

### Supplementary information for

#### Investigating the effects of ultrafine bubbles on bacterial growth

**Table S1.** Percent variation in laser scattering of three culture media over time at room temperature (25°C) (compared to the start time).

Time (hour)	Percent variation (%)		
	DW	AUFB	HUFB
1	1.34	5.33	3.50
2	-2.66	0.54	3.14
3	-3.29	-0.89	2.47
4	-1.86	3.39	3.39
5	-1.04	3.62	3.96
6	1.48	3.45	5.31

**Table S2.** Live cell count result.

(A) The average live cell concentration of five culture media.

Media	Live cell concentration (cells ml <sup>-1</sup> )
DW	$15.2 \times 10^5 \pm 13.0 \times 10^4$
AUFB	$42 \times 10^5 \pm 12 \times 10^4$
AUFB – SDS	$43 \times 10^5 \pm 12 \times 10^4$
HUFB	$91.4 \times 10^5 \pm 11.4 \times 10^4$

HUFB - SDS	$92 \times 10^5 \pm 16 \times 10^4$
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(B) Mann-Whitney U test results showed no significant difference in live cell concentration between each pair of UFB culture media (AUFB and AUFB-SDS; HUFB and HUFB-SDS).

Cultture media	Sample size	Test values		Significance level ( $\alpha$ )
		U critical	U score	
AUFB, AUFB-SDS	5, 5	6	2	0.05
HUFB, HUFB-SDS	5, 5	9.5	2	

**Table S3.** Statistical results from one-tailed t-test on the difference between the size average of bacteria in each pair of culture media.

Species	Null hypothesis	Sample size	p-value	Significance level ( $\alpha$ )
<i>E. coli</i>	DW $\geq$ AUFB	150, 150	$0.25 \times 10^{-3}$	0.05
	DW $\geq$ HUFB	150, 150	$2.3 \times 10^{-17}$	
	AUFB $\geq$ HUFB	150, 150	$2.9 \times 10^{-7}$	
<i>S. aureus</i>	DW $\geq$ AUFB	150, 150	$1.1 \times 10^{-9}$	
	DW $\geq$ HUFB	150, 150	$2.1 \times 10^{-24}$	
	AUFB $\geq$ HUFB	150, 150	$2.7 \times 10^{-13}$	