SUPPLEMENTAL MATERIALS

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Simple Catalytic Approach for Removal of Analytical Interferences Caused by Hydrogen Peroxide in a Standard Chemical Oxygen Demand Test

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Supplemental figures

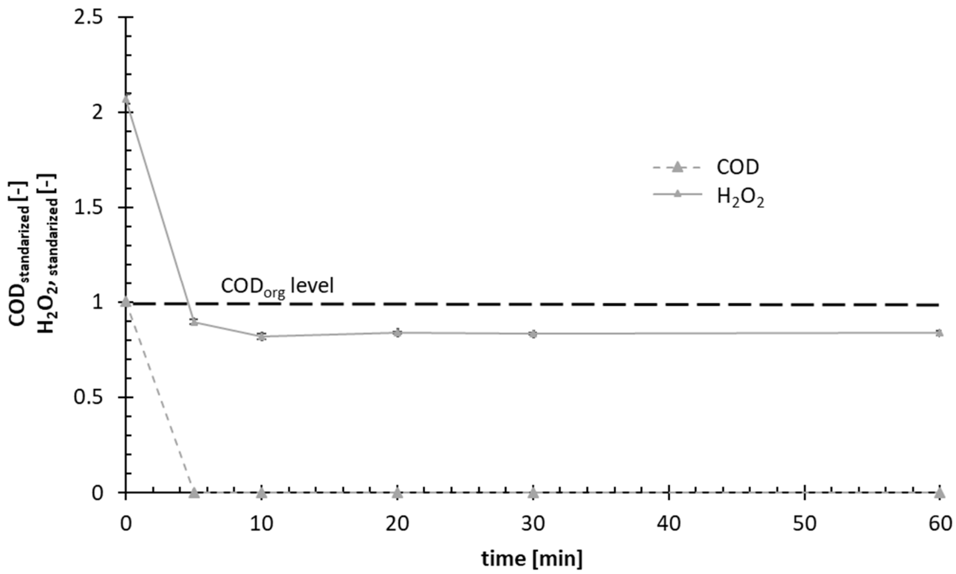


Figure S1. Determination of $COD_{standarized}$ of synthetic wastewater (SWW) according to the Na_2CO_3 approach (Wu and Englehardt 2012), with a ratio of 38 mol Na_2CO_3 to 1 mol H_2O_2 , pH 11.08, and heating at 90°C for 60 min.

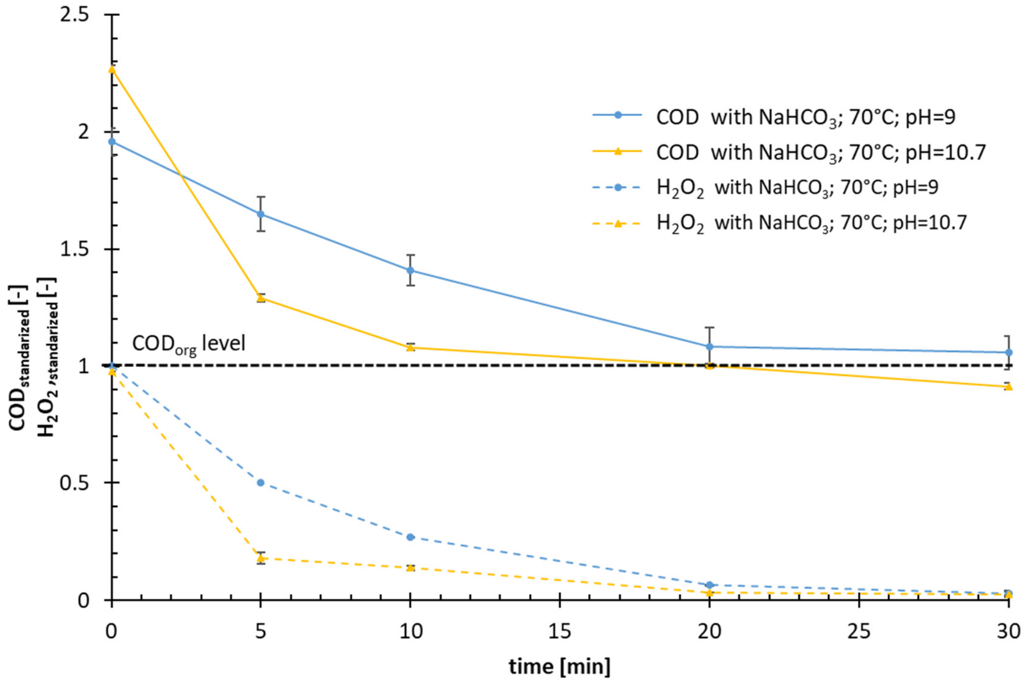
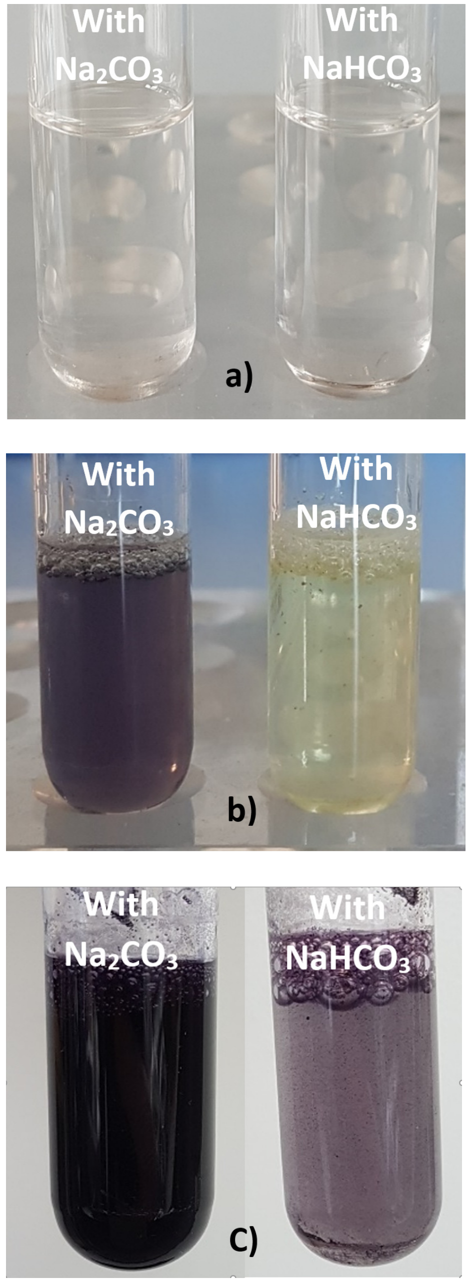


Figure S2. Change in H_2O_2 decomposition and chemical oxygen demand (COD) removal caused by increasing the pH of $NaHCO_3$-solution from 9 to 10.7 via NaOH. After pH adjustment at 10.7, H_2O_2 was added meeting the ratio $NaHCO_3$:H_2O_2 = 22.5 mol/mol. H_2O_2 and COD were observed during heating at 70°C for 30 min.



a) **Figure S3.** Color of samples after addition of nitro blue tetrazolium (NBT) to identify superoxides ($O_2^{\bullet -}$) at ambient temperature (~20°C): a) before NBT additon; b) after 1 min of NBT additon; and c) after 24 h of NBT additon. NBT=1.5 mM, pH=8.7 for $NaHCO_3$-sample, pH=11 for $NaCO_3$-sample.

Supplemental tables

Table S1. Comparison of interference ratios in literature and this work.

Study	Solution	COD [mg/L]	H_2O_2 [$mmol_{H_2O_2}$/L]	Ratio [$mg_{COD}/mmol_{H_2O_2}$]	Reference
Kuo (1992)	DW*	-	3.4–60.6	12	(Kuo 1992)
Talinli et al. (1992)	Glucose	230–906	7.4–29.4	10.1–8.5	(Talinli and Anderson 1992)
Kang et al. (1999)	KHP*	102–498	2.9–44.1	23.8–14.1	(Kang et al. 1999)
Lee et al. (2011)	KHP	0–1000	0.88–5.6	19.7	(Lee et al. 2011)
	livestock	0–400	0.88–2.9	17.7	
Wu et al. (2012)	MSE***	30–40	1–5	17.4	(Wu and Englehardt 2012)
Chavoshani et al. (2016)	Leachate	610	10 - 40	16.7	(Afsane Chavoshani. Aezam Rostami. Fahimeh Golzari 2016)
This work	SWW	1192	44.5	16.91	
	Leachate	1328	44.5	11.20	
	MPE	180	44.5	16.46	
	CID	45	44.5	17.25	

* Deionized water; ** Potassium hydrogen phthalate; *** Municipal secondary effluent (MSE)

Table S2. Data of side-by-side comparison approach via $NaHCO_3$ and Na_2CO_3.

		time [min]	Exp. 1	Exp. 2	Exp. 3	Exp. 4	mean value	SD
H_2O_2 [mmol/L]	With $NaHCO_3$	0	95	80	83	88	87	7
		5	73	79	80	70	76	5
		10	45	46	30	44	41	8
		20	17	18	19	18	18	1
		30	0	0	0	0	0	0
		60	0	0	0	0	0	0
	With Na_2CO_3	0	91	88	86	88	89	2
		5	8	9	13	6	9	3
		10	0	0	0	0	0	0
		20	0	0	0	0	0	0
		30	0	0	0	0	0	0
		60	0	0	0	0	0	0
COD* [mg/L]	With $NaHCO_3$	0	2700	2680	2644	2660	2671	24
		5	2380	2400	2456	2424	2415	33
		10	1912	1872	1960	1976	1930	47
		20	1428	1440	1468	1480	1454	24
		30	1276	1236	1278	1296	1272	25
		60	1120	1136	1124	1180	1140	28
	With Na_2CO_3	0	2648	2656	2412	2688	2601	127
		5	1312	1420	1278	1260	1318	72
		10	1188	1180	1138	1160	1167	22
		20	1084	1108	1054	1076	1081	22
		30	1044	1016	1050	992	1026	27
		60	976	976	1012	972	984	19
pH	With $NaHCO_3$	0	8.64	8.40	8.66	8.81	8.63	0.17
		5	8.61	8.60	8.66	8.72	8.65	0.06
		10	8.63	8.69	8.69	8.78	8.70	0.06
		20	8.65	8.74	8.74	8.81	8.74	0.07
		30	8.61	8.69	8.71	8.76	8.69	0.06
		60	8.66	8.65	8.70	8.79	8.70	0.06
	With Na_2CO_3	0	11.00	10.93	11.03	11.05	11.00	0.05
		5	11.08	11.08	11.06	11.02	11.06	0.03
		10	11.04	11.05	11.00	10.97	11.02	0.04
		20	11.02	11.03	10.96	10.98	11.00	0.03
		30	10.99	10.98	10.97	10.95	10.97	0.02
		60	10.97	10.95	10.96	10.96	10.96	0.01

*COD of the original solution SWW is COD_{org}=1195 mg/L

References

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