	y = -0.088x – 0.718	0.990
p-CBA	0.070	y = -0.070x – 0.361	0.999	0.078	y = -0.078x – 0.431	0.999	0.079	y = -0.079x – 0.351	0.998
Paracetamol	0.125	y = -0.125x – 0.723	0.998	0.215	y = -0.215x – 1.018	0.994	0.131	y = -0.132x – 0.781	0.997