

Inactivation of antibiotic resistant bacteria and inhibition of horizontal resistance gene transfer is more effective by 222 than 254 nm UV

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Supplemental Material

Table S1 Summarized log logistic parameters fitting to UV dose curves for ARB inactivation, extracted and intracellular gene damage and HGT inhibition with kinetic information

Target	UV Source	Condition	b(cm ² /mJ per log reduction)	d (log reduction)	e (mJ/cm ²)	D ₁ (mJ/cm ²)	D ₂ (mJ/cm ²)
Cells	222 nm	Inactivation	-0.67±0.04	10.66±0.97	119.29±32.54	4.11	28.61
Cells	254 nm		-0.64±0.14	21.57±0.17	998.89±12.55	8.99	13.54
1017 bp	222 nm	Extracellular	-0.44±0.10	8.73±5.00	394.21±919.16	3.85	33.05
870 bp		Extracellular	-0.65±0.07	5.30±0.80	88.99±42.91	9.50	40.82
832 bp		Extracellular	-0.54±0.11	9.36±7.53	721.54±1743.74	14.24	72.87
266 bp		Extracellular	-0.53±0.10	9.09±6.69	1054.59±2225.60	20.67	126.03
1017 bp		Intracellular	-0.47±0.16	12.09±13.82	702.48±2882.74	4.03	25.26
870 bp		Intracellular	-1.0670.23	3.66±0.36	23.10±5.49	9.25	41.25
832 bp		Intracellular	-0.71±0.09	4.56±0.76	72.12±36.44	12.21	64.91
266 bp		Intracellular	-0.66±0.12	8.40±6.38	657.94±1156.39	32.40	97.51
1017 bp	254 nm	Extracellular	-0.52±0.20	14.17±23.31	1070.48±5262.33	7.47	42.94
870 bp		Extracellular	-0.90±0.07	4.73±0.37	57.61±11.58	13.33	57.51
832 bp		Extracellular	-0.56±0.03	6.98±1.39	372.15±234.23	15.19	91.99
266 bp		Extracellular	-0.49±0.30	6.34±11.78	620.72±3898.87	19.80	150.79
1017 bp		Intracellular	-0.57±0.07	14.60±8.92	1054.19±1681.70	3.85	21.82
870 bp		Intracellular	-0.56±0.10	11.61±9.49	956.89±2171.48	9.50	27.48
832 bp		Intracellular	-0.73±0.12	9.58±7.32	574.23±943.64	14.24	51.15
266 bp		Intracellular	-1.12±0.26	3.54±1.35	119.53±83.69	20.67	114.33
HGT Inhibition	254 nm	Extracellular	-0.88±0.53	3.04±3.08	112.59±264.52	8.57	236.81
	222 nm		-0.48±0.19	5.51±4.13	191.98±568.91	50.23	60.14
	254 nm	Intracellular	-1.33±0.19	1.52±0.17	56.74±12.55	20.14	NA
	222 nm		-0.62±0.10	13.14±9.55	1094.24±1819.24	92.90	70.07

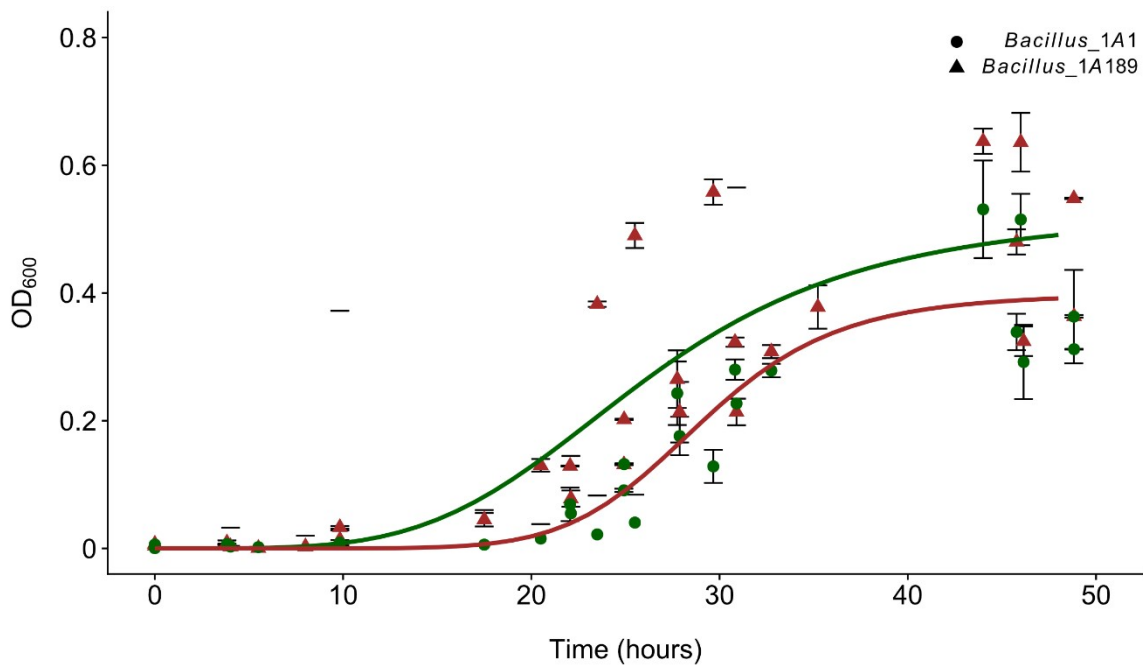


Figure S1 Growth curves (OD vs. time) for *B.subtilis* 1A189 (green) and *B.subtilis* 1A1 (red). Error bars represent SEM of three averaged biological replicates, with three technical replicates each, at each collecting time. Modeled parameters are shown in Table S2.

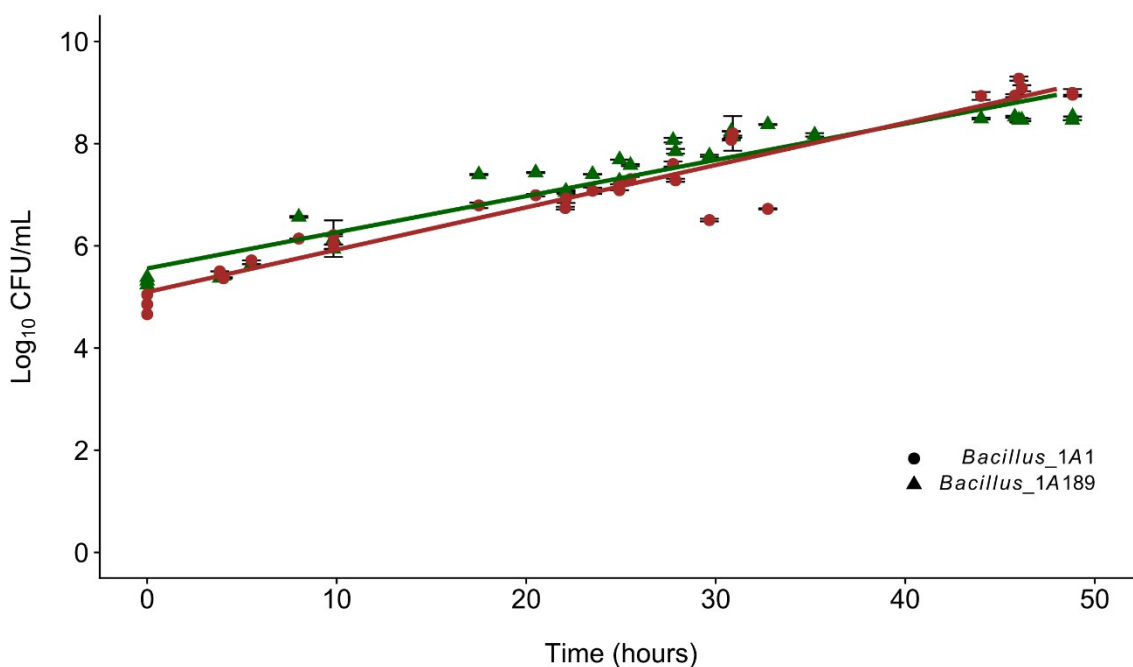


Figure S2 Growth curves (Log_{10} CFU/mL vs. time) for *B.subtilis* 1A189 (green) and *B.subtilis* 1A1 (red). Error bars represent SEM of three averaged biological replicates, with three technical replicates each, at each collecting time. Modeled parameters are shown in Table S3.

Table S2. Summary of four parameter estimates with their corresponding standard deviation of log logistic model depicting the growth curve of OD at 600 nm over time curve for *B.subtilis* 1A189 and *B.subtilis* 1A1

<i>B.subtilis</i>	b (1/hour)	d (OD_{600})	e (hour)
1A189	-4.29 ± 2.06	0.52 ± 0.09	26.02 ± 3.02
1A1	-8.01 ± 1.96	0.39 ± 0.02	29.09 ± 1.01

Table S3. Summary of slope and intercept of linear model with their corresponding standard deviation depicting the growth curve of Log_{10} CFU/mL over time for *B.subtilis* 1A189 and *B.subtilis* 1A1

<i>B.subtilis</i>	Slope ($\text{log}_{10}\text{CFU/mL/hour}$)	Intercept ($\text{log}_{10}\text{CFU/mL}$)
1A189	0.07 ± 0.001	5.55 ± 0.12
1A1	0.08 ± 0.001	5.09 ± 0.12

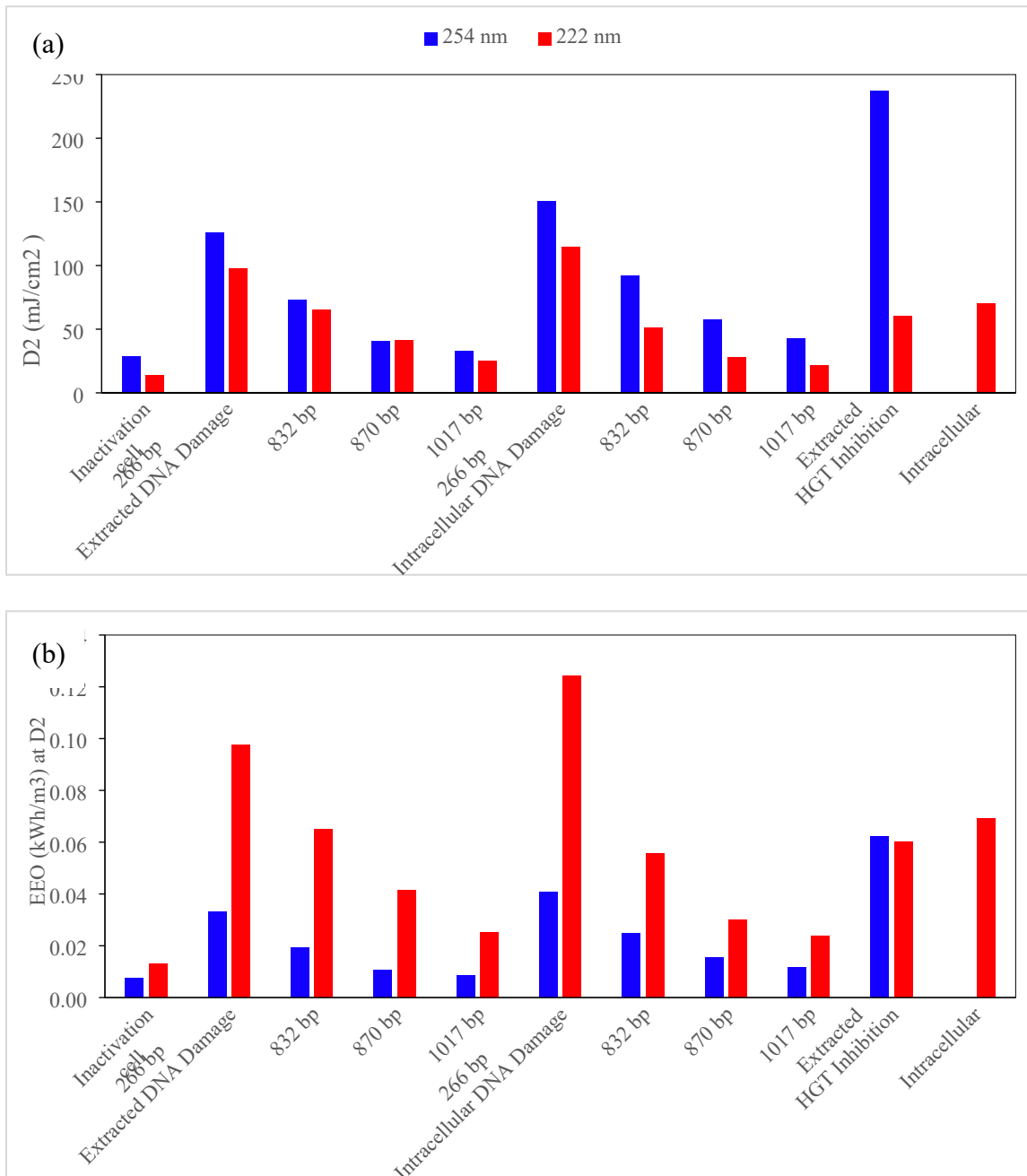


Figure S3 (a) D₂ for 1-log₁₀ reduction and (b) Electrical Energy per Order at D₂ of: cell inactivation, extracted DNA damage at various amplicon lengths, intracellular DNA damage at various amplicon lengths, and HGT inhibition of intracellular and extracted DNA with 254 nm (blue) and 222 nm (red) UV.