

**Phase variations in waste-derived CaSiO<sub>3</sub> for efficient drug loading, releasing, and antimicrobial applications**

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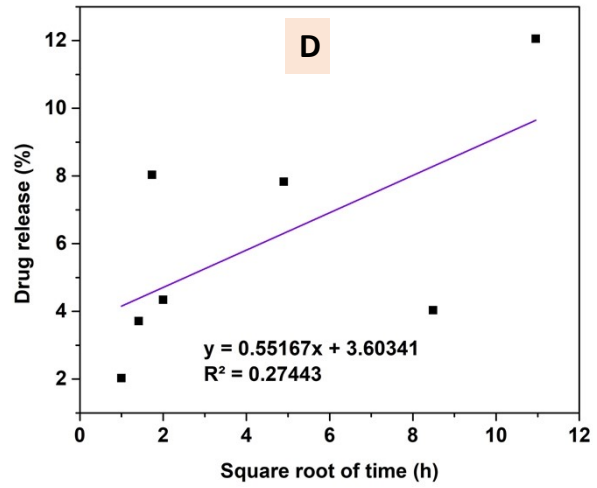
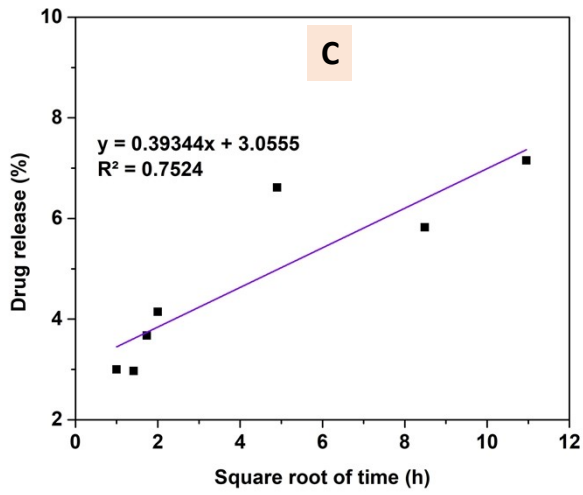
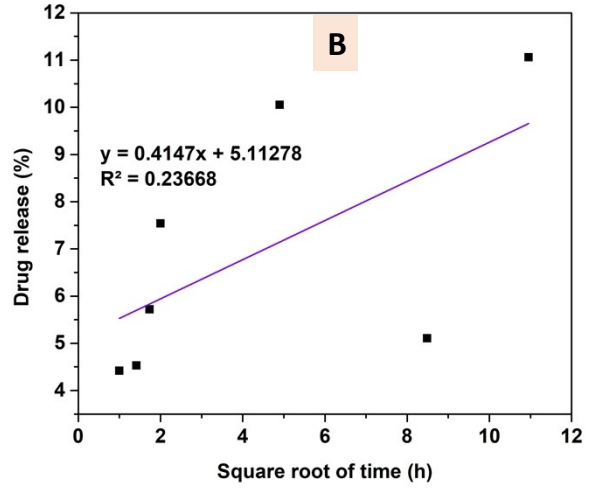
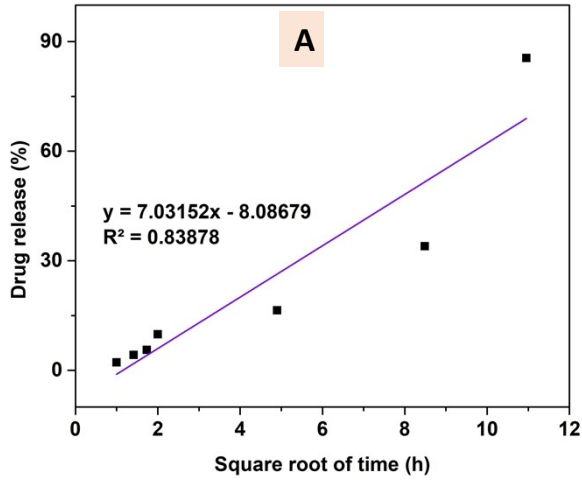
**Table S\_1:** Diameter and thickness of scaffolds.

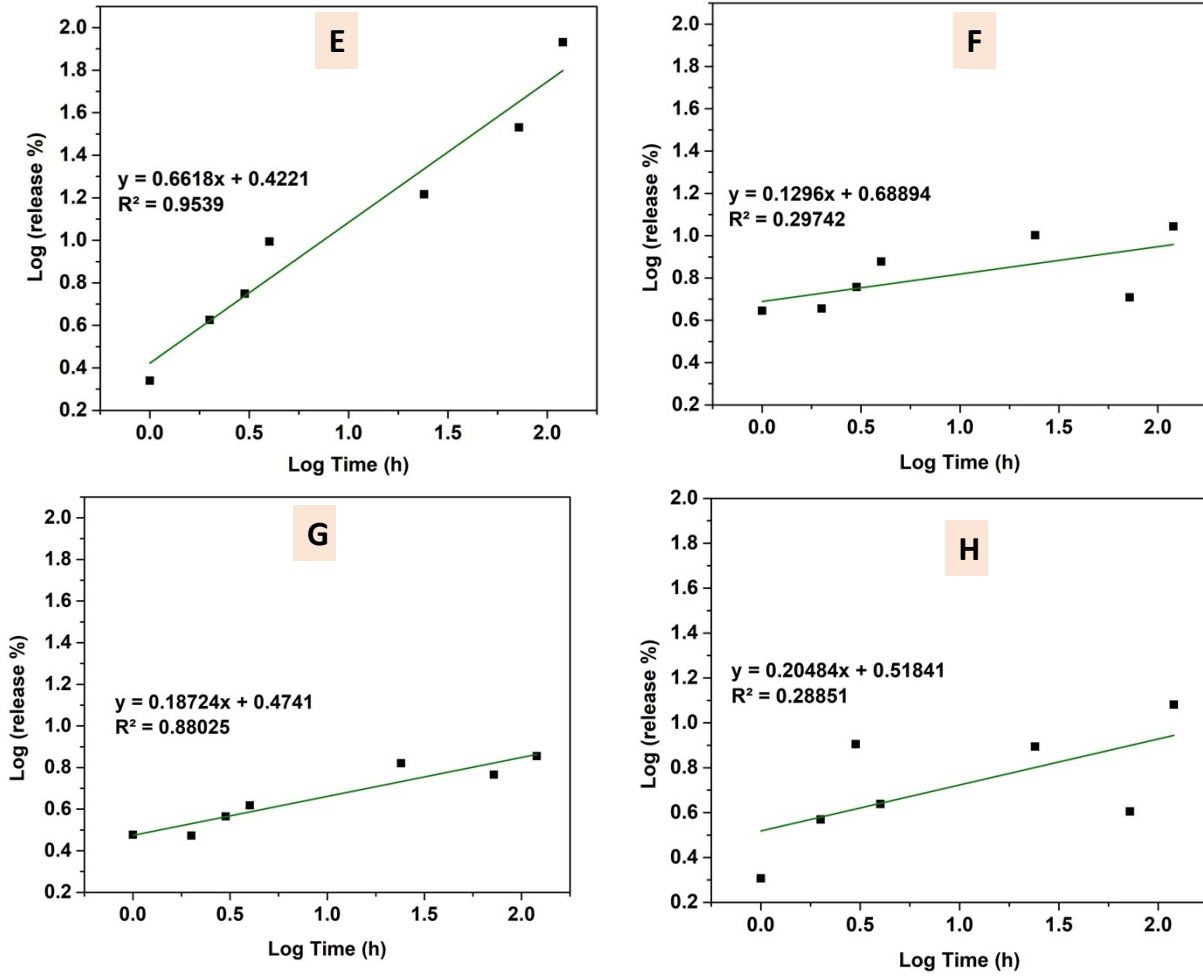
<b>Sample name</b>	<b>Diameter (mm)</b>	<b>Thickness (mm)</b>
2:1_CS	13.19	2.14
2:1.5_CS	13.14	1.81
2:2_CS	13.12	1.79
2:3_CS	13.29	1.78

**Table S\_2:** Comparison of diffraction angles and planes of synthesized products with standard values.

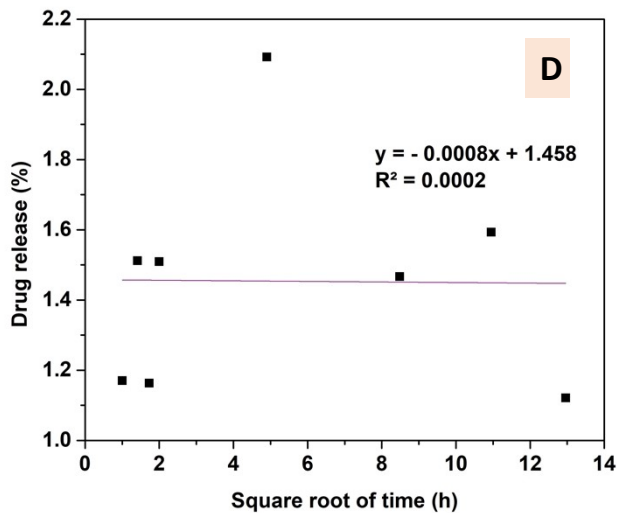
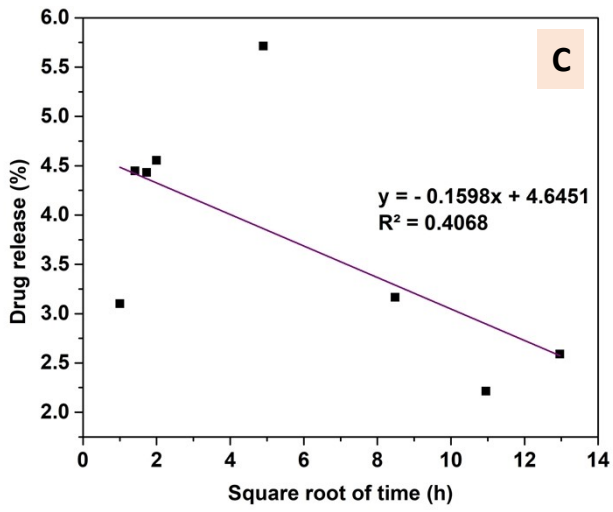
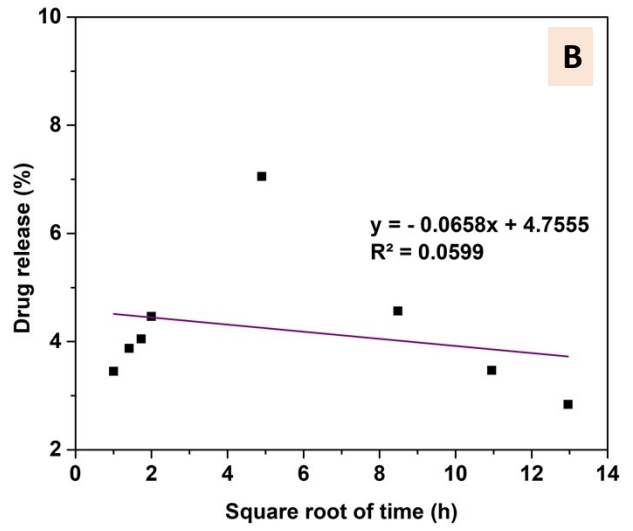
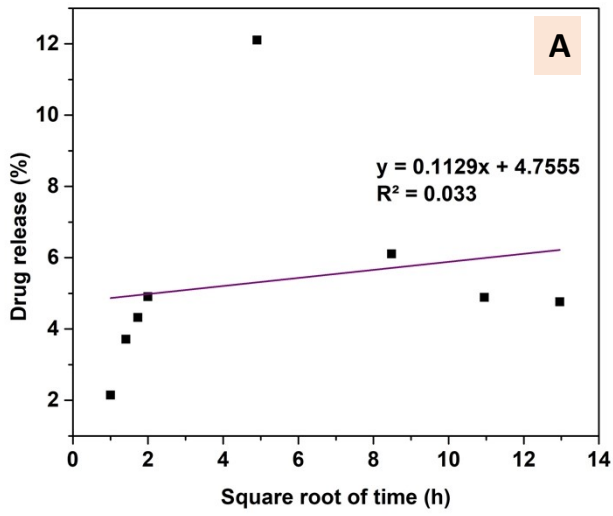
Sample name	Phase	Phase percentage (%)	Diffraction angle (2 $\theta$ )		Planes (h k l)
			Sample	Standard	
2:1	Wollastonite (Monoclinic) ICDD# 00-027-0088	98.6	23.102	23.149	4 0 0
			25.308	25.303	0 0 2
			26.836	26.848	-2 0 2
			27.516	27.472	4 0 1
			28.851	28.870	2 0 2
			29.954	29.991	3 2 0
			32.861	32.852	-4 0 2
			35.038	35.022	6 0 0
			36.258	36.266	1 2 2
			38.172	38.217	-5 0 2
			41.286	41.304	5 2 1
			45.754	45.722	6 0 2
			49.740	49.785	0 4 0
			52.099	52.212	-2 0 4
			57.416	57.450	-2 4 2
	Di-calcium silicate ICDD# 00-061-0379	1.4	21.693	21.700	2 0 0
			31.848	31.760	1 1 3
			39.415	39.380	1 0 4
			53.127	53.220	3 1 4
2:1.5	Wollastonite (Triclinic) ICDD# 00-029-0372	68.5	11.519	11.513	1 0 0
			25.422	25.354	-2 0 1
			28.974	28.897	-1 0 2
			30.042	30.001	2 -2 0
			35.178	35.121	0 -2 2
			38.327	38.336	-1 -2 2
			39.290	39.222	-1 0 3
			41.337	41.403	-3 1 2
	Larnite ICDD# 00-009-0351	31.5	49.837	49.902	3 1 2
			50.910	50.976	2 -2 3
			57.473	57.636	4 -2 2
			23.199	23.223	0 1 2
			26.355	26.370	0 2 0
			28.082	28.081	0 2 1

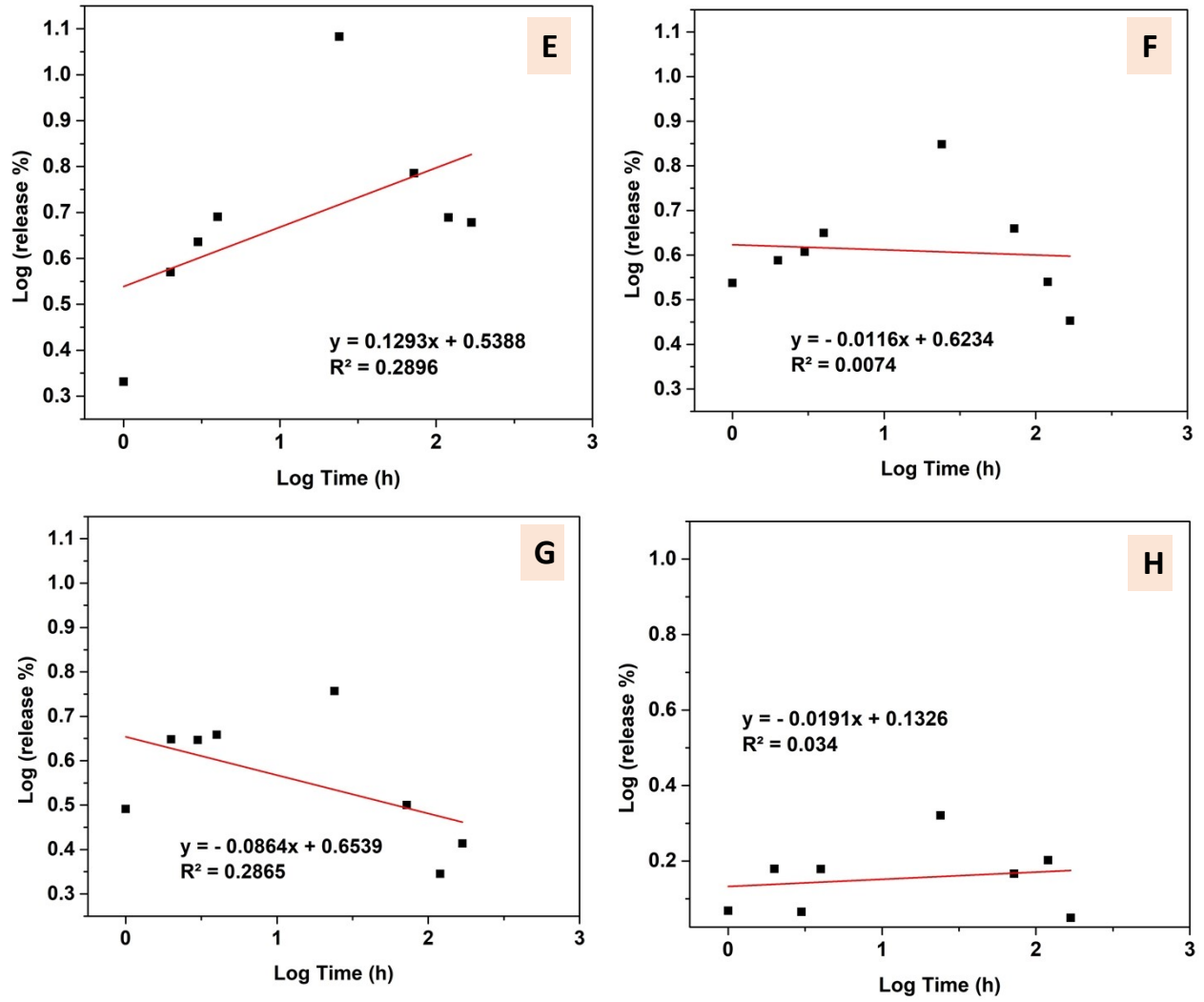
2:2	Larnite ICDD# 00-009-0351	97.3	29.293	29.296	1 1 2
			32.077	31.995	-1 0 3
			32.607	32.606	2 0 0
			35.269	35.264	2 1 0
			37.430	37.441	1 2 2
			39.451	39.455	0 2 3
			41.181	41.370	3 3 -2
			56.439	56.300	3 4 1
	Rankinite ICDD# 04-015-0709	2.7	29.293	29.507	3 1 -2
			41.227	41.370	3 3 -2
56.530			56.680	1 5 -2	
2:3	Larnite ICDD# 00-009-0351	81.1	29.311	29.296	1 1 2
			32.165	32.172	-1 2 1
			32.578	32.606	2 0 0
			35.316	35.264	2 1 0
			37.350	37.441	1 2 2
			39.443	39.455	0 2 3
			41.235	41.225	0 3 1
			45.775	45.715	-2 2 2
			47.881	47.914	2 1 3
			62.421	62.491	3 1 3
	Calcium silicate hydroxide ICDD# 00-029-0377	18.9	44.494	44.186	2 1 2
			50.873	51.657	-5 0 3



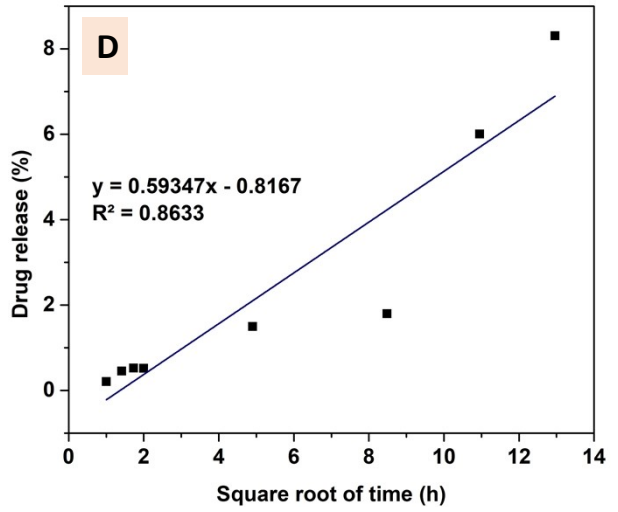
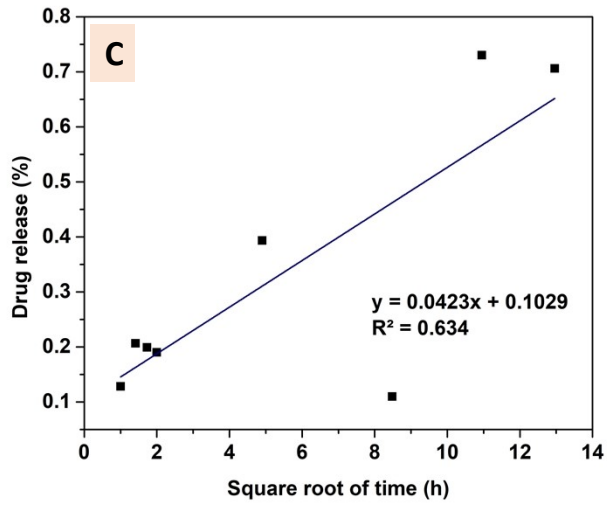
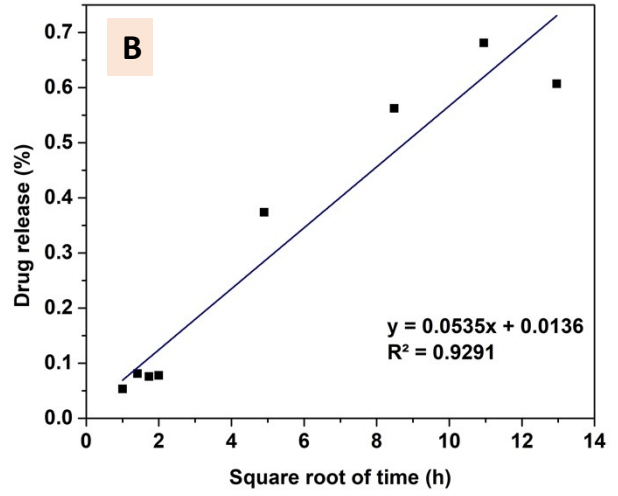
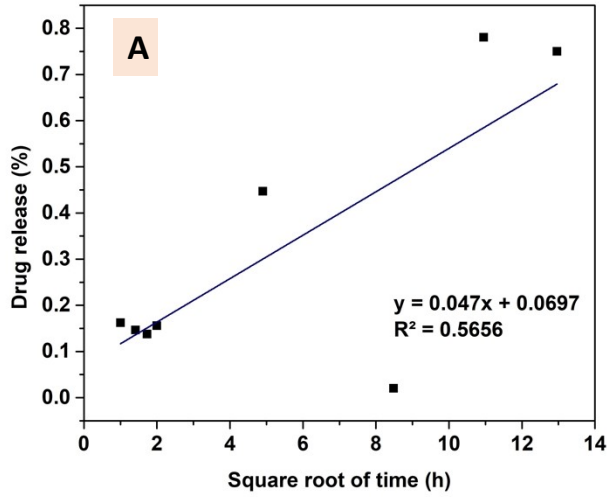


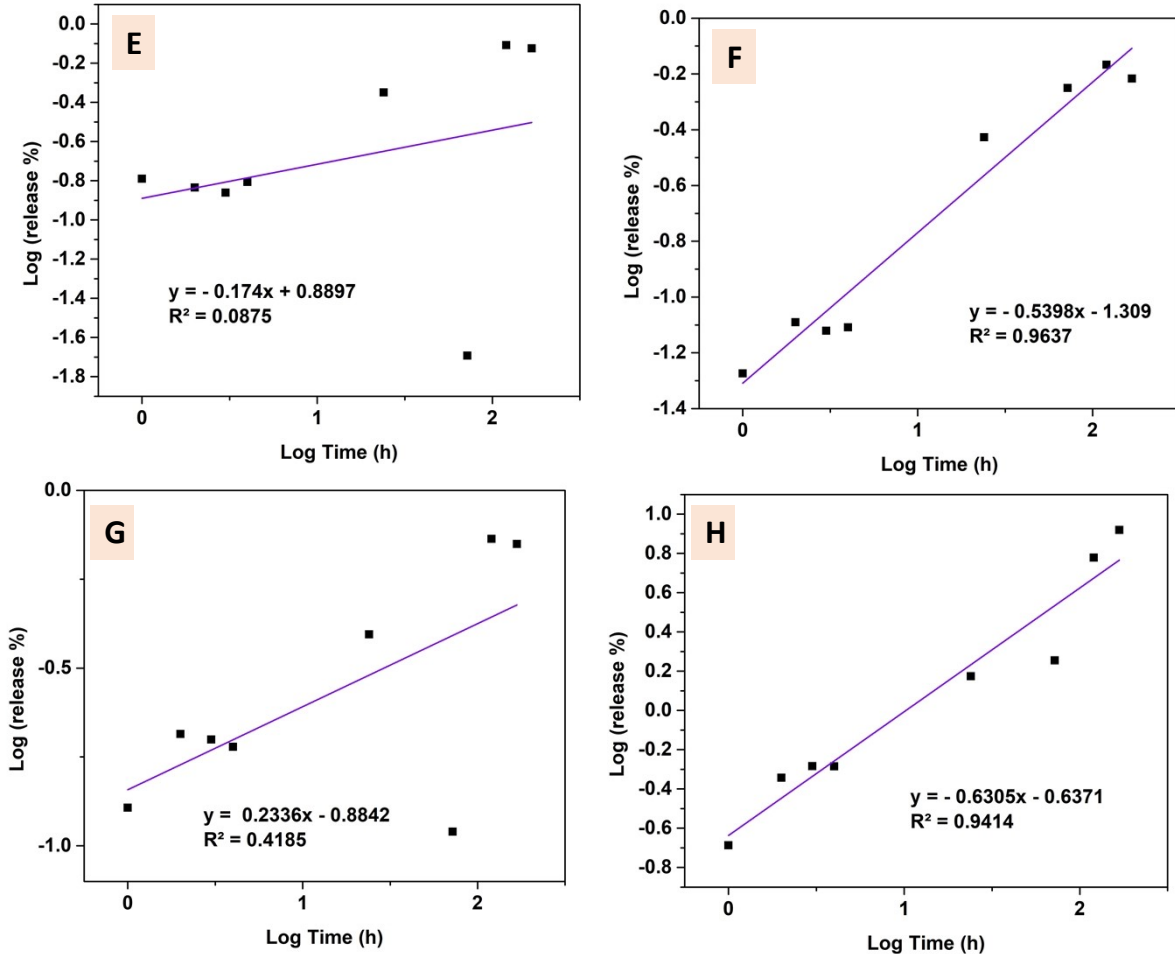
**Figure S\_1.** Higuchi release (A, B, C, D) and Korsmeyer-Peppas (E, F, G, H) model of CIP-loaded sample.



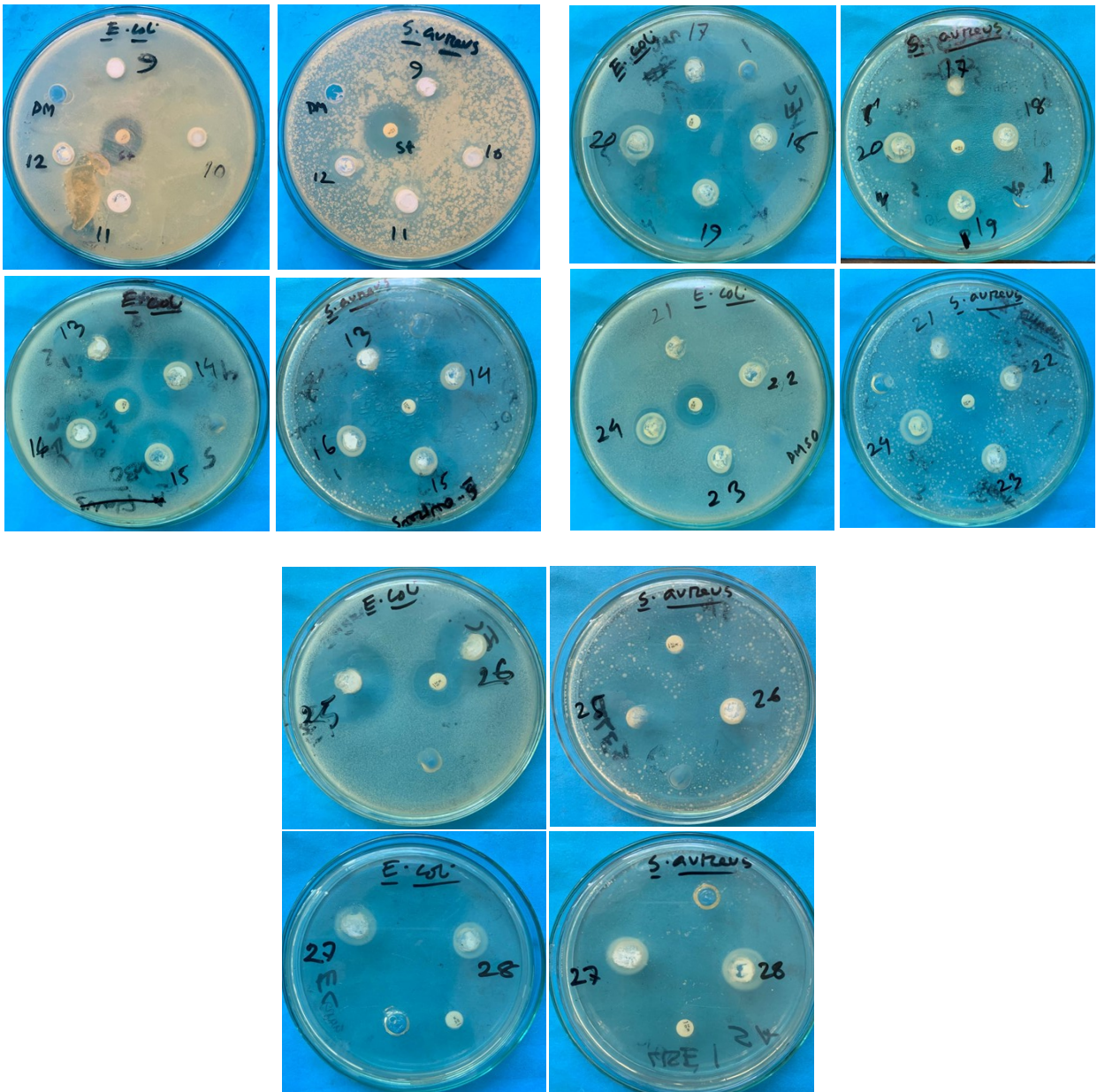


**Figure S\_2.** Higuchi release (A, B, C, D) and Korsmeyer-Peppas (E, F, G, H) model of AMX-loaded sample.





**Figure S\_3.** Higuchi release (A, B, C, D) and Korsmeyer-Peppas (E, F, G, H) model of LVF-loaded sample.



**Figure S\_4.** Antimicrobial activity of 2:1\_CS, 2:1.5\_CS, 2:2\_CS, and 2:3\_CS samples before and after drug loading and releasing.

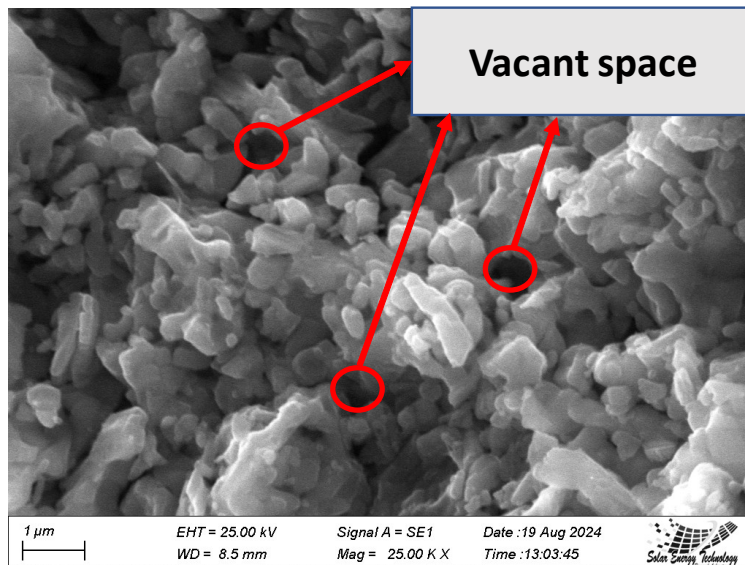


Figure S\_5. FESEM of 2:1\_CS sample after CIP loading.

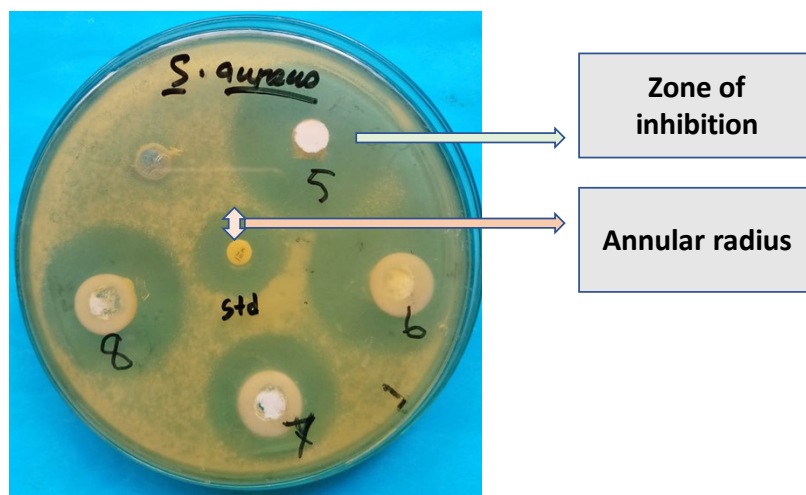


Figure S\_6. Indication of the zone of inhibition.

**Table S\_3:** CIP-loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (µS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (mΩ)</b>	<b>TDS (mg/L)</b>
1	2:1_CS	6.34	26.2	129	0.4	-1	71.4
	2:1.5_CS	6.72	26.4	145	0.5	-1	81.2
	2:2_CS	6.53	26	121	0.5	-1	69.5
	2:3_CS	6.45	26.7	134	0.5	-1	84.2
3	2:1_CS	10.56	28.9	336	0.4	-1	201
	2:1.5_CS	11.61	29	505	0.5	-1	302
	2:2_CS	10.91	29.2	393	0.5	-1	235
	2:3_CS	12.85	30	7020	0.5	-1	4210
5	2:1_CS	10.17	27.1	380	0.4	-1	227
	2:1.5_CS	10.35	27.5	408	0.5	-1	249
	2:2_CS	10.34	27.9	439	0.4	-1	263
	2:3_CS	12.11	27.4	4650	2	-1	2770
7	2:1_CS	9.63	27.5	359	0.4	-1	214
	2:1.5_CS	10.31	29.1	410	0.5	-1	245
	2:2_CS	10.59	28.8	462	0.5	-1	276
	2:3_CS	12.45	28.3	6040	2.6	-1	3610
14	2:1_CS	9.76	26.7	304	0.4	-1	189.8
	2:1.5_CS	10.08	26.9	402	0.4	-1	239
	2:2_CS	10.11	27.1	429	0.5	-1	256
	2:3_CS	12.15	27.5	6330	2.7	-1	3780
21	2:1_CS	9.84	27.6	353	0.4	-1	210
	2:1.5_CS	9.68	28.1	366	0.4	-1	218
	2:2_CS	9.72	27.9	358	0.4	-1	213
	2:3_CS	12.41	29.1	5460	2.4	-1	3320

**Table S\_4:** AMX loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (µS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (MΩ)</b>	<b>TDS (mg/L)</b>
1	2:1_CS	6.23	26.3	13.63	0.3	0.07	6.28
	2:1.5_CS	6.21	26.8	13.02	0.4	0.06	6.49
	2:2_CS	6.21	27.2	14.69	0.4	0.07	7.01
	2:3_CS	6.56	27	18.17	0.5	0.07	6.92
3	2:1_CS	10.87	27.1	330	0.4	-1	200
	2:1.5_CS	10.82	27.6	333	0.4	-1	200
	2:2_CS	10.71	28.4	353	0.4	-1	211
	2:3_CS	12.62	27.9	3590	1.6	-1	2160
5	2:1_CS	10.66	27.1	360	0.4	-1	215
	2:1.5_CS	10.63	26.9	425	0.5	-1	254
	2:2_CS	10.21	27.2	394	0.4	-1	238
	2:3_CS	10.06	27.2	174.8	0.5	-1	105.7
7	2:1_CS	10.52	27.9	324	0.4	-1	192.6
	2:1.5_CS	10.43	27.5	368	0.4	-1	219
	2:2_CS	10.23	27.6	394	0.5	-1	236
	2:3_CS	10	27.7	175.8	0.4	-1	105.4
14	2:1_CS	10.90	27.1	426	0.5	-1	257
	2:1.5_CS	9.75	27.2	273	0.4	-1	165.4
	2:2_CS	9.84	27.7	337	0.4	-1	202
	2:3_CS	9.59	27.3	249	0.4	-1	148.2
21	2:1_CS	10.90	27	438	0.5	-1	265
	2:1.5_CS	9.85	27.6	311	0.4	-1	183.4
	2:2_CS	9.68	27.5	314	0.4	-1	189.1
	2:3_CS	9.40	26.7	289	0.4	-1	173.4

**Table S\_5:** LVF-loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (μS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (MΩ)</b>	<b>TDS (mg/L)</b>
1	2:1_CS	6.84	26.7	53	0.3	0.02	31.6
	2:1.5_CS	6.94	26.9	47.1	0.3	0.02	29.3
	2:2_CS	6.93	26.3	49	0.3	0.02	36.6
	2:3_CS	6.59	27.6	51.2	0.3	0.02	47.6
3	2:1_CS	9.80	27.9	323	0.4	-1	193
	2:1.5_CS	10.38	27.7	303	0.4	-1	181.3
	2:2_CS	10.39	28.2	370	0.4	-1	222
	2:3_CS	12.92	28.3	690	3	-1	4140
5	2:1_CS	9.25	26.8	328	0.4	-1	198.6
	2:1.5_CS	9.51	27.2	299	0.5	-1	179.4
	2:2_CS	9.77	26.5	389	0.4	-1	233
	2:3_CS	12.30	26.3	5940	2.6	-1	3560
7	2:1_CS	9.24	27	222	0.4	-1	136.6
	2:1.5_CS	9.46	27.9	311	0.4	-1	186.1
	2:2_CS	9.68	28.4	383	0.4	-1	230
	2:3_CS	12.28	28.3	5390	2.3	-1	3220
14	2:1_CS	9.15	26.6	347	0.5	-1	206
	2:1.5_CS	9.37	27.2	303	0.4	-1	181.2
	2:2_CS	9.45	27.3	340	0.4	-1	203
	2:3_CS	12.26	27.9	349	1.6	-1	2050
21	2:1_CS	9.21	27.3	204	0.4	-1	122.6
	2:1.5_CS	9.36	27.3	258	0.4	-1	156.2
	2:2_CS	9.43	28.5	201	0.4	-1	115.7
	2:3_CS	11.89	27.9	1801	0.9	-1	1073

**Table S\_6:** Drug release of CIP-loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (mS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (MΩ)</b>	<b>TDS (g/L)</b>
Initial	SBF	7.4	26.8	20.4	10.1	-1	12.29
1	2:1_CS	8.65	29.5	25.2	13.4	-1	14.91
	2:1.5_CS	8.93	29.1	24.2	12.72	-1	14.15
	2:2_CS	9.11	30.2	9.42	13.1	-1	12.86
	2:3_CS	9.12	29.5	23.3	11.9	-1	14.11
3	2:1_CS	9.10	31.6	18.1	8.8	-1	10.89
	2:1.5_CS	9.46	31.3	23.4	12.1	-1	14.23
	2:2_CS	9.80	31.3	24.7	12.9	-1	14.77
	2:3_CS	9.95	31.3	22.9	11.8	-1	13.76
5	2:1_CS	9.06	30.4	24.7	13.1	-1	14.65
	2:1.5_CS	9.41	30.9	22.4	11.4	-1	13.38
	2:2_CS	9.60	30.2	24.7	13.0	-1	14.76
	2:3_CS	9.76	30.3	23.3	12.0	-1	13.97
7	2:1_CS	9.13	28.6	25.0	12.7	-1	14.71
	2:1.5_CS	9.42	29.5	23.5	12.2	-1	14.05
	2:2_CS	9.62	29.2	24.3	12.8	-1	14.55
	2:3_CS	9.77	29.7	29.9	11.8	-1	13.78

**Table S\_7:** Drug release of AMX-loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (mS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (MΩ)</b>	<b>TDS (g/L)</b>
Initial	SBF	7.4	26.8	20.4	10.1	-1	12.29
1	2:1_CS	8.97	29.0	24.5	13.0	-1	14.64
	2:1.5_CS	9.13	28.3	24	12.6	-1	14.60
	2:2_CS	9.21	27.8	24.3	12.4	-1	14.35
	2:3_CS	9.35	29.3	22.4	11.5	-1	13.44
3	2:1_CS	9.32	30.2	25.8	13.8	-1	15.65
	2:1.5_CS	9.68	31.3	23.9	12.5	-1	14.38
	2:2_CS	9.67	30.9	25.0	13.1	-1	14.98
	2:3_CS	10.14	30.9	24.4	12.8	-1	14.62
5	2:1_CS	9.31	28.6	26.1	14	-1	15.60
	2:1.5_CS	9.58	29.5	24.1	12.6	-1	14.52
	2:2_CS	9.55	29.8	25.3	13.4	-1	15.21
	2:3_CS	9.85	30.6	23.9	12.5	-1	14.36
7	2:1_CS	9.33	28.8	26	14.6	-1	16.07
	2:1.5_CS	9.68	27.9	23.4	12.1	-1	14.07
	2:2_CS	9.67	28.7	25.4	13.5	-1	15.30
	2:3_CS	10.11	29.3	24.0	12.5	-1	14.39

**Table S\_8:** Drug release of LVF-loaded sample.

<b>Time (day)</b>	<b>Sample name</b>	<b>pH</b>	<b>Temperature (°C)</b>	<b>Conductivity (mS)</b>	<b>Salinity (g/L)</b>	<b>Resistance (MΩ)</b>	<b>TDS (g/L)</b>
Initial	SBF	7.4	26.8	20.4	10.1	-1	12.29
1	2:1_CS	9.08	27.8	23.3	12.1	-1	14.08
	2:1.5_CS	9.20	29.2	23.2	12.0	-1	13.92
	2:2_CS	9.33	29.3	23.1	11.9	-1	13.84
	2:3_CS	9.44	29.4	22.5	11.5	-1	13.51
3	2:1_CS	9.35	29.1	25.1	13.4	-1	15.15
	2:1.5_CS	9.70	29.8	26.1	13.9	-1	15.63
	2:2_CS	9.75	28.9	25.7	13.7	-1	15.35
	2:3_CS	9.91	29.4	24.8	13.2	-1	14.99
5	2:1_CS	9.34	29.0	25.6	13.6	-1	15.48
	2:1.5_CS	9.61	29.8	25.3	13.4	-1	15.17
	2:2_CS	9.63	29.9	23.7	12.3	-1	14.09
	2:3_CS	9.71	30.0	23.5	12.1	-1	14.08
7	2:1_CS	9.47	27.7	25.1	13.3	-1	15.16
	2:1.5_CS	9.62	29	25.9	13.8	-1	15.52
	2:2_CS	9.67	29.5	25	13.2	-1	14.97
	2:3_CS	9.76	29.7	23.9	12.5	-1	14.30