

## SUPPLEMENTARY

### THYMOL:DECANOIC ACID DES

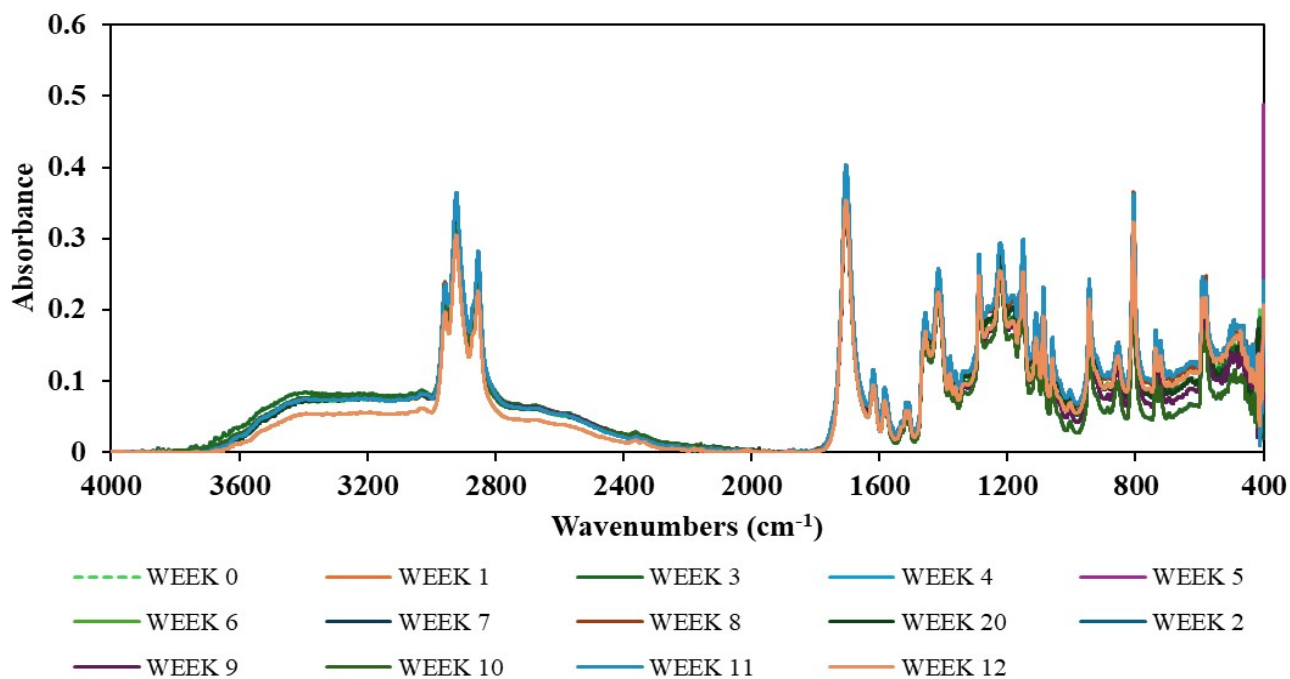


Figure S1(i) – FT-IR for thymol: Decanoic acid (Week 1-12 and week 20)

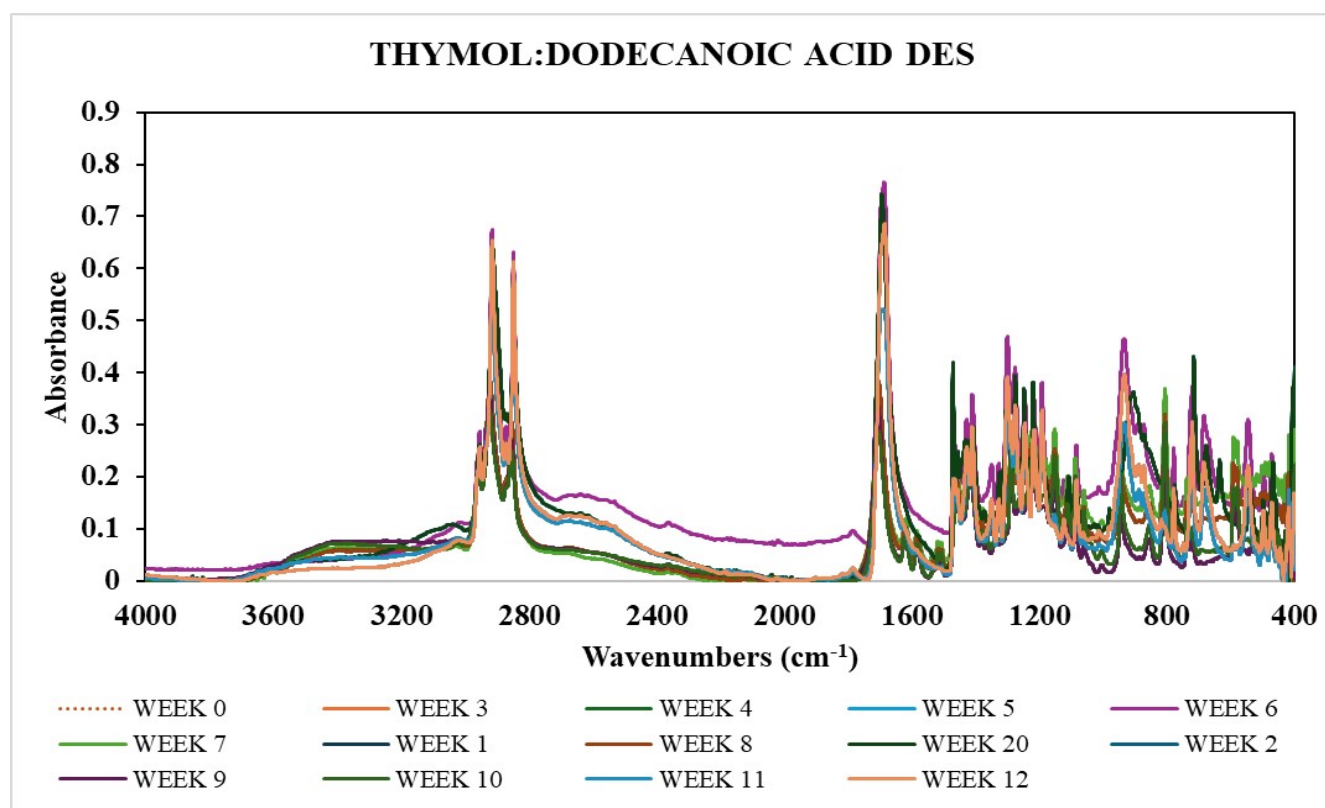


Figure S1(ii) – FT-IR for thymol: Dodecanoic acid (Week 1-12 and week 20)

### TOAB:DECANOIC ACID DES

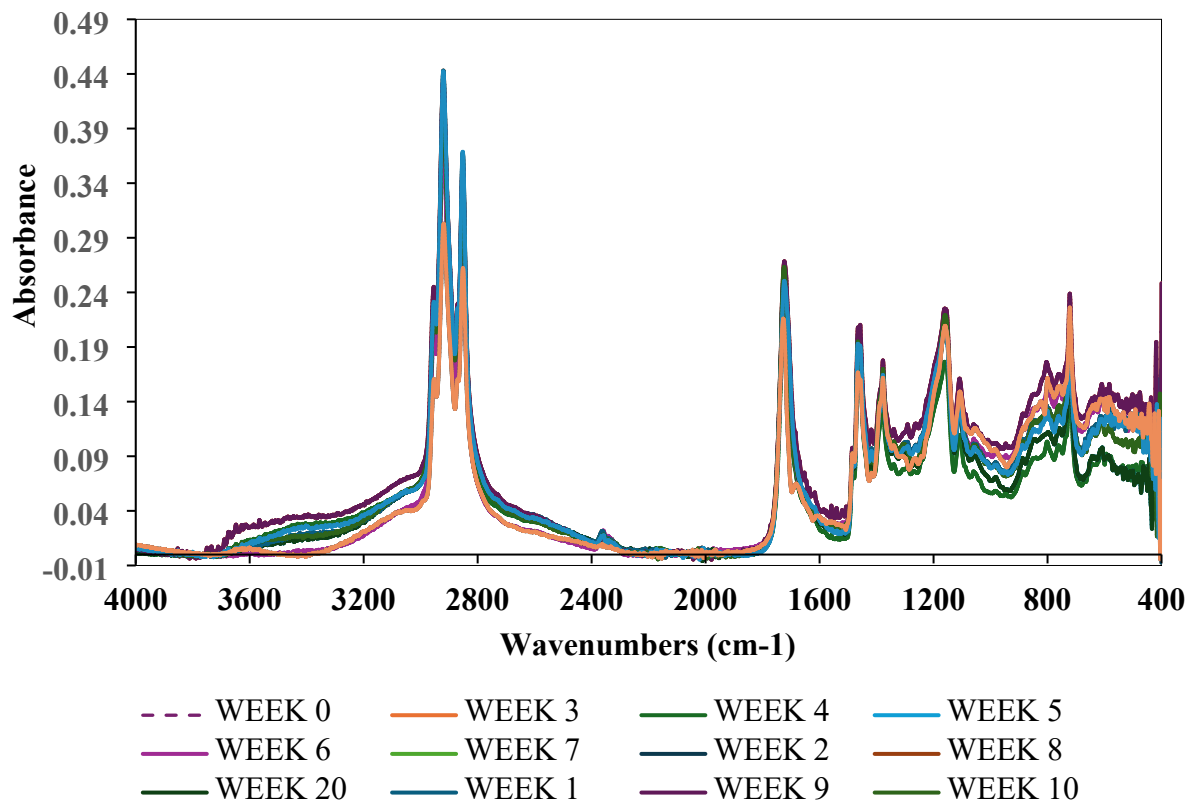


Figure S1(iii) – FT-IR for TOAB: Decanoic acid (Week 1-12 and week 20)

### TOAB:DODECANOIC ACID DES

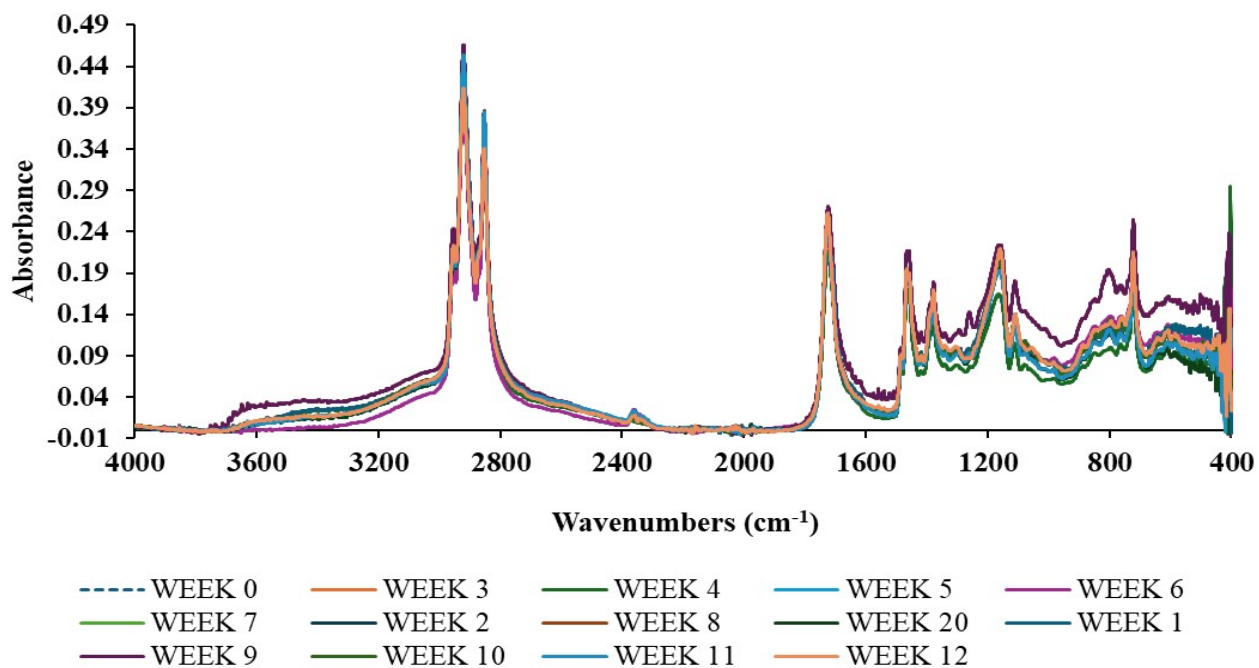


Figure S1(iv) – FT-IR for TOAB: dodecanoic acid (Week 1-12 and week 20)

**TGA CURVE (THY + DECANOIC ACID  
(1:1))**

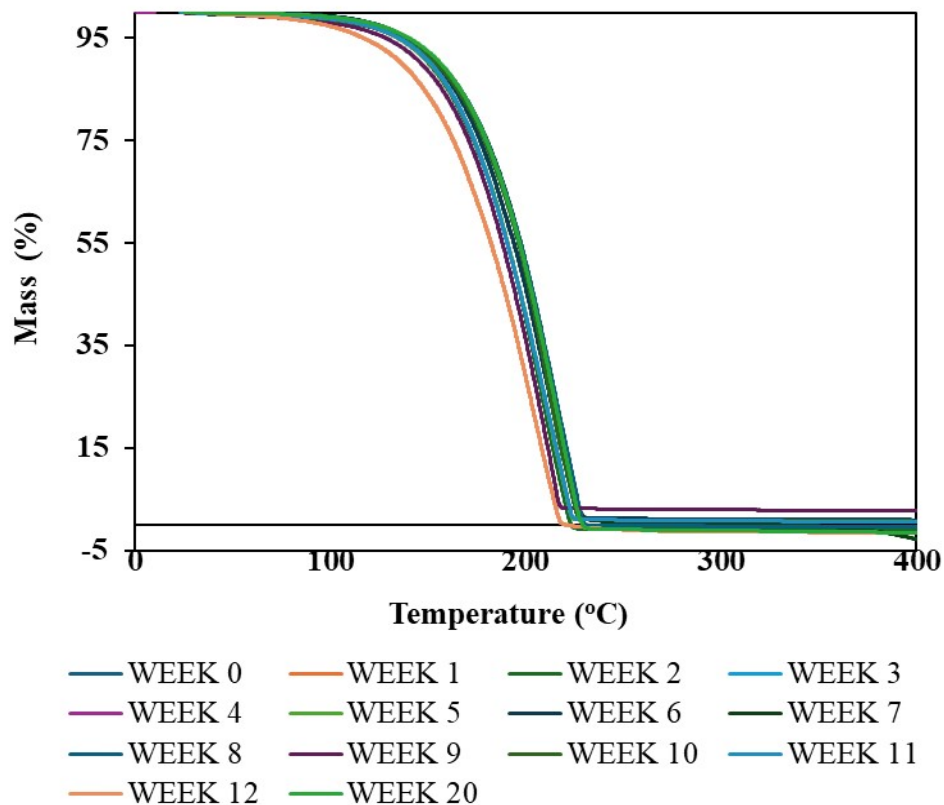


Figure S2(i) – TGA for Thy: Decanoic Acid (Week 1-12 and week 20)

**TGA CURVE (THY + DODECANOIC ACID  
(1:1))**

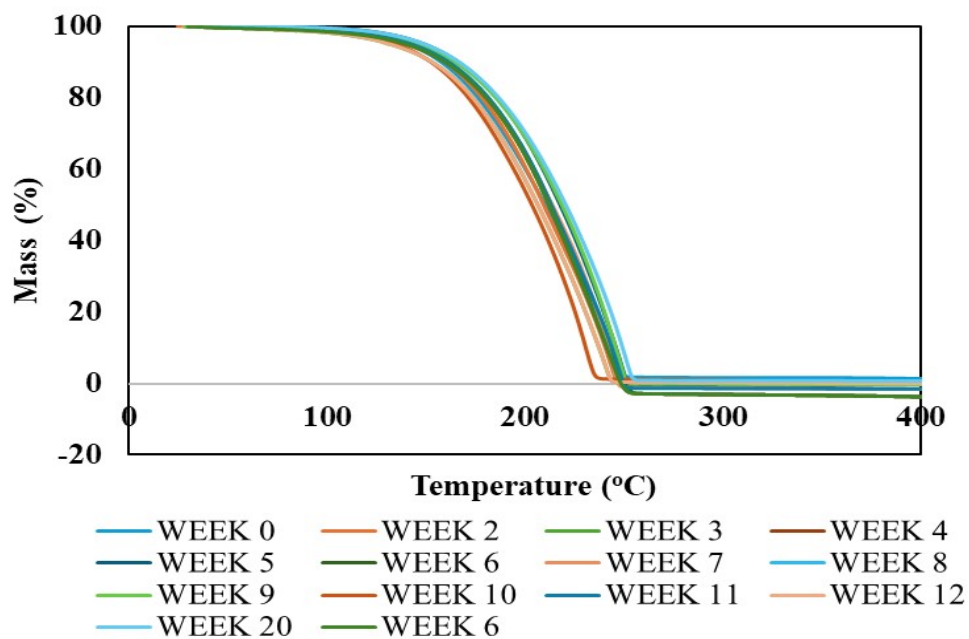


Figure S2(ii) – TGA for Thy: Dodecanoic Acid (Week 1-12 and week 20)

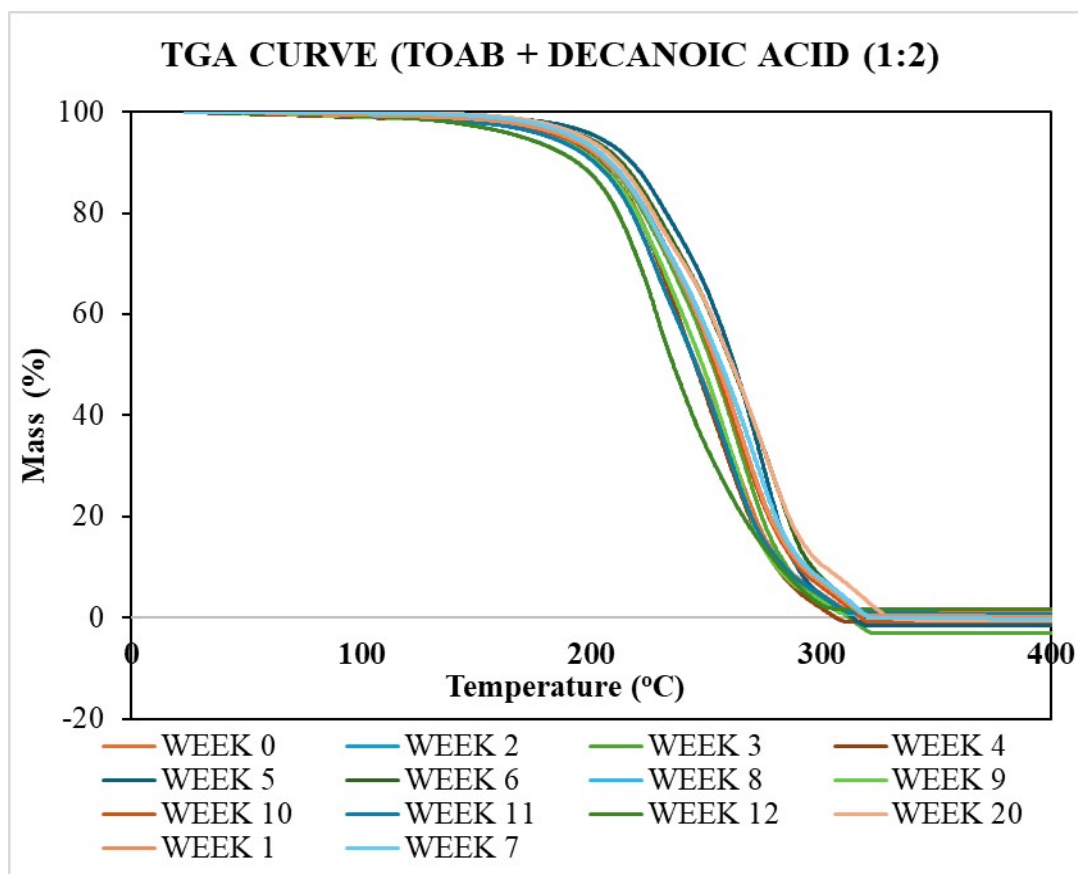


Figure S2(iii) – TGA for TOAB: Decanoic Acid (Week 1-12 and week 20)

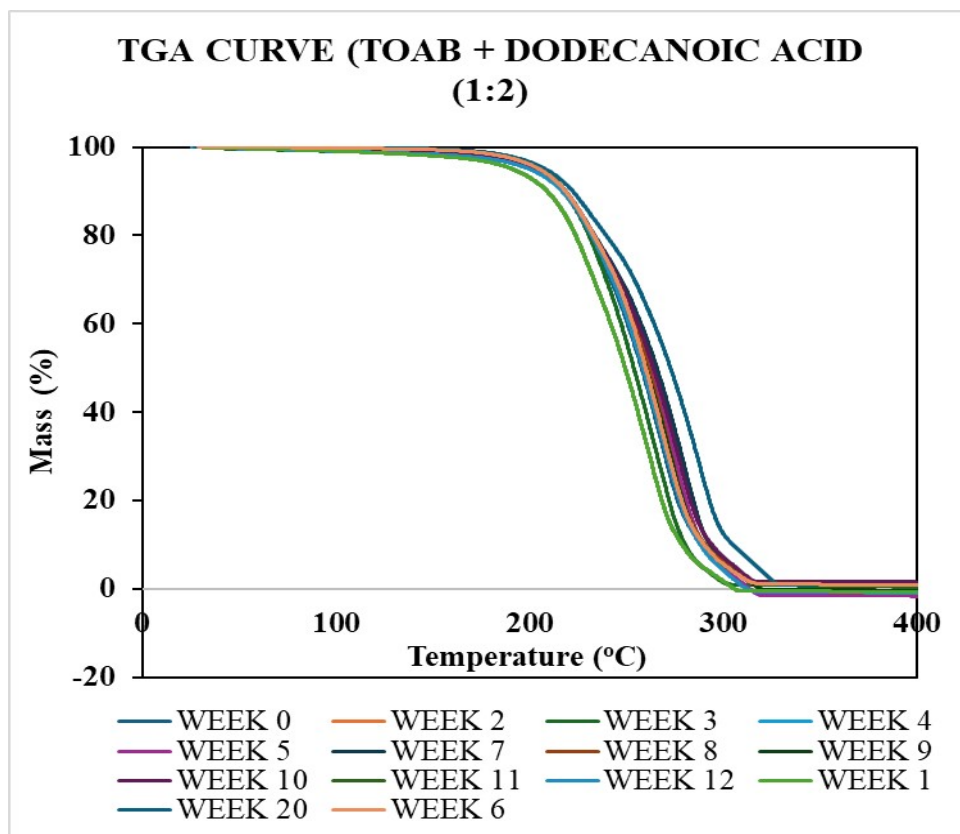


Figure S2(iv) – TGA for TOAB: Decanoic Acid (Week 1-12 and week 20)

**DSC Thermograms for Thymol :Decanoic Acid from Week 0 -  
Week 20**

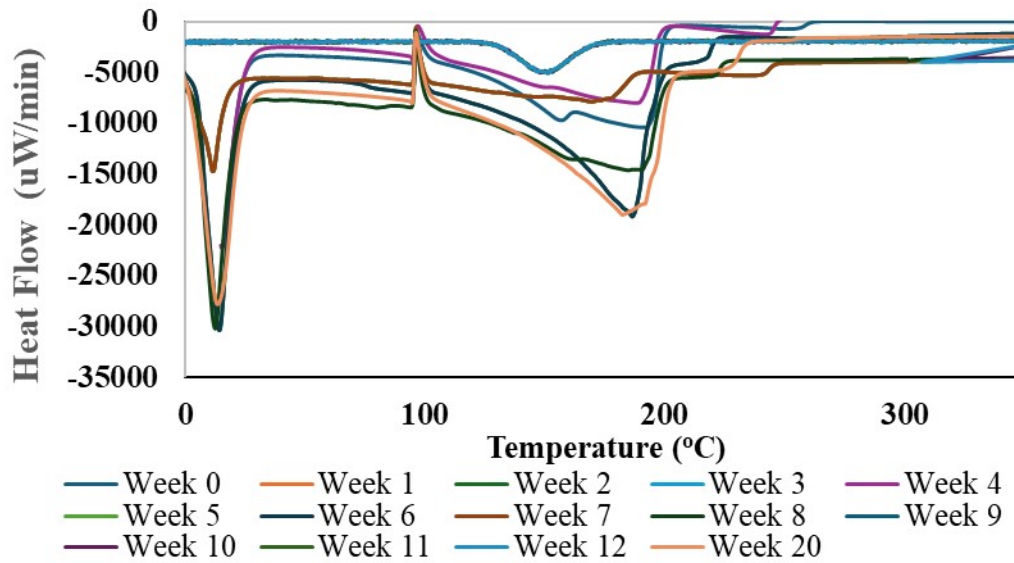


Figure S3(i) – DSC thermograms for Thymol: Decanoic Acid(Week 1-12 and week 20)

**DSC Thermograms for Thymol :Dodecanoic Acid from  
Week 0 -Week 20**

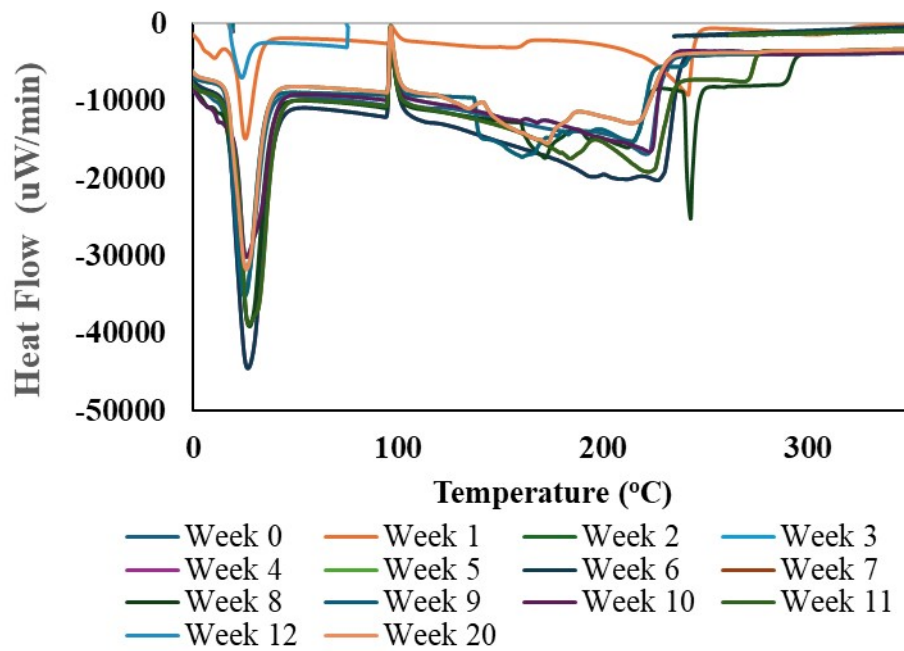


Figure S3(ii) – DSC thermograms for Thymol: Dodecanoic Acid(Week 1-12 and week 20)

**DSC Thermograms for TOAB :Decanoic Acid from Week 0 -Week 20**

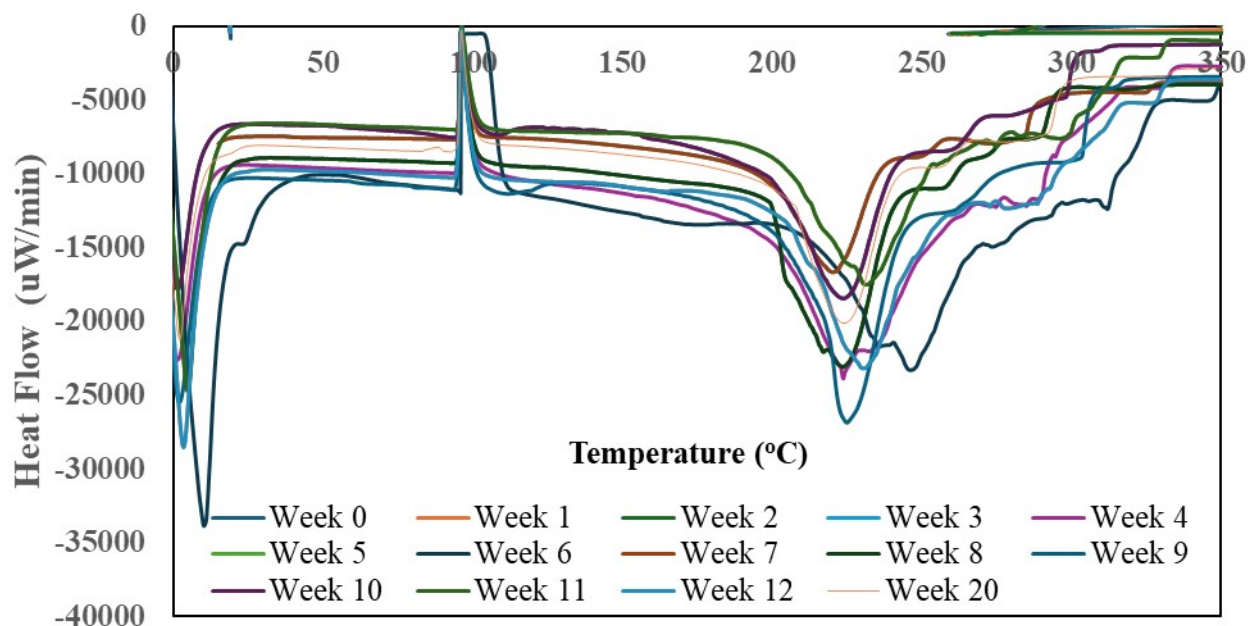


Figure S3(iii) – DSC thermograms for TOAB: Decanoic Acid(Week 1-12 and week 20)

**DSC Thermograms for TOAB :Dodecanoic Acid from Week 0 -Week 20**

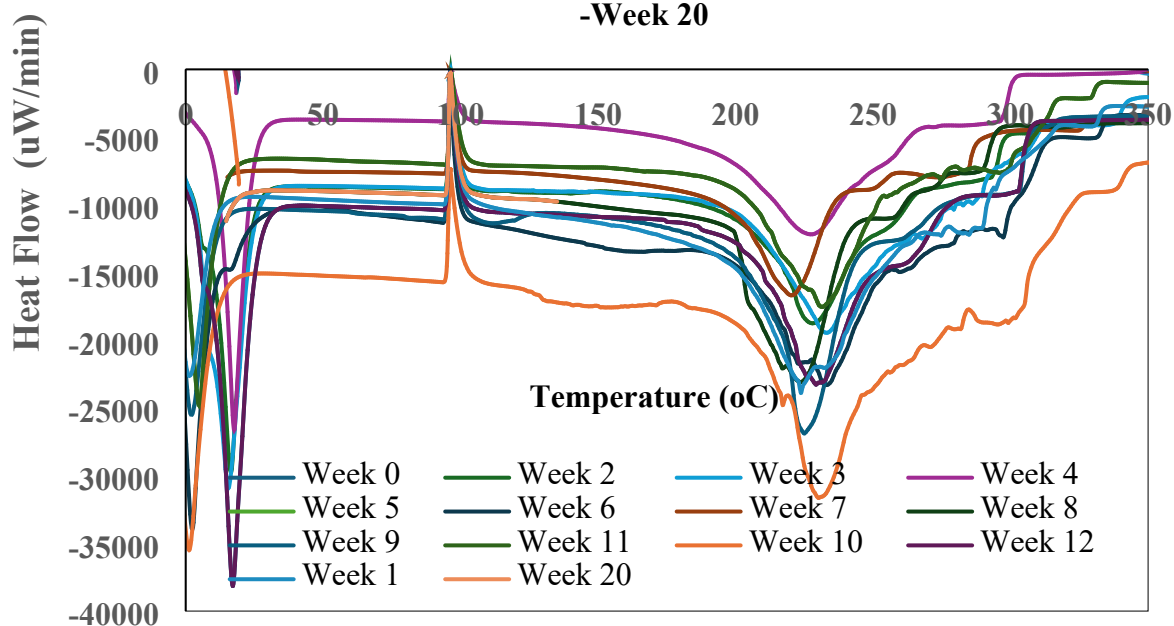


Figure S3(iv) – DSC thermograms for TOAB: Dodecanoic Acid(Week 1-12 and week 20)

Table S1: Eutectic melt temperatures derived from the DSC thermograms of the DES and thermodynamic data for Thymol: Decanoic Acid (week 1-12 and week 20)

Week	$g^E/RT$	Eutectic/Melting temperature (Kelvin)	$\ln(\gamma_{Thy})$	$\gamma_{Thy}$	$\ln(\gamma_{DA})$	$\gamma_{DA}$
0	-1.1564	262.36	-1.205	0.2996	-1.1079	0.3303
1	-1.019	265.525	-1.084	0.338	-0.9532	0.3855
2	-1.15	262.51	-1.1993	0.3014	-1.1005	0.3327
3	-1.117	263.26	-1.1706	0.3102	-1.064	0.3452
4	-1.0633	264.495	-1.1236	0.3251	-1.0031	0.3667
5	-0.9969	266.041	-1.065	0.3446	-0.9283	0.3952
6	-1.1139	263.331	-1.1679	0.311	-1.06	0.34645
7	-1.1917	261.56	-1.2359	0.2906	-1.1475	0.3174
8	-1.1094	263.435	-1.1639	0.3123	-1.0549	0.3482
9	-1.1634	262.202	-1.2111	0.2979	-1.1157	0.3277
10	-1.0033	265.891	-1.071	0.3427	-0.9356	0.3924
11	-1.0976	263.706	-0.1535	0.3155	-1.0416	0.3529
12	-1.0568	264.646	-1.1179	0.327	-0.9958	0.3694
20	-1.3187	258.72	-1.347	0.26	-1.2904	0.2752

Table S2: Eutectic melt temperatures derived from the DSC thermograms of the DES and thermodynamic data for Thymol: Dodecanoic Acid (week 1-12 and week 20).

Week	$g^E/RT$	Eutectic/Melting temperature (Kelvin)	$\ln(\gamma_{Thy})$	$\gamma_{Thy}$	$\ln(\gamma_{Do})$	$\gamma_{Do}$
0	-1.2132	272.829	-0.8179	0.4414	-1.6086	0.2002
1	-1.3857	269.115	-0.9518	0.3860	-1.8197	0.1621
2	-1.3046	270.85	-0.8888	0.4112	-1.7204	0.1790
3	-1.2038	273.035	-0.8105	0.4446	-1.5971	0.2025
4	-1.2144	272.803	-0.8188	0.4410	-1.6101	0.1999
5	-1.2359	272.336	-0.8354	0.4337	-1.6363	0.1947
6	-1.3451	269.98	-0.9202	0.3984	-1.7700	0.1703
7	-1.2466	272.102	-0.8438	0.4300	-1.6500	0.1922
8	-1.2182	272.72	-0.8217	0.4400	-1.6147	0.1990
9	-1.2308	272.447	-0.8315	0.4354	-1.6301	0.1960
10	-1.3325	270.25	-0.9105	0.4023	-1.7546	0.1730
11	-1.3451	269.98	-0.9202	0.3984	-1.7700	0.1703
12	-1.3181	270.56	-0.8992	0.4069	-1.7369	0.1761
20	-1.2572	271.872	-0.8520	0.4266	-1.6635	0.1897

Table S3: Eutectic melt temperatures derived from the DSC thermograms of the DES and thermodynamic data for TOAB Decanoic Acid (week 1-12 and week 20)

Week	$g^E/RT$	Eutectic/Melting temperature (Kelvin)	$\ln(\gamma_{TOAB})$	$\gamma_{TOAB}$	$\ln(\gamma_{DA})$	$\gamma_{DA}$
0	-2.3611	266.11	-4.6577	0.0095	-1.2127	0.2974
1	-2.2163	268.65	-4.4654	0.0115	-1.0918	0.3356
2	-2.1232	270.31	-4.3417	0.0130	-1.0140	0.3628
3	-2.0061	272.428	-4.1860	0.0152	-0.9166	0.4000
4	-2.3688	265.975	-4.6681	0.0094	-1.2192	0.2955
5	-2.1556	269.73	-4.3848	0.0125	-1.0410	0.3531
6	-2.0021	272.5	-4.1808	0.0153	-0.9128	0.4014
7	-1.9967	272.598	-4.1736	0.0154	-0.9083	0.4032
8	-1.9731	273.029	-4.1423	0.0159	-0.8889	0.4112
9	-2.0279	272.031	-4.2150	0.0148	-0.9343	0.3929
10	-2.0743	271.19	-4.2768	0.0139	-0.9731	0.3780
11	-2.0241	272.1	-4.2100	0.0149	-0.9311	0.3941
12	-1.9786	272.93	-4.1495	0.0158	-0.8938	0.4094
20	-2.0078	272.396	-4.1884	0.0152	-0.9175	0.3995

Table S4: Eutectic melt temperatures derived from the DSC thermograms of the DES and thermodynamic data for TOAB: Dodecanoic Acid (week 1-12 and week 20).

Week		Eutectic/Melting temperature (Kelvin)	$\ln(\gamma_{TOAB})$	$\gamma_{TOAB}$	$\ln(\gamma_{DA})$	$\gamma_{DA}$
0	-3.8429	254.75	-5.5647	0.0038	-2.9819	0.0507
1	-3.8633	254.46	-5.5900	0.0037	-3.0006	0.0498
2	-3.7676	255.82	-5.4759	0.0042	-2.9134	0.0543
3	-4.0444	251.93	-5.8026	0.003	-3.1653	0.0422
4	-3.7040	256.73	-5.4009	0.0045	-2.8556	0.0575
5	-3.8641	254.45	-5.5600	0.0037	-3.0012	0.0497
6	-3.8016	255.34	-5.5156	0.0040	-2.9441	0.0527
7	-3.9983	252.57	-5.7481	0.0032	-3.1233	0.0440
8	-3.6762	257.13	-5.3681	0.0047	-2.8303	0.0560
9	-3.7047	256.72	-5.4017	0.0045	-2.8562	0.0575
10	-3.8202	255.07	-5.5380	0.0039	-2.9614	0.0517
11	-3.7179	256.53	-5.4173	0.0044	-2.8682	0.0568
12	-3.8139	255.16	-5.5306	0.0040	-2.9556	0.0521
20	-3.7739	255.73	-5.4833	0.0042	-2.9191	0.0540