Supplementary Information (SI) for Nanoscale Advances.

A Biocompatible β-Cyclodextrin Inclusion Complex Containing Natural Extracts: A Promising Antibiofilm Agent

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Supplementary Figure S1.

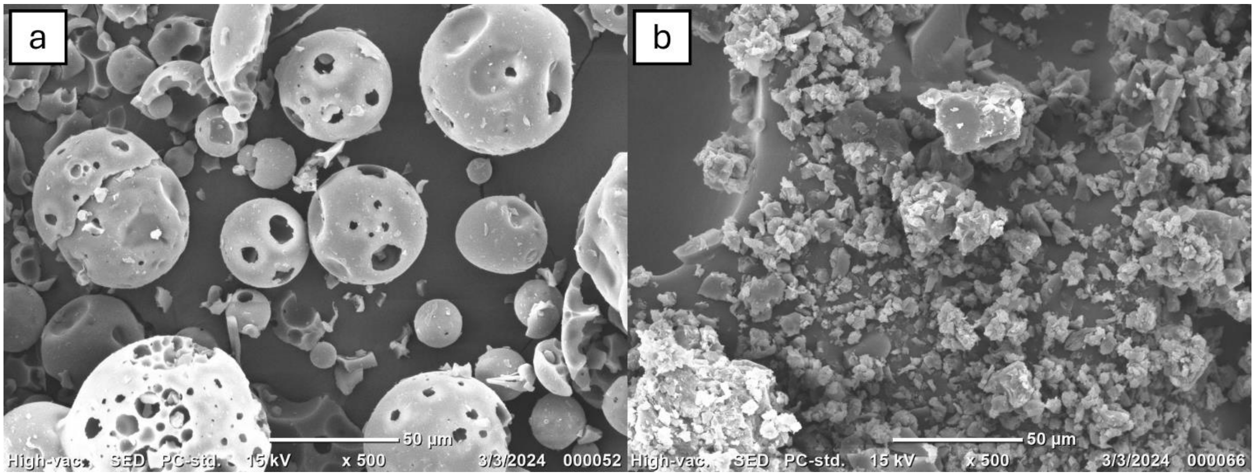


Figure S1. SEM images of (**a**) βCD and (**b**) BOS-βCD inclusion complex. The βCD field demonstrated large ovoid crystals alongside rectangular particles, whereas the particles of BOS-βCD inclusion complex were presented with significant reduction in size and substantial morphological alterations developing several aggregates as well. These observations suggest the potential complexation formation of BOS-βCD inclusion complex, possibly involving an amorphous product interacting with other components in the established complex.

Supplementary Figure S2.

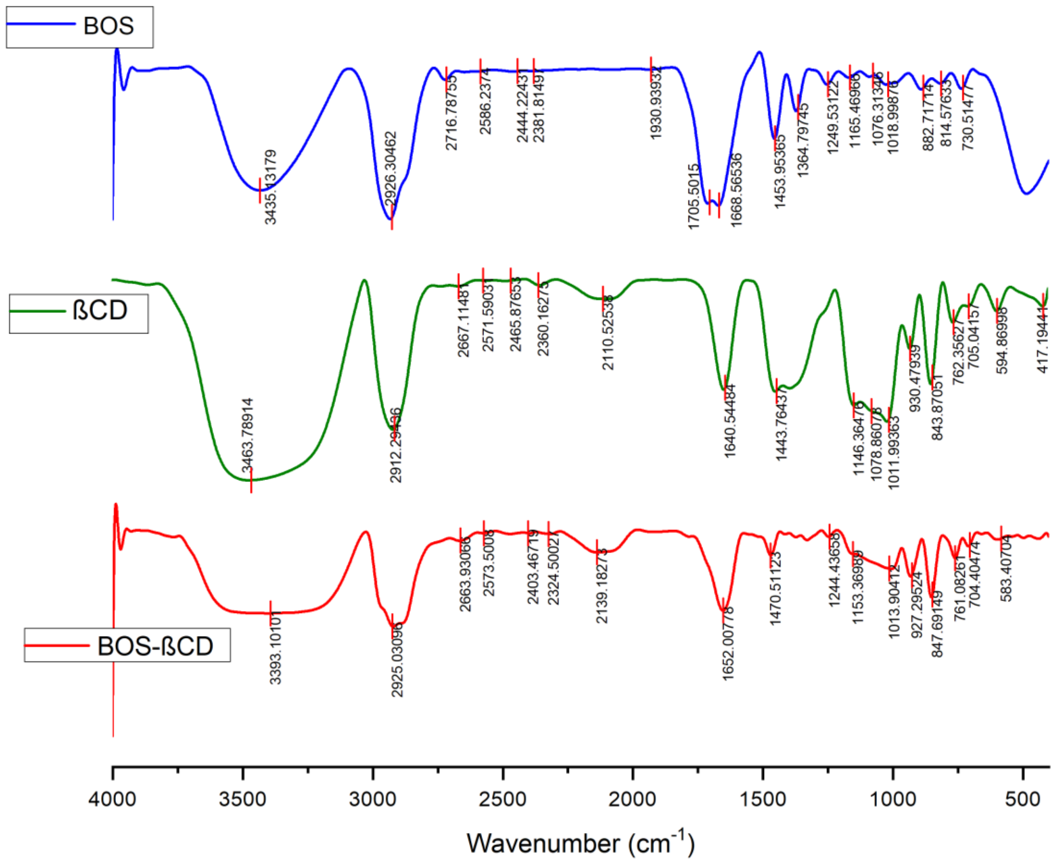


Figure S2. FTIR spectra for BOS, βCD, and BOS-βCD inclusion complex.

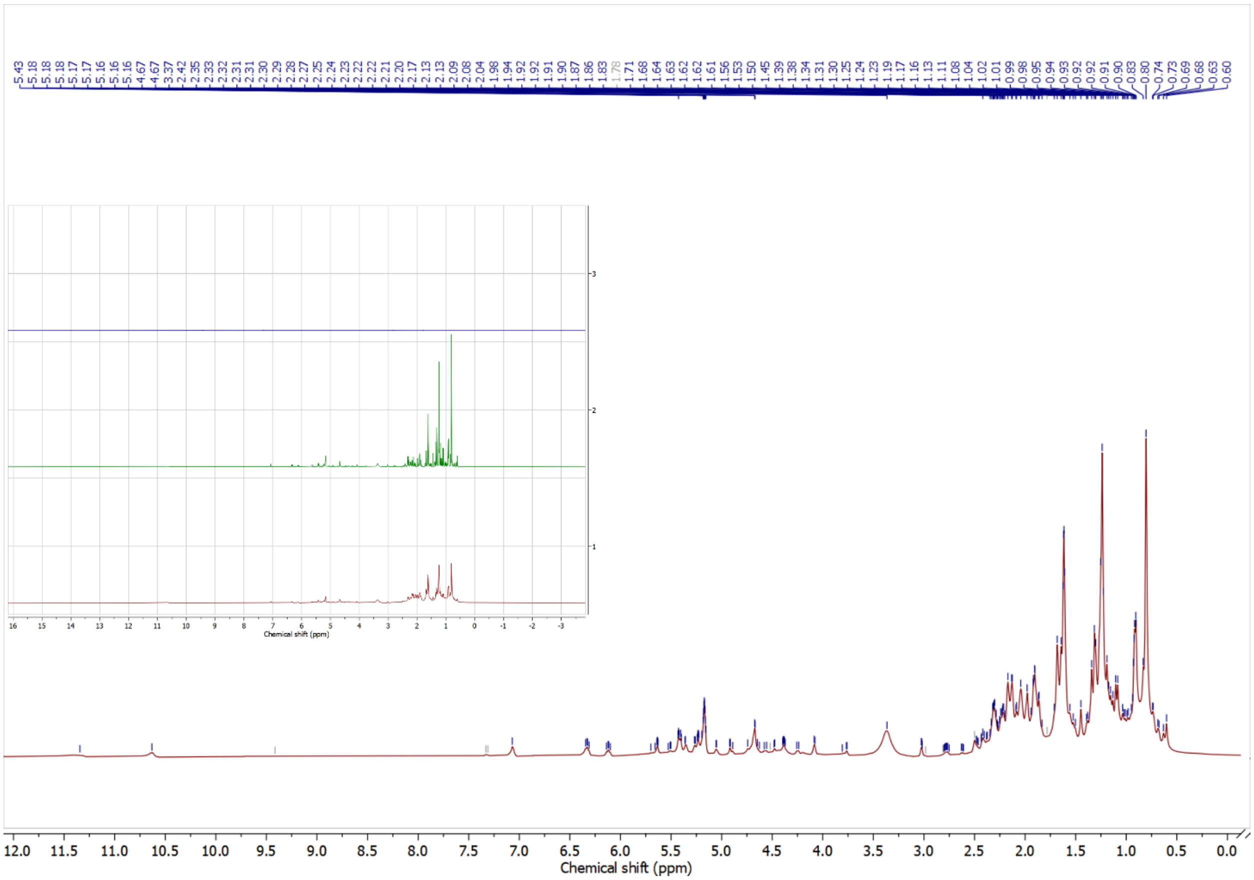


Figure S3. ^{1}H NMR spectrum and stacked H1 Sub-spectra of BOS EO.

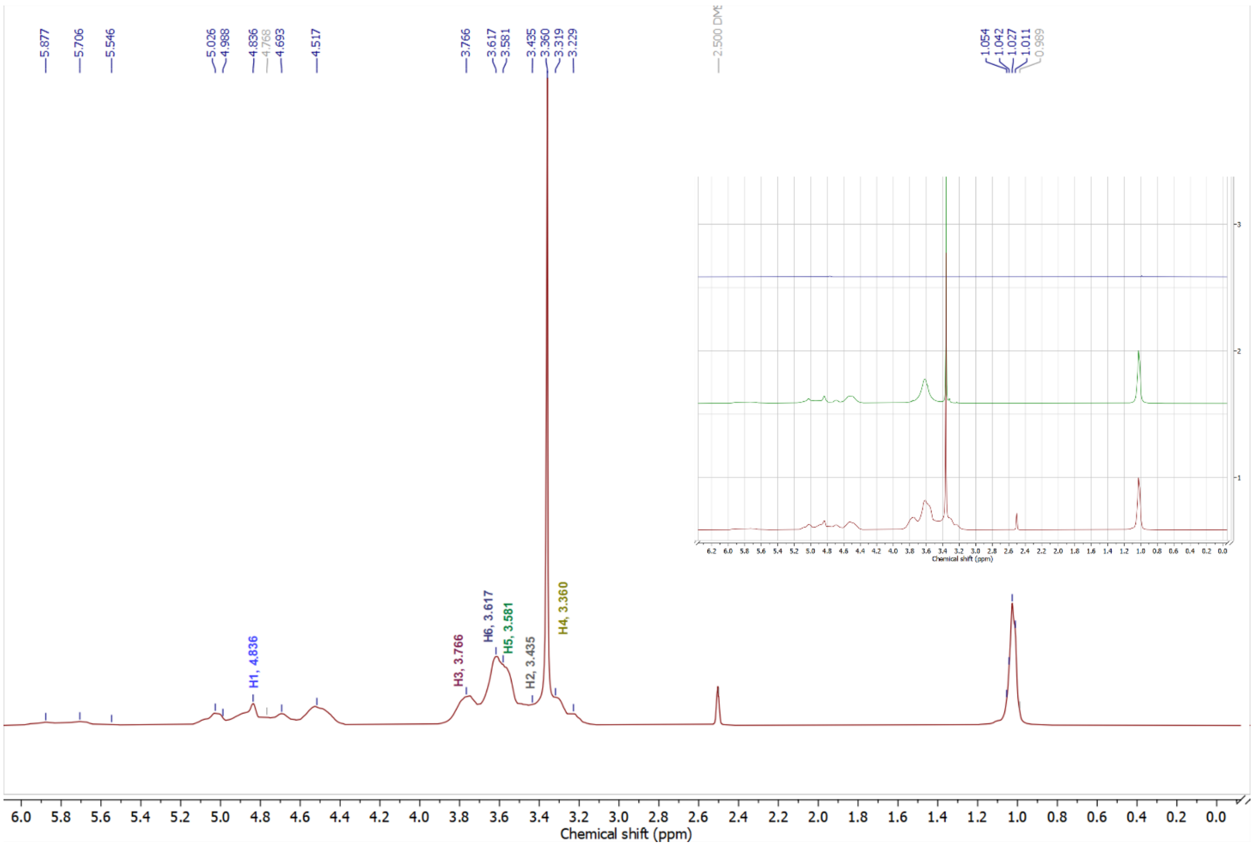


Figure S4. ^{1}H NMR spectrum and stacked H1 Sub-spectra of βCD.

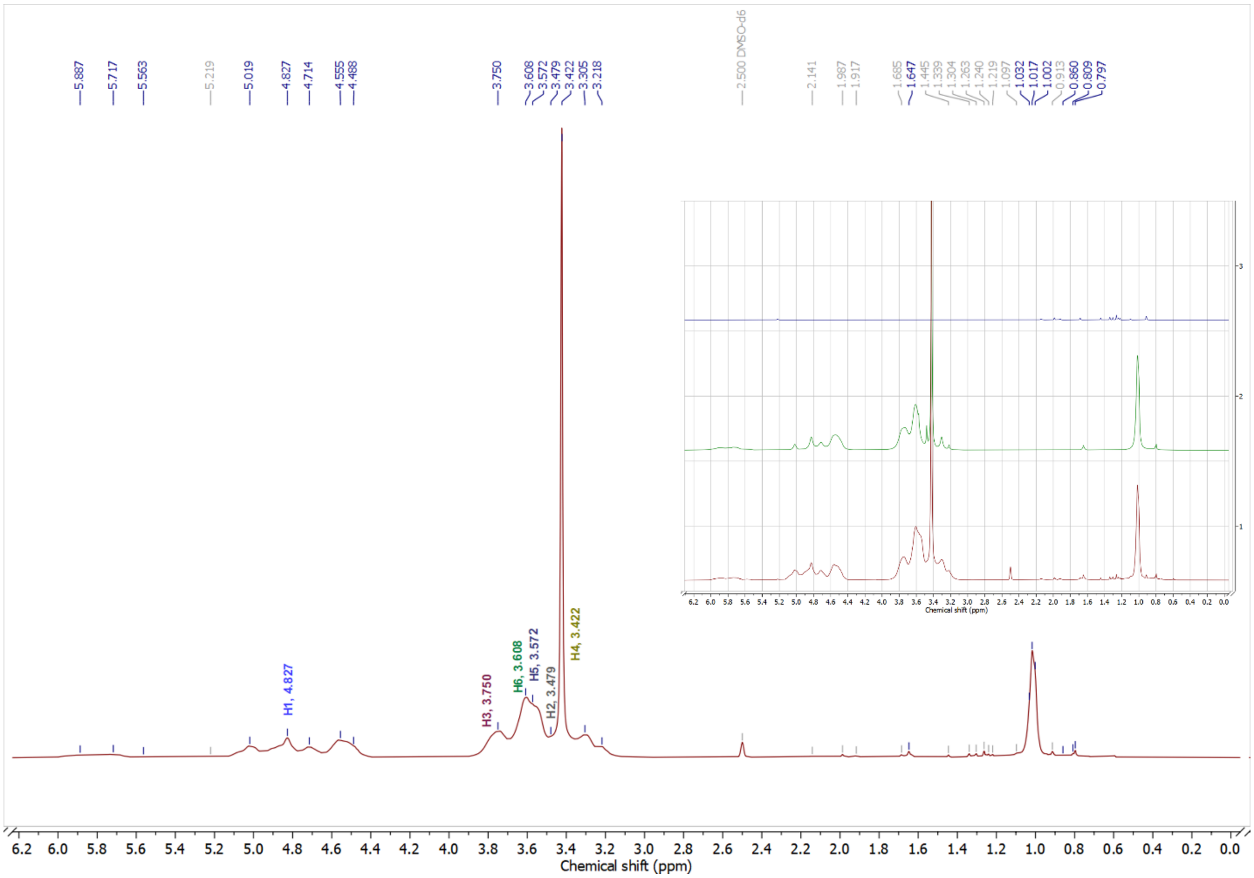


Figure S5. ^{1}H NMR spectrum and stacked H1 Sub-spectra of BOS-βCD.

Supplementary Table 1. Chemical shifts (δ) for βCD and BOS-βCD and differences in chemical shift ($\Delta\delta$)

Proton no.	βCD (δ/ppm)	BOS- βCD (δ/ppm)	$\Delta\delta$ BOS-βCD/βCD ($\Delta\delta$/ppm)
H1	4.836	4.827	0.009
H2	3.435	3.479	-0.044
H3	3.766	3.750	0.016
H4	3.360	3.422	-0.062
H5	3.581	3.572	0.009
H6	3.617	3.608	0.009

Supplementary Figure S6.

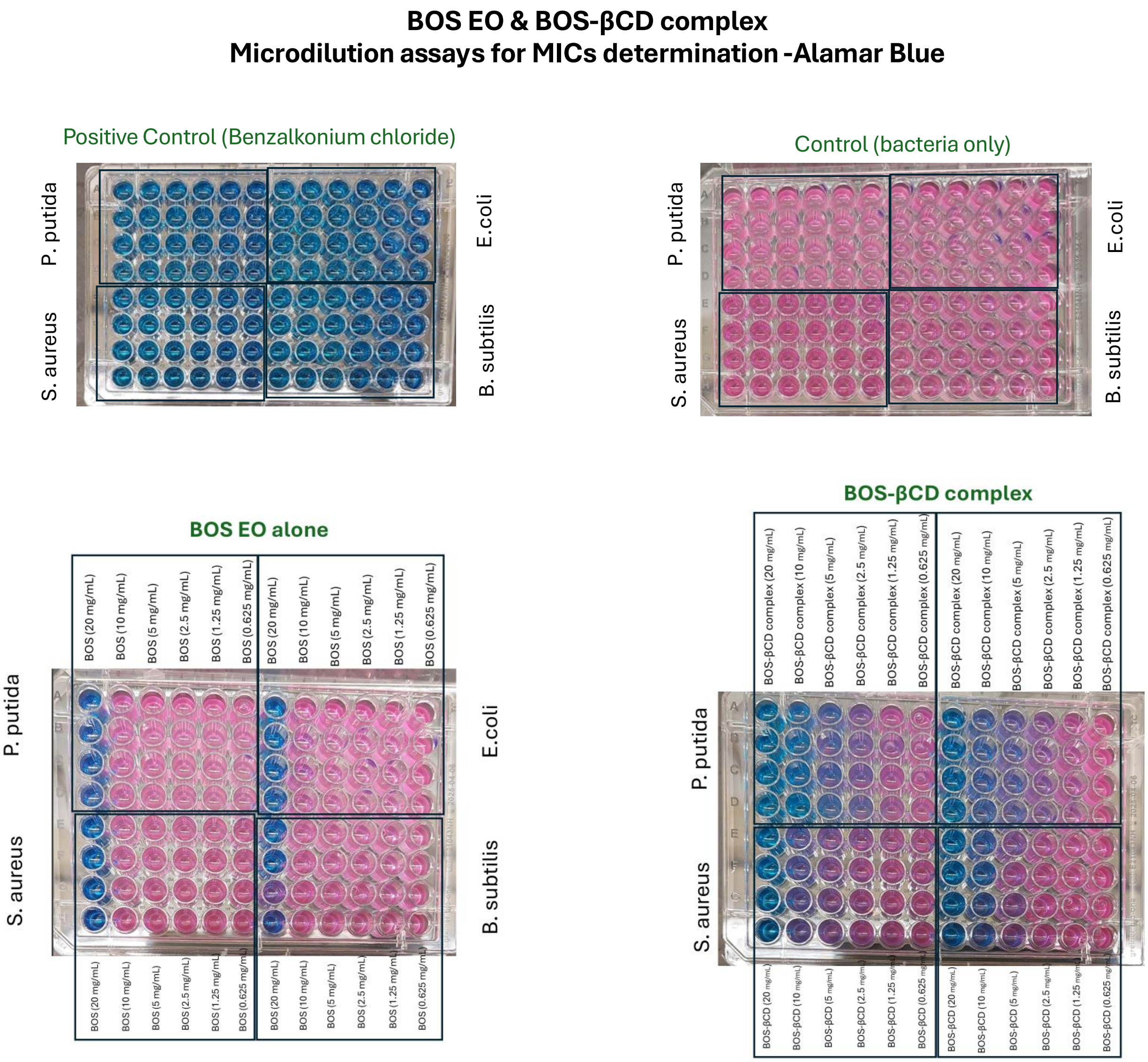


Figure S6. Microdilution assays for MICs determination of BOS EO & BOS-βCD complex (Alamar Blue).

Supplementary Figure S7I.

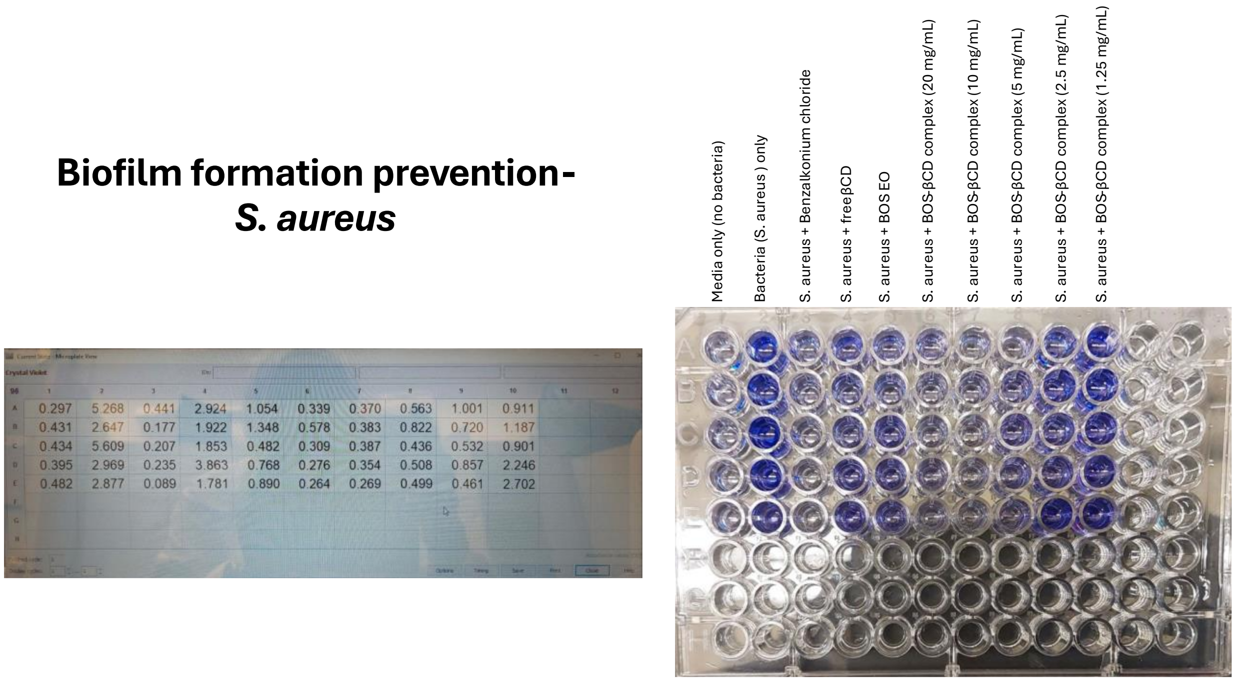
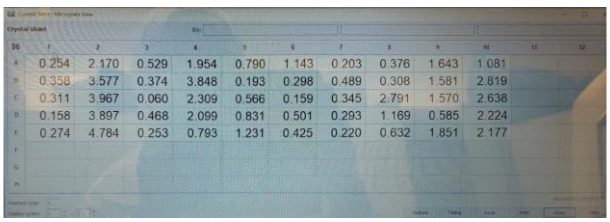


Figure S7I. Assay of Biofilm formation prevention against *S. aureus*.

Supplementary Figure S7II.

Biofilm formation prevention - *P. Putida*



Crystal Violet

96	1	2	3	4	5	6	7	8	9	10	11	12
A	0.254	2.170	0.529	1.954	0.790	1.143	0.203	0.376	1.643	1.081		
B	0.358	3.577	0.374	3.848	0.193	0.298	0.489	0.308	1.581	2.819		
C	0.311	3.967	0.060	2.309	0.566	0.159	0.345	2.791	1.570	2.638		
D	0.158	3.897	0.468	2.099	0.831	0.501	0.293	1.169	0.585	2.224		
E	0.274	4.784	0.253	0.793	1.231	0.425	0.220	0.632	1.851	2.177		
F												
G												
H												

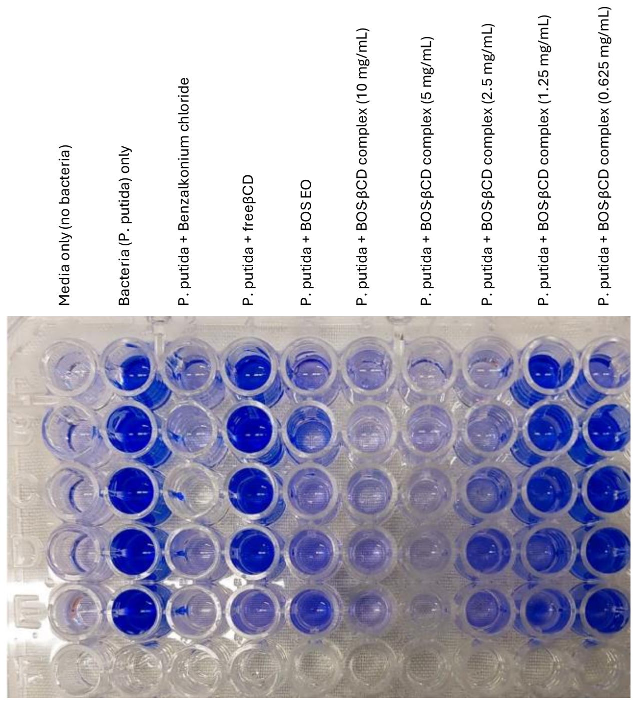
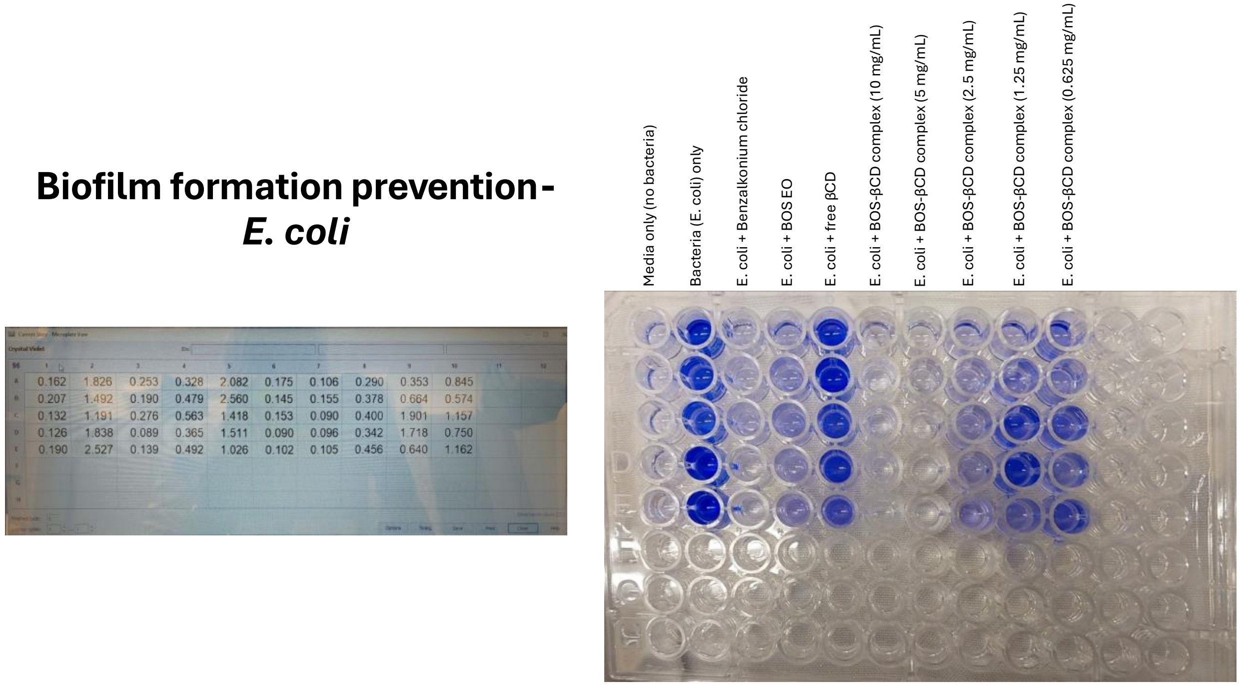


Figure S7II. Assay of Biofilm formation prevention against *P. putida*.

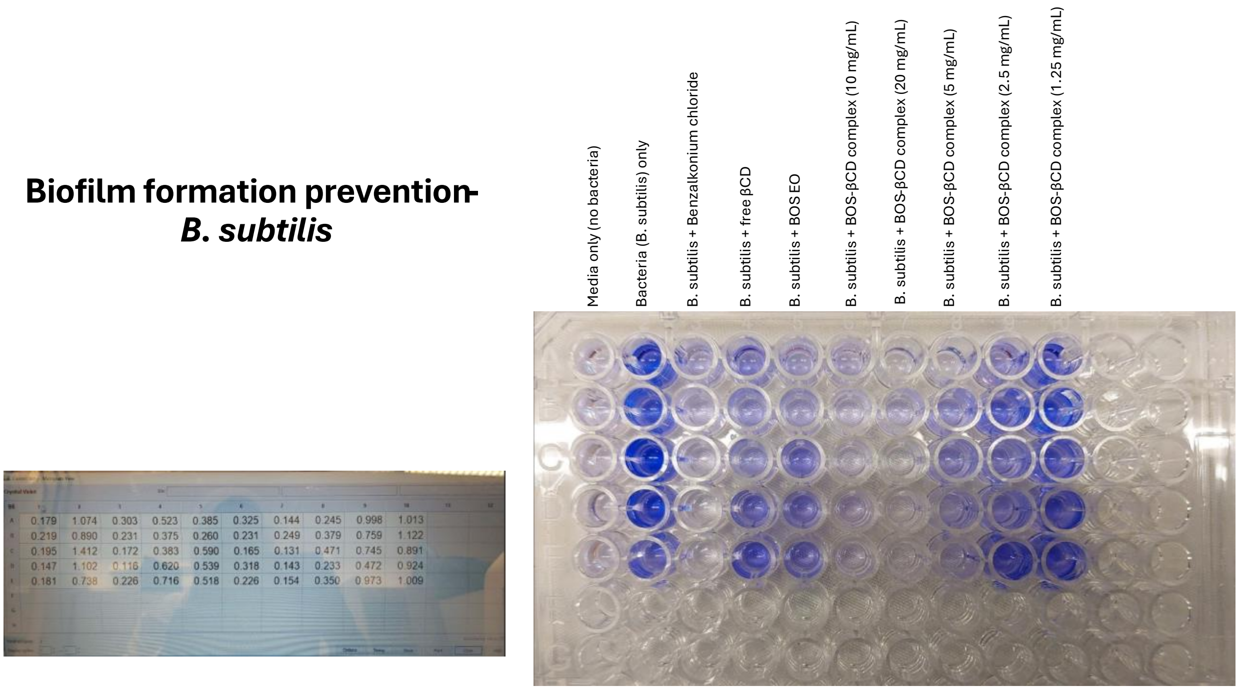
Supplementary Figure S7III.



96	1	2	3	4	5	6	7	8	9	10	11	12
A	0.162	1.826	0.253	0.328	2.082	0.175	0.106	0.290	0.353	0.845		
B	0.207	1.492	0.190	0.479	2.560	0.145	0.155	0.378	0.664	0.574		
C	0.132	1.191	0.276	0.563	1.418	0.153	0.090	0.400	1.901	1.157		
D	0.126	1.838	0.089	0.365	1.511	0.090	0.096	0.342	1.718	0.750		
E	0.190	2.527	0.139	0.492	1.026	0.102	0.105	0.456	0.640	1.162		
F												
G												
H												

Figure S7III. Assay of Biofilm formation prevention against *E. coli*.

Supplementary Figure S7IV.

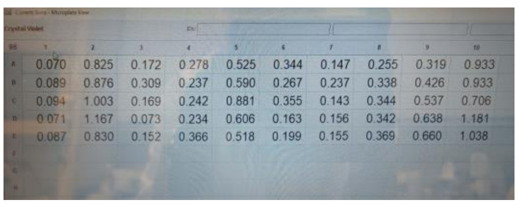


	1	2	3	4	5	6	7	8	9	10	11	12
A	0.179	1.074	0.303	0.523	0.385	0.325	0.144	0.245	0.998	1.013		
B	0.219	0.890	0.231	0.375	0.260	0.231	0.249	0.379	0.759	1.122		
C	0.195	1.412	0.172	0.383	0.590	0.165	0.131	0.471	0.745	0.891		
D	0.147	1.102	0.116	0.620	0.539	0.318	0.143	0.233	0.472	0.924		
E	0.181	0.738	0.226	0.716	0.518	0.226	0.154	0.350	0.973	1.009		

Figure S7IV. Assay of Biofilm formation prevention against *B. subtilis*.

Supplementary Figure S8I.

Biofilm disruption -
S. aureus



Crystal Violet

	1	2	3	4	5	6	7	8	9	10
A	0.070	0.825	0.172	0.278	0.525	0.344	0.147	0.255	0.319	0.933
B	0.089	0.876	0.309	0.237	0.590	0.267	0.237	0.338	0.426	0.933
C	0.094	1.003	0.169	0.242	0.881	0.355	0.143	0.344	0.537	0.706
D	0.071	1.167	0.073	0.234	0.606	0.163	0.156	0.342	0.638	1.181
E	0.087	0.830	0.152	0.366	0.518	0.199	0.155	0.369	0.660	1.038
F										
G										
H										

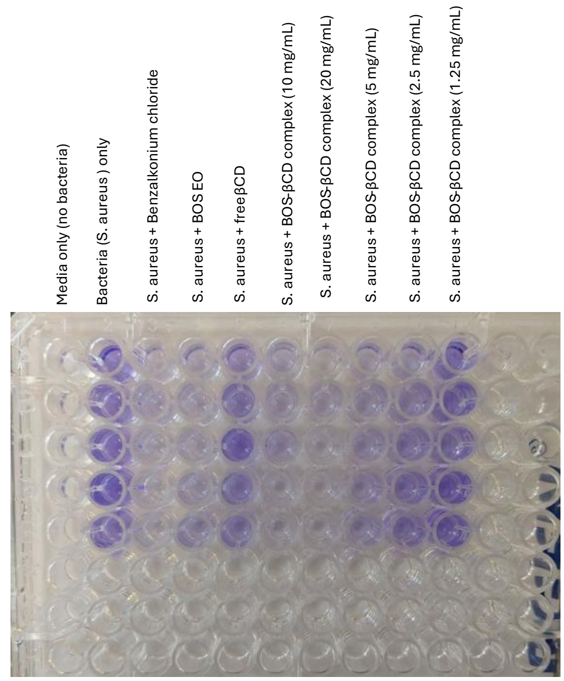


Figure S8I. Assay of established biofilm disruption against *S. aureus*.

Supplementary Figure S8II.

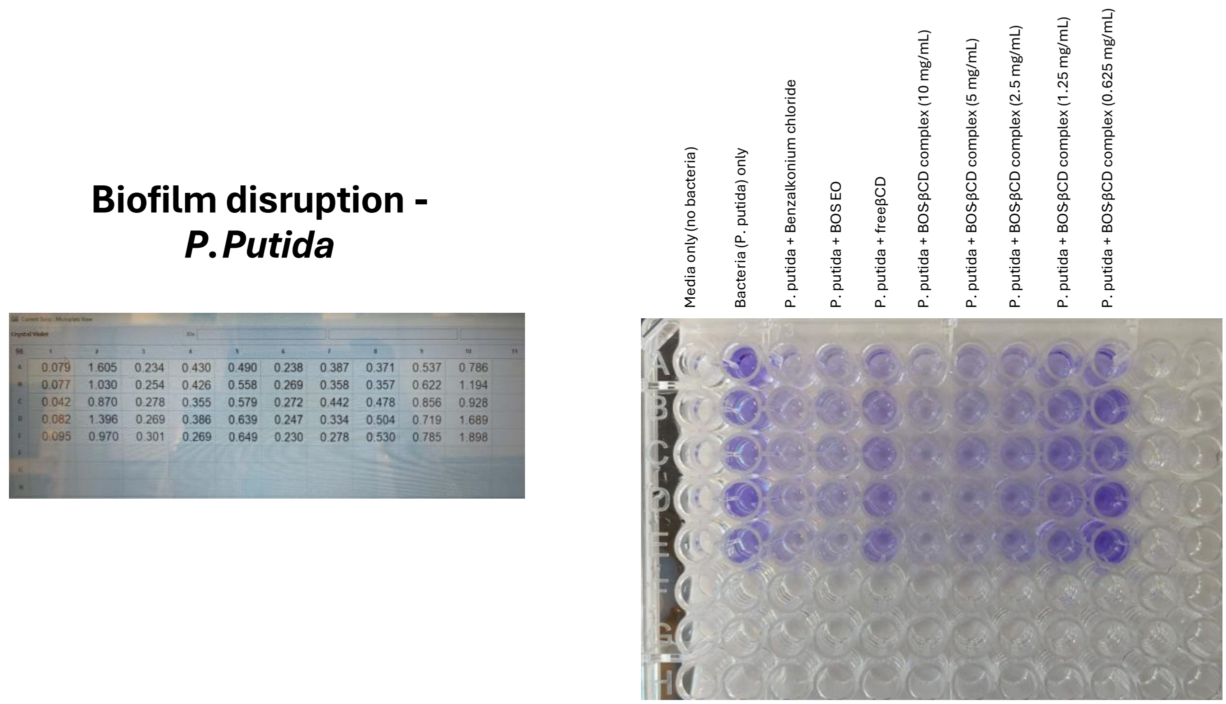
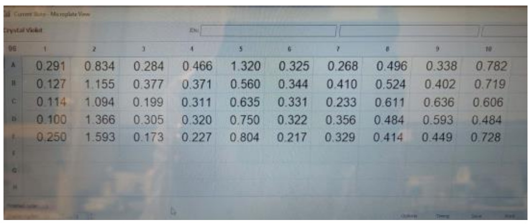


Figure S8II. Assay of established biofilm disruption against *P. putida*.

Supplementary Figure S8III.

Biofilm disruption - *E. coli*



96	1	2	3	4	5	6	7	8	9	10
A	0.291	0.834	0.284	0.466	1.320	0.325	0.268	0.496	0.338	0.782
B	0.127	1.155	0.377	0.371	0.560	0.344	0.410	0.524	0.402	0.719
C	0.114	1.094	0.199	0.311	0.635	0.331	0.233	0.611	0.636	0.606
D	0.100	1.366	0.305	0.320	0.750	0.322	0.356	0.484	0.593	0.484
E	0.250	1.593	0.173	0.227	0.804	0.217	0.329	0.414	0.449	0.728

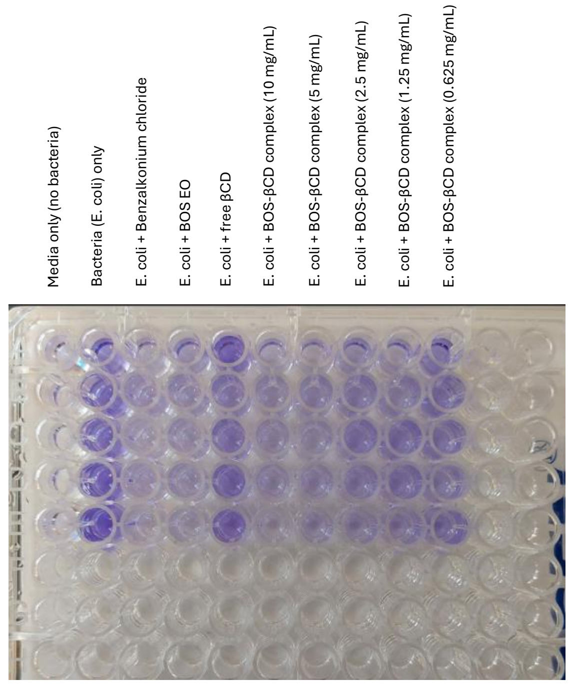


Figure S8III. Assay of established biofilm disruption against *E. coli*.

Supplementary Figure S8IV.

Biofilm disruption -
B. subtilis

96	1	2	3	4	5	6	7	8	9	10
A	0.137	0.963	0.215	0.290	0.920	0.514	0.175	0.242	0.674	0.972
B	0.135	0.934	0.335	0.188	0.714	0.213	0.184	0.254	0.367	1.017
C	0.059	0.831	0.147	0.381	0.805	0.177	0.191	0.201	0.496	1.214
D	0.071	0.944	0.148	0.280	0.870	0.233	0.275	0.233	0.388	0.995
E	0.121	0.723	0.161	0.282	0.792	0.247	0.295	0.203	0.808	0.809

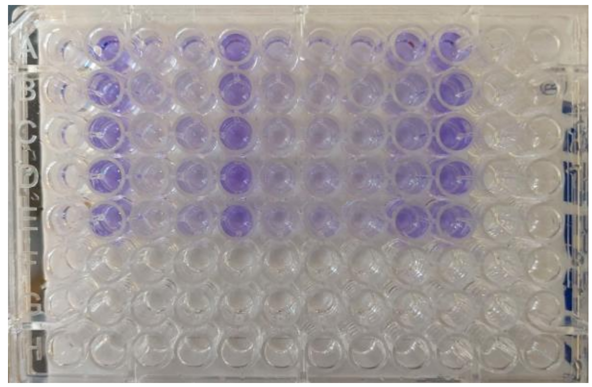


Figure S8IV. Assay of established biofilm disruption against *B. subtilis*.