Supporting Information

Curcumin Eutectics with Enhanced Dissolution Rates: Binary Phase Diagrams, Characterization and Dissolution Studies

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I. Tables

Table S1. Molar extinction coefficients determined for raw curcumin and various curcumin eutectics

S. No	Curcumin solid form	Molar extinction coefficient (Ɛ) ($Mm^{-1}cm^{-1}$)
01.	Raw curcumin	56.19
02.	CUR-SUC-LAG-X_{CUR}-0.5	48.68
03.	CUR-PAR-LAG-X_{CUR}-0.25	49.55
04.	CUR-CBZ-LAG-X_{CUR}-0.4	47.67
05	CUR-GLY-LAG-X_{CUR}-0.67	57.22
06.	CUR-TYR-LAG-X_{CUR}-0.67	50.73
07.	CUR-N-ATP-LAG-X_{CUR}-0.75	51.66
08.	CUR-BIO-LAG-X_{CUR}-0.7	65.74
09.	CUR-ETP-LAG-X_{CUR}-0.1	41.33

Table S2. List of guest molecules reported to form cocrystal with ibuprofen

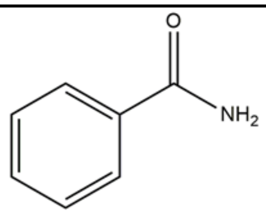
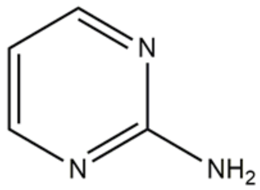
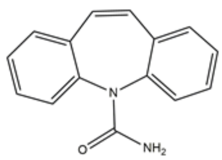
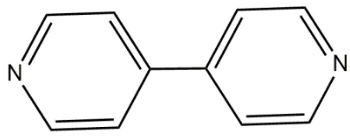
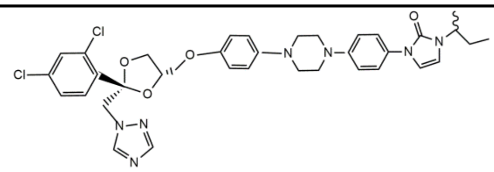
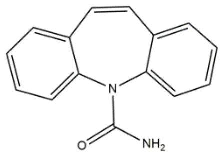
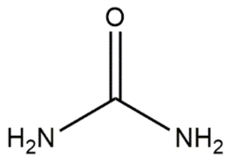
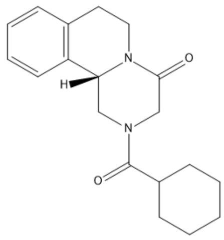
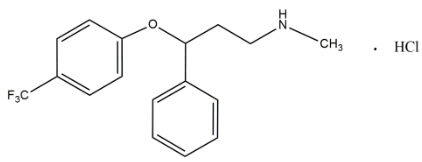
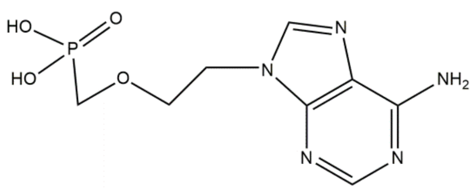
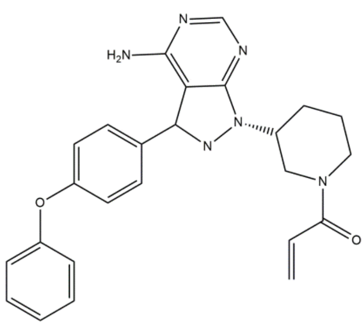
Name of the coformer molecules	Chemical structure of the guest molecules	Reference(s)
Nicotinamide		1, 2, 3, 4
2-aminopyrimidine		5
Carbamazepine		6
4,4'-Bipyridine		7

Table S3. List of guest molecules reported to form cocrystal with succinic acid

Name of the guest molecules	Chemical structure of the guest molecules	Reference(s)
Itraconazole		8
Carbamazepine		9
urea		10, 11
***Racemic*praziquantel**		12
Fluoxentine Hydrochloride		13
AdefovirDipivoxil		14
Ibrutinib		15

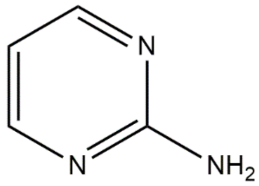
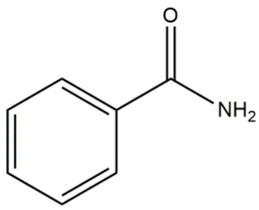
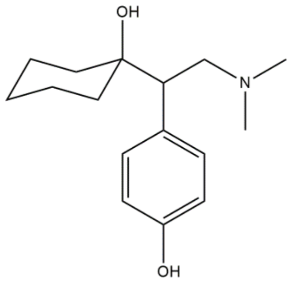
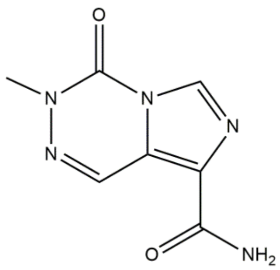
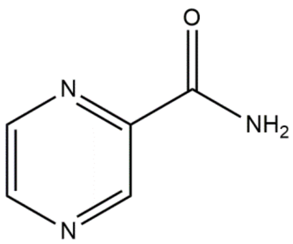
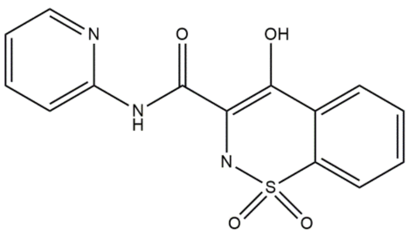
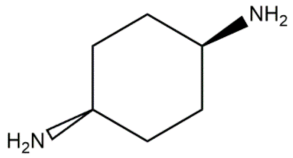
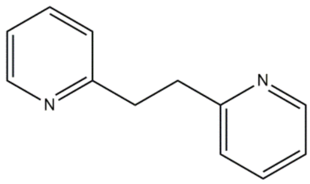
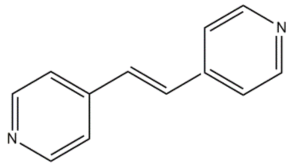
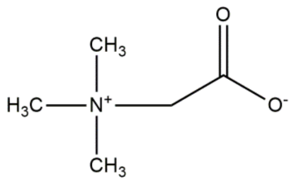
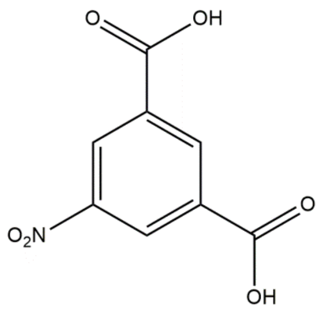
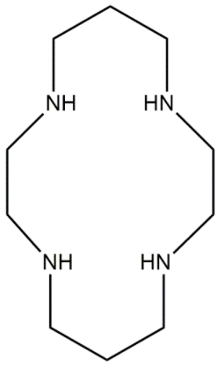
2-Aminopyrimidine		16
Nicotinamide		17
O-desmethylvenlafaxine		18
Temozolomide		19
Pyrazinamide		20
Piroxicam		21

Table S4. List of guest molecules reported to form cocrystal with paracetamol

Name of the guest molecules	Chemical structure of the guest molecules	Reference(s)
Trans-1,4-diaminocyclohexane		22
1,2-bis(4-bipyridyl)ethane		22
Trans-1,4-di(4-pyridyl)ethylene		22
Trimethyl glycine		23
5-nitroisopthalic acid		24
Cyclam		25

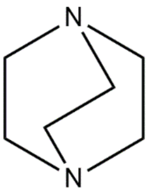
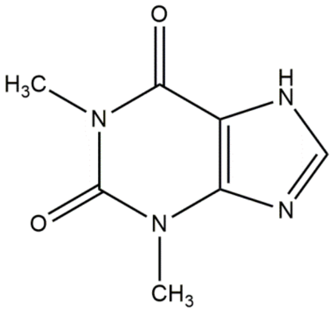
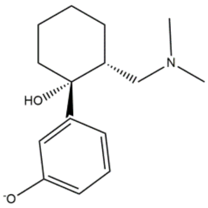
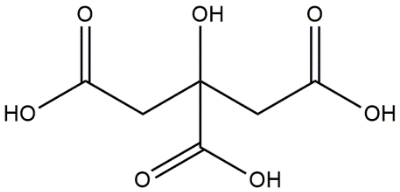
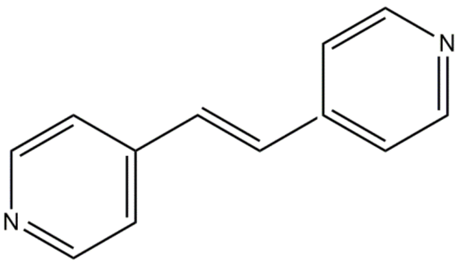
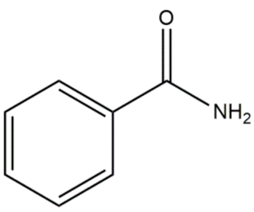
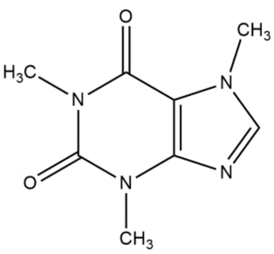
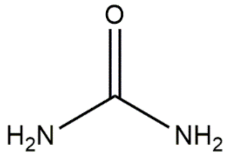
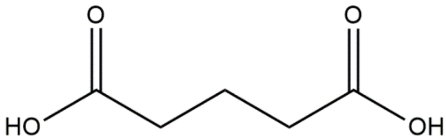
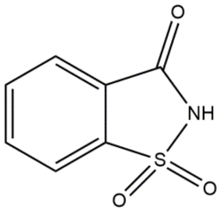
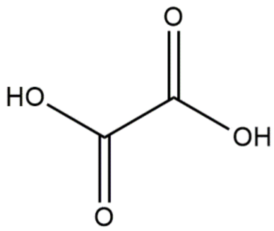
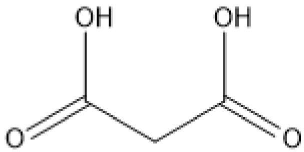
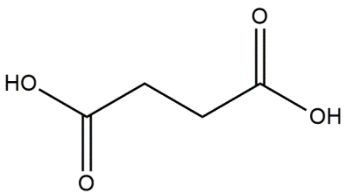
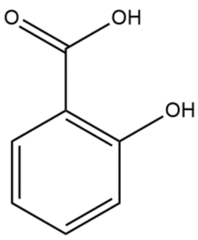
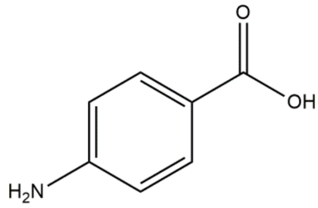
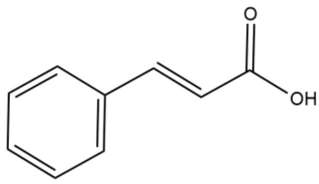
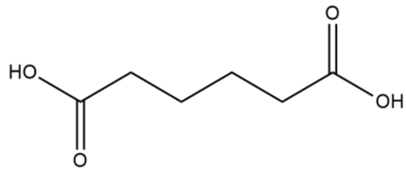
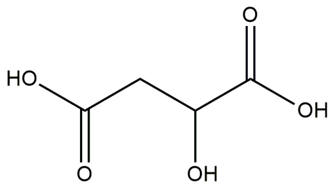
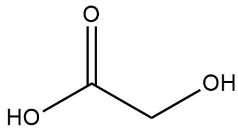
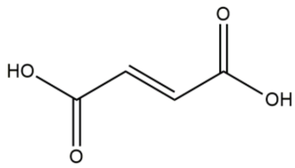
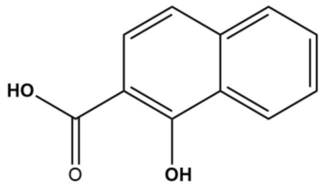
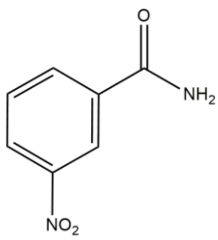
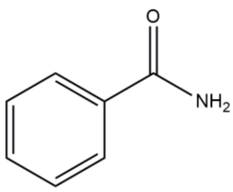
DABCO		25
Theophylline		26, 27
Tramadol		28
Citric acid		29
trans-1,2-bis(4-pyridyl)ethylene		30
Nicotinamide		31
Caffeine		32

Table S5. List of few guest molecules reported to form cocrystal with carbamazepine

Name of the guest molecules	Chemical structure of the guest molecules	Reference(s)
Urea		33
Glutaric acid		33
Saccharin		33
Oxalic acid		33
Malonic acid		33
Succinic acid		33
Salicylic acid		33

4-aminobenzoic acid		34
***Trans*-cinnamic acid**		35
Adipic acid		36
Malic acid		36
Glycolic acid		33
Fumaric acid		33
1-hydroxy 2-naphthoic acid		37
3-nitrobenzamide		38
Benzamide		38

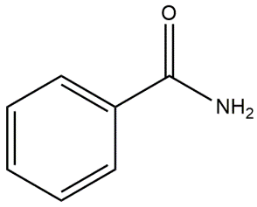
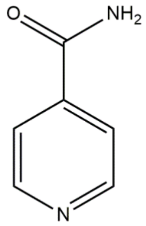
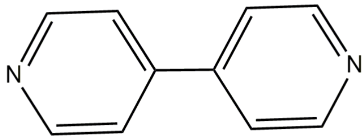
Nicotinamide		33
Isonicotinamide		39
4,4’-Bipyridine		40

Table S6. List of guest molecules reported to form cocrystal with glycine

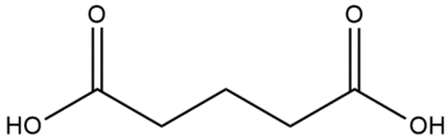
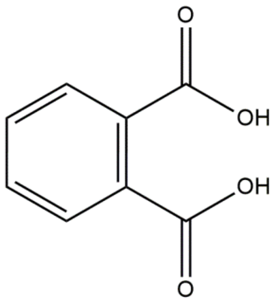
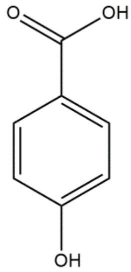
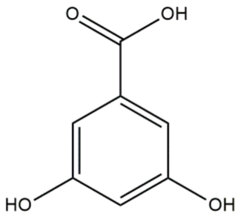
Name of the guest molecules	Chemical structure of the guest molecules	Reference(s)
Glutaric acid		41-44
Pthalic acid		45
4-hydroxybenzoic acid		44
3,5-dihydroxybenzoic acid		44

Table S7. List of guest molecules reported to form cocrystal with ethyl paraben

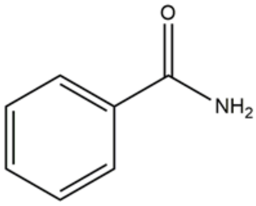
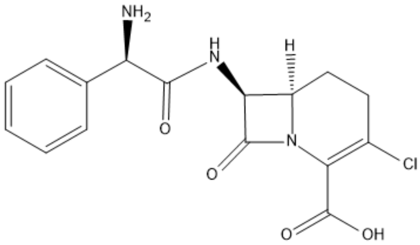
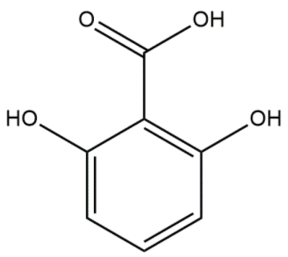
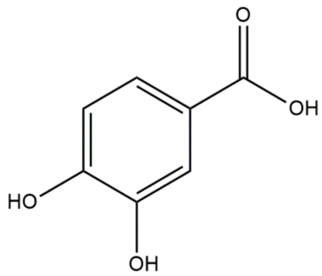
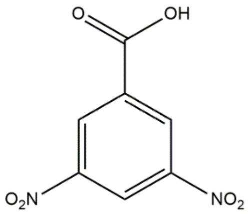
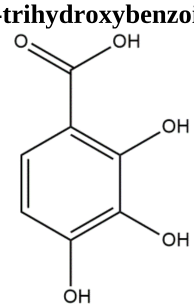
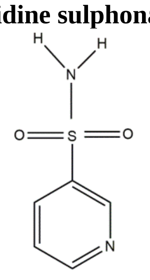
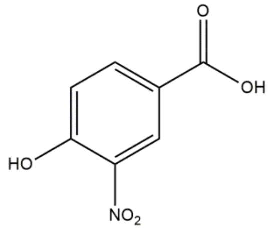
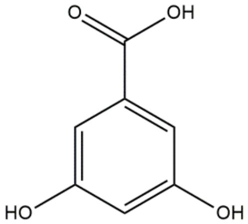
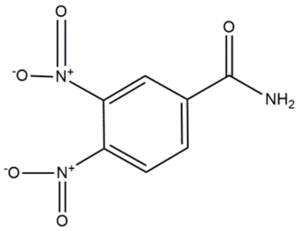
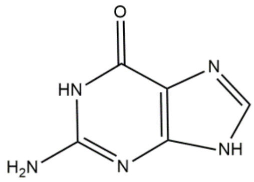
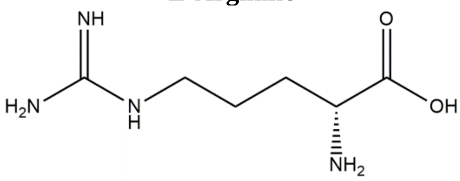
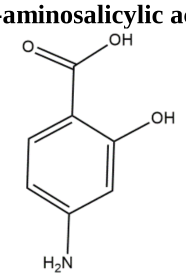
Name of the guest molecules	Chemical structure of the guest molecules	Reference(s)
Nicotinamide		46
Loracarbef		47

Table S8. List of coformers that have been reported to neither form eutectics nor cocrystals with curcumin

Name of the coformer	Reference(s)
2,6-dihydroxybenzoic acid 	48
3,4-dihydroxybenzoic acid 	48
3.5-dinitrobenzoic acid 	48
2,3,4-trihydroxybenzoic acid 	48
3-Pyridine sulphonamide 	48

4-hydroxy 3-nitrobenzoic acid 	48
3,5-dihydroxybenzoic acid 	48
3,4-dinitrobenzamide 	48
Guanine 	48
L-Arginine 	48
4-aminosalicylic acid 	48
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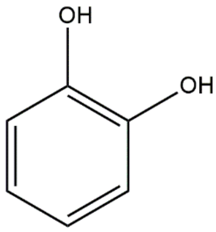	
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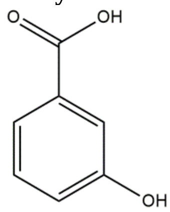	
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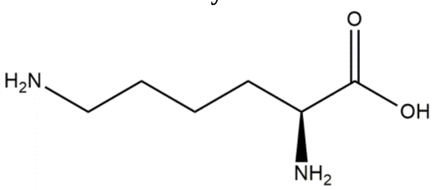	
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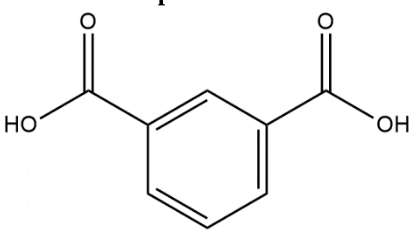	
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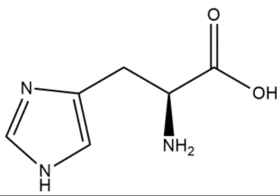	

II. Figures

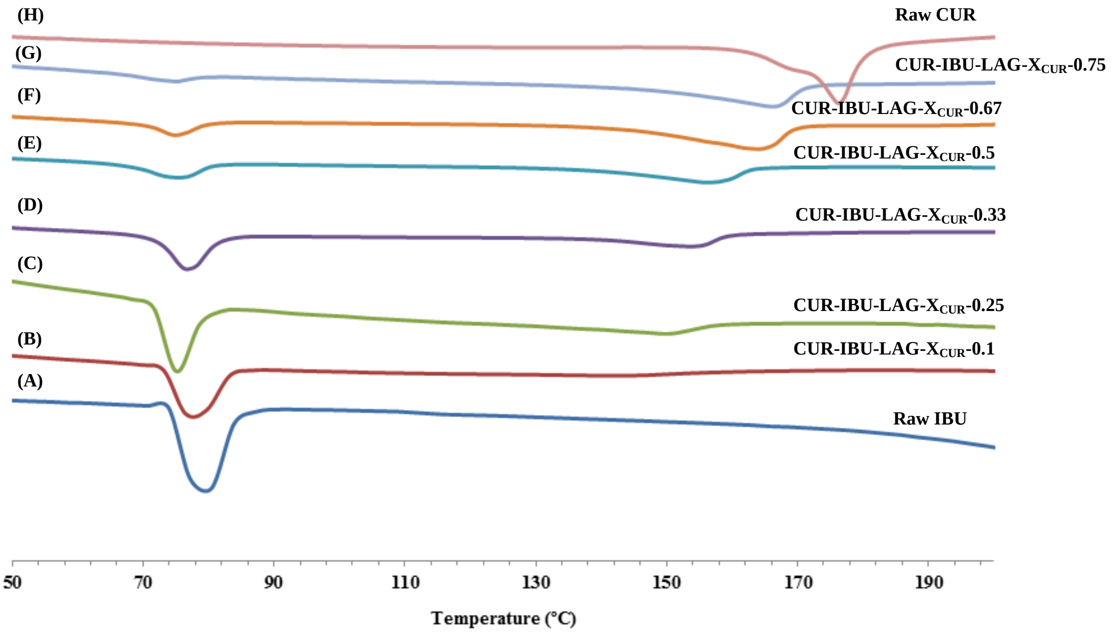

Figure S1. Overlay of DSC thermograms of (A) Raw IBU, (B) CUR-IBU-LAG-X$_{CUR}$-0.1, (C) CUR-IBU-LAG-X$_{CUR}$-0.25, (D) CUR-IBU-LAG-X$_{CUR}$-0.33, (E) CUR-IBU-LAG-X$_{CUR}$-0.5, (F) CUR-IBU-LAG-X$_{CUR}$-0.67, (G) CUR-IBU-LAG-X$_{CUR}$-0.75 and (H) Raw CUR

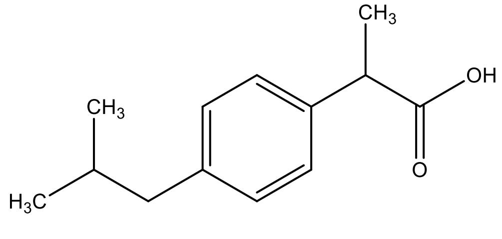

Figure S2. Chemical structure of Ibuprofen

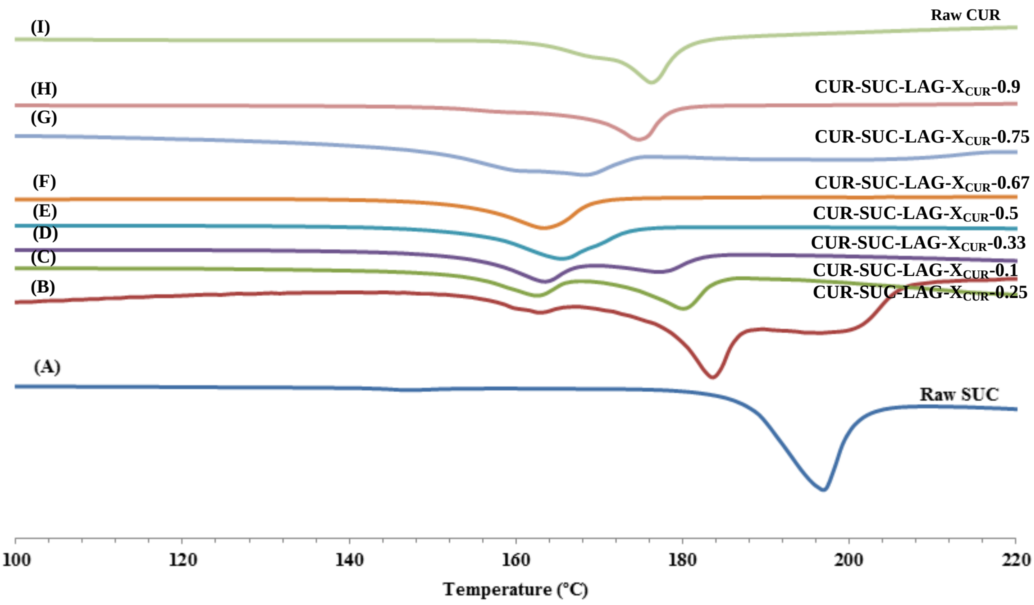

Figure S3. Overlay of DSC thermograms of (A) Raw SUC, (B) CUR-SUC-LAG-X$_{CUR}$-0.1, (C) CUR-SUC-LAG-X$_{CUR}$-0.25, (D) CUR-SUC-LAG-X$_{CUR}$-0.33, (E) CUR-SUC-LAG-X$_{CUR}$-0.5, (F) CUR-SUC-LAG-X$_{CUR}$-0.67, (G) CUR-SUC-LAG-X$_{CUR}$-0.75, (H) CUR-SUC-LAG-X$_{CUR}$-0.9 and (I) Raw CUR

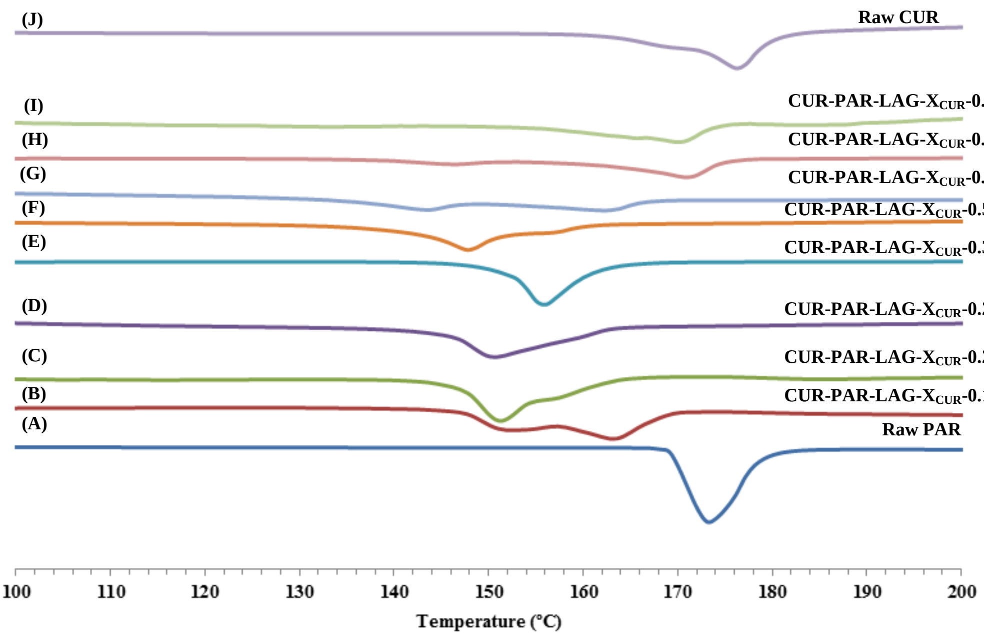

Figure S4. Overlay of DSC thermograms of (A) Raw PAR, (B) CUR-PAR-LAG-X$_{CUR}$-0.1, (C) CUR-PAR-LAG-X$_{CUR}$-0.2, (D) CUR-PAR-LAG-X$_{CUR}$-0.25, (E) CUR-PAR-LAG-X$_{CUR}$-0.33, (F) CUR-PAR-LAG-X$_{CUR}$-0.5, (G) CUR-PAR-LAG-X$_{CUR}$-0.67, (H) CUR-SUC-LAG-X$_{CUR}$-0.8, (I) CUR-SUC-LAG-X$_{CUR}$-0.9 and (J) Raw CUR

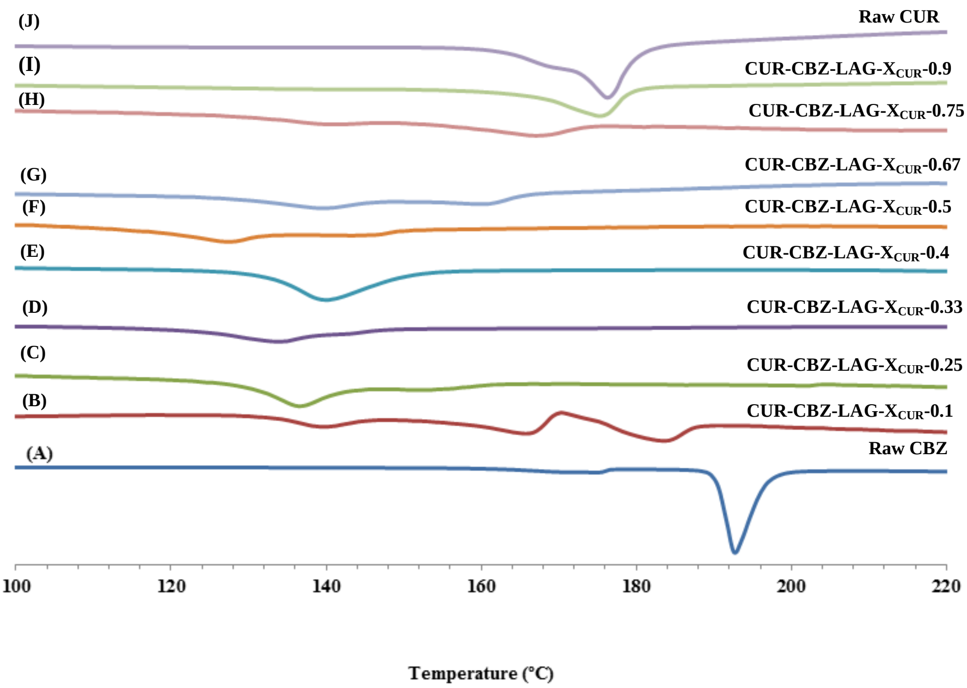

Figure S5. Overlay of DSC thermograms of (A) Raw CBZ, (B) CUR-CBZ-LAG-X$_{CUR}$-0.1, (C) CUR-CBZ-LAG-X$_{CUR}$-0.25, (D) CUR-CBZ-LAG-X$_{CUR}$-0.33, (E) CUR-CBZ-LAG-X$_{CUR}$-0.4, (F) CUR-CBZ-LAG-X$_{CUR}$-0.5, (G) CUR-CBZ-LAG-X$_{CUR}$-0.67, (H) CUR-CBZ-LAG-X$_{CUR}$-0.75, (I) CUR-CBZ-LAG-X$_{CUR}$-0.9 and (J) Raw CUR

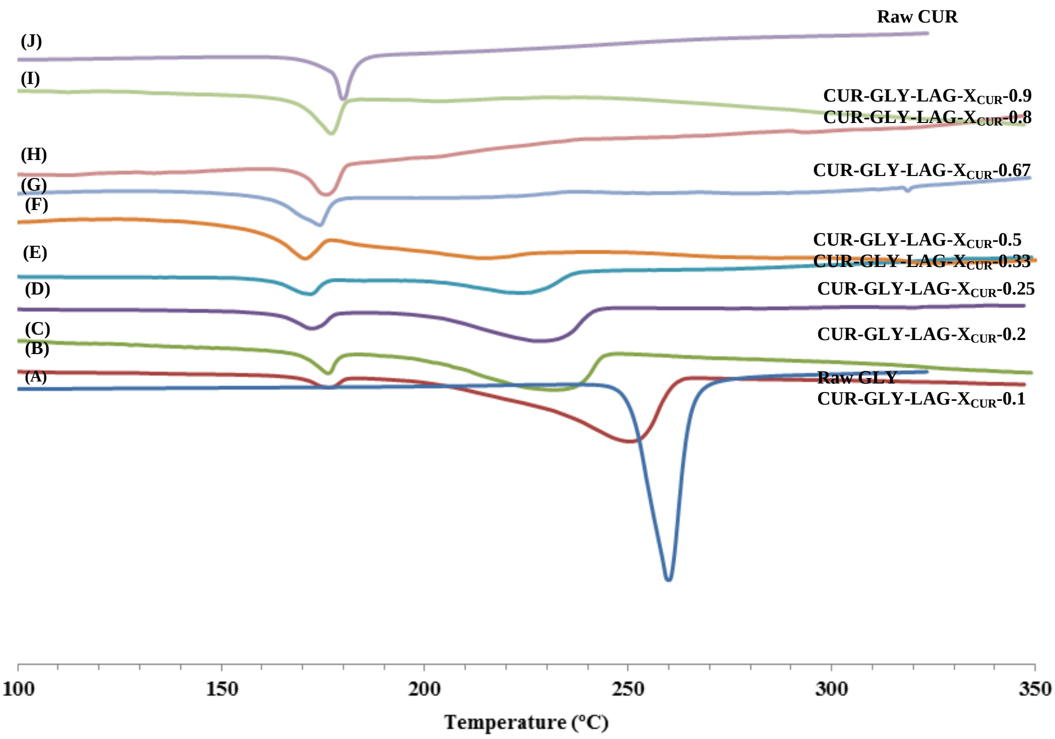

Figure S6. Overlay of DSC thermograms of (A) Raw GLY, (B) CUR-GLY-LAG-X$_{CUR}$-0.1, (C) CUR-GLY-LAG-X$_{CUR}$-0.2, (D) CUR-GLY-LAG-X$_{CUR}$-0.25, (E) CUR-GLY-LAG-X$_{CUR}$-0.33, (F) CUR-GLY-LAG-X$_{CUR}$-0.5, (G) CUR-GLY-LAG-X$_{CUR}$-0.67, (H) CUR-GLY-LAG-X$_{CUR}$-0.8, (I) CUR-GLY-LAG-X$_{CUR}$-0.9 and (J) Raw CUR

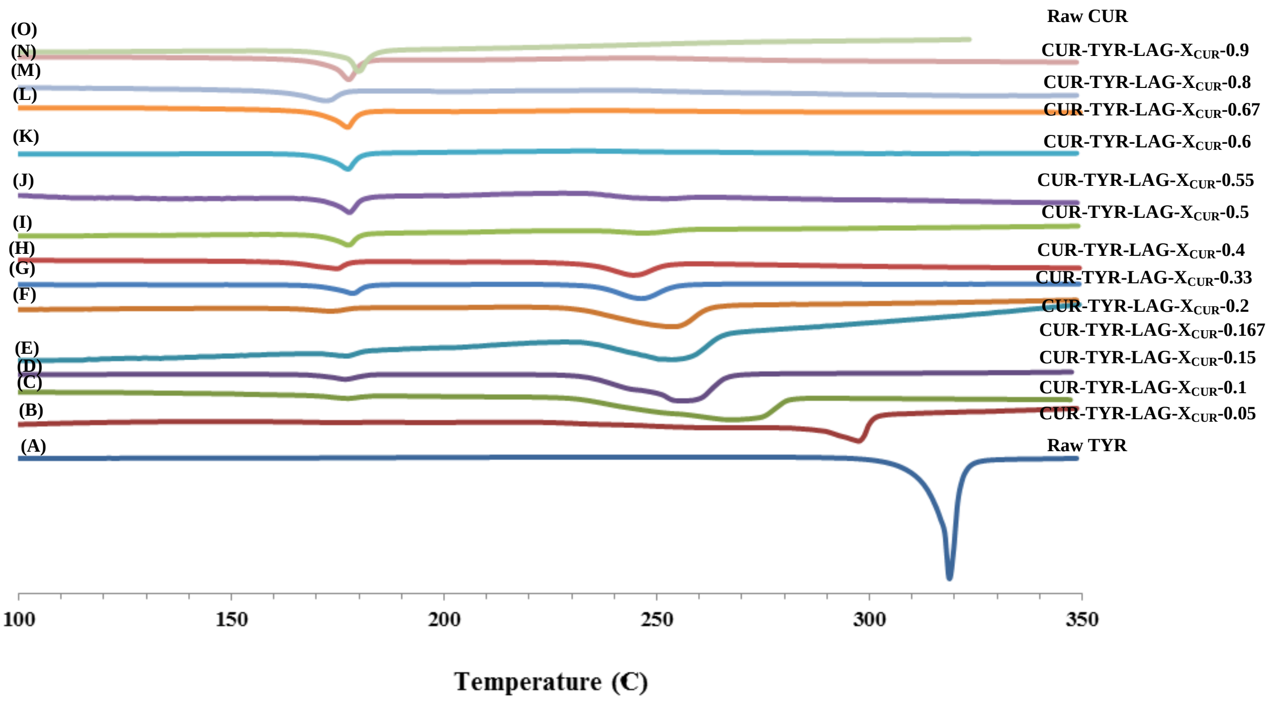

Figure S7. Overlay of DSC thermograms of (A) Raw TYR, (B) CUR-TYR-LAG-X$_{CUR}$-0.05, (C) CUR-TYR-LAG-X$_{CUR}$-0.1, (D) CUR-TYR-LAG-X$_{CUR}$-0.15, (E) CUR-TYR-LAG-X$_{CUR}$-0.167, (F) CUR-TYR-LAG-X$_{CUR}$-0.2, (G) CUR-TYR-LAG-X$_{CUR}$-0.33, (H) CUR-TYR-LAG-X$_{CUR}$-0.4, (I) CUR-TYR-LAG-X$_{CUR}$-0.5, (J) CUR-TYR-LAG-X$_{CUR}$-0.55, (K) CUR-TYR-LAG-X$_{CUR}$-0.6, (L) CUR-TYR-LAG-X$_{CUR}$-0.67, (M) CUR-TYR-LAG-X$_{CUR}$-0.8, (N) CUR-TYR-LAG-X$_{CUR}$-0.9, and (O) Raw CUR

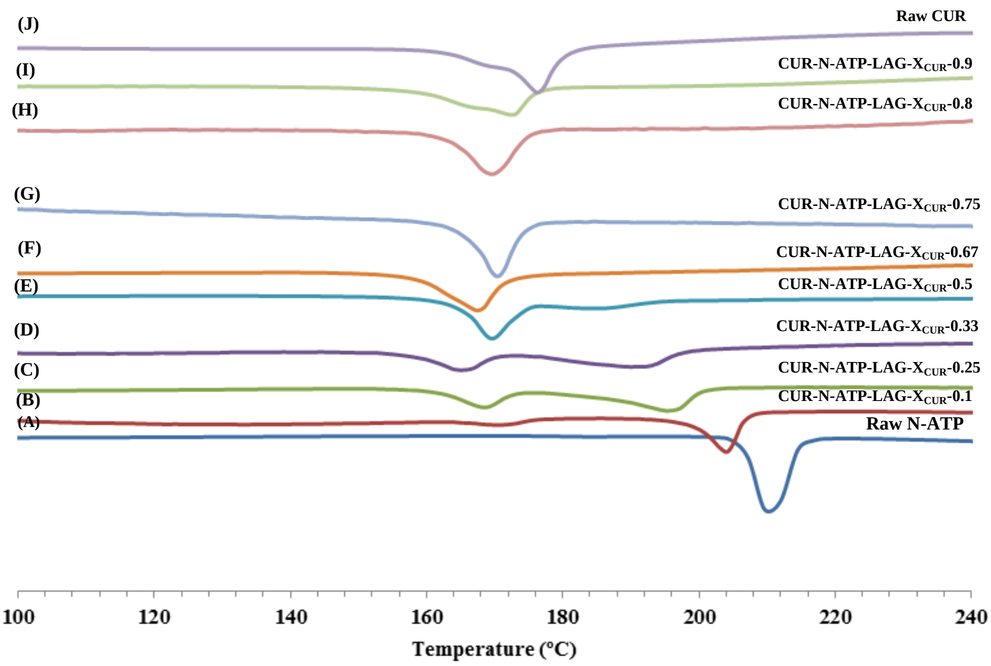

Figure S8. Overlay of DSC thermograms of (A) Raw *N*-ATP, (B) CUR-*N*-ATP-LAG-X$_{CUR}$-0.1, (C) CUR-*N*-ATP-LAG-X$_{CUR}$-0.25, (D) CUR-*N*-ATP-LAG-X$_{CUR}$-0.33, (E) CUR-*N*-ATP-LAG-X$_{CUR}$-0.5, (F) CUR-*N*-ATP-LAG-X$_{CUR}$-0.67, (G) CUR-*N*-ATP-LAG-X$_{CUR}$-0.75, (H) CUR-*N*-ATP-LAG-X$_{CUR}$-0.8, (I) CUR-*N*-ATP-LAG-X$_{CUR}$-0.9 and (J) Raw CUR

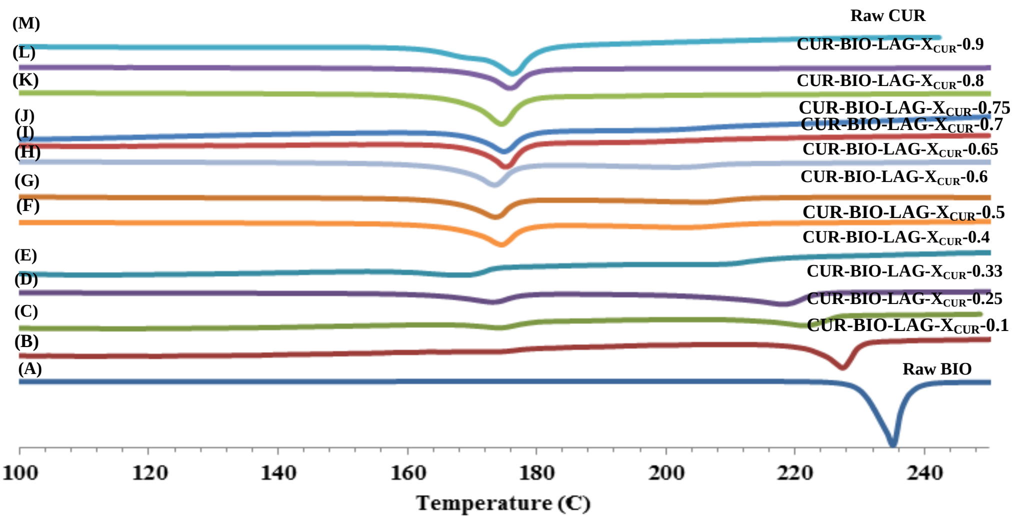

Figure S9. Overlay of DSC thermograms of (A) Raw BIO, (B) CUR-BIO-LAG-X$_{CUR}$-0.1, (C) CUR-BIO-LAG-X$_{CUR}$-0.25, (D) CUR-BIO-LAG-X$_{CUR}$-0.33, (E) CUR-BIO-LAG-X$_{CUR}$-0.4, (F) CUR-BIO-LAG-X$_{CUR}$-0.5, (G) CUR-BIO-LAG-X$_{CUR}$-0.6, (H) CUR-BIO-LAG-X$_{CUR}$-0.65, (I) CUR-BIO-LAG-X$_{CUR}$-0.7, (J) CUR-BIO-LAG-X$_{CUR}$-0.75, (K) CUR-BIO-LAG-X$_{CUR}$-0.8, (L) CUR-BIO-LAG-X$_{CUR}$-0.9 and (M) Raw CUR

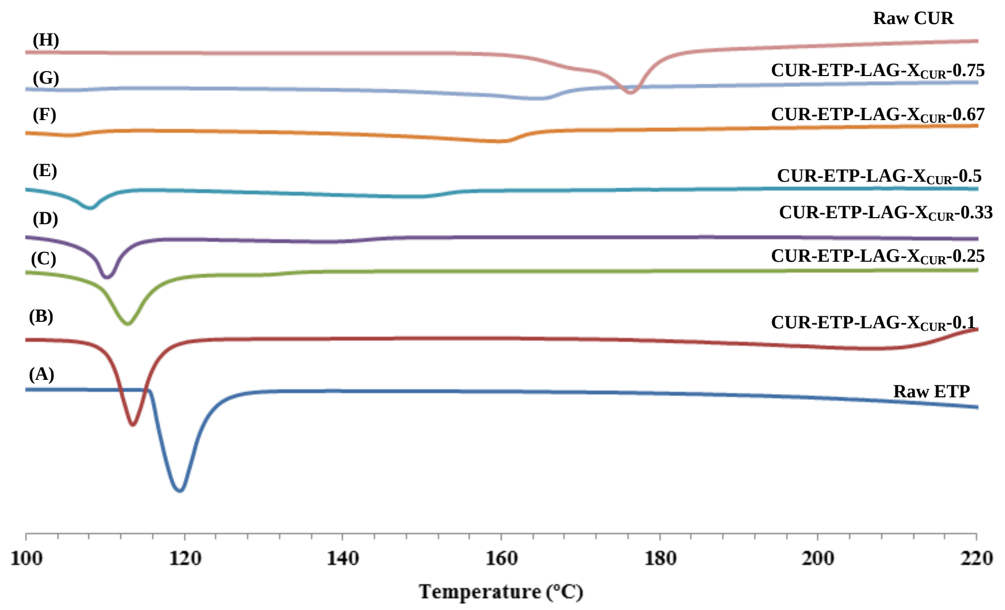

Figure S10. Overlay of DSC thermograms of (A) Raw ETP, (B) CUR-ETP-LAG-X$_{CUR}$-0.1, (C) CUR-ETP-LAG-X$_{CUR}$-0.25, (D) CUR-ETP-LAG-X$_{CUR}$-0.33, (E) CUR-ETP-LAG-X$_{CUR}$-0.5, (F) CUR-ETP-LAG-X$_{CUR}$-0.67, (G) CUR-ETP-LAG-X$_{CUR}$-0.75 and (H) Raw CUR

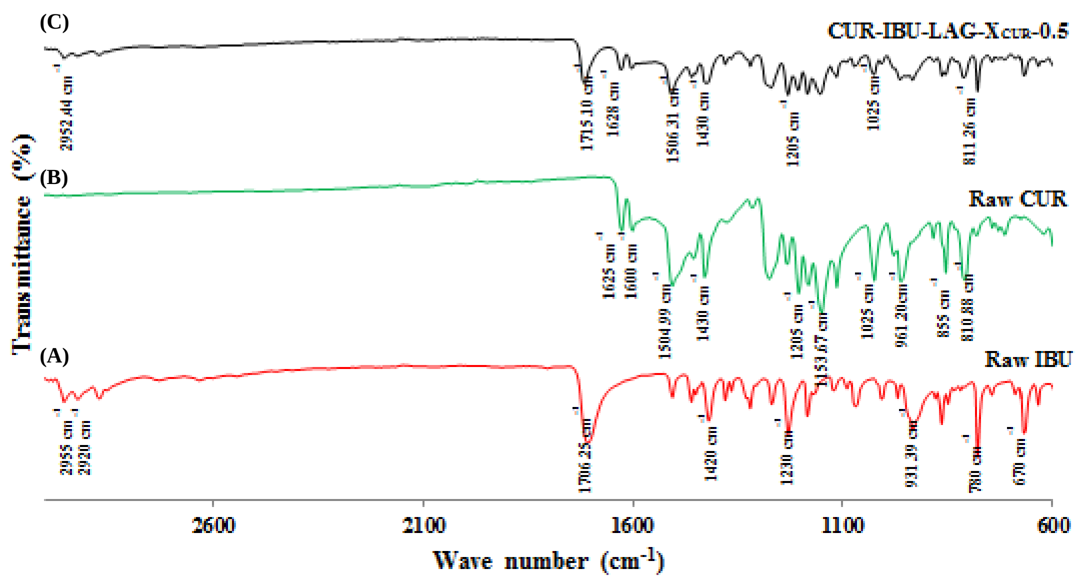

Figure S11. Overlay of FT-IR spectra of (A) Raw IBU, (B) Raw CUR and (C) CUR-IBU-LAG-X$_{CUR}$-0.5

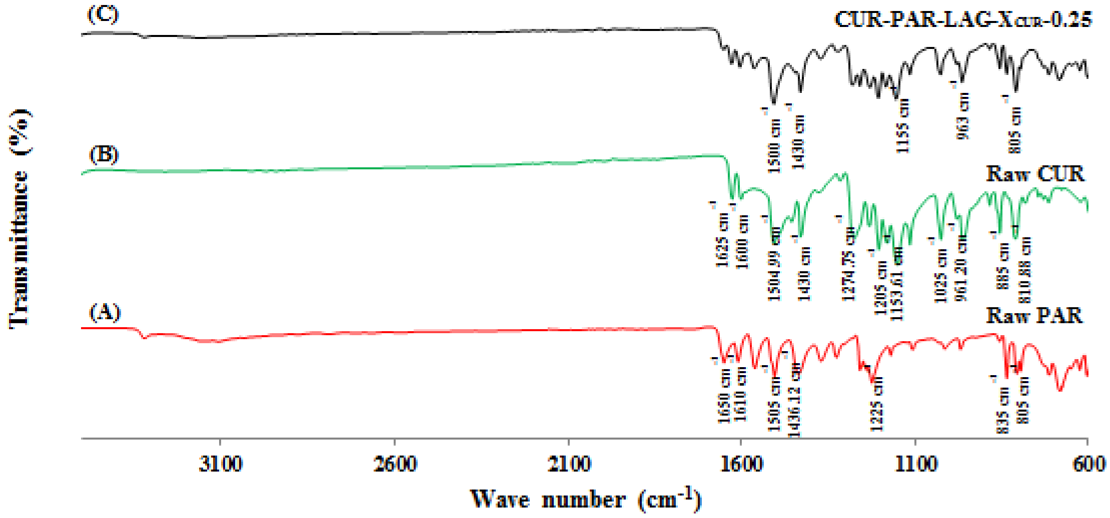

Figure S12. Overlay of FT-IR spectra of (A) Raw PAR, (B) Raw CUR and (C) CUR-PAR-LAG-X_{CUR}-0.25

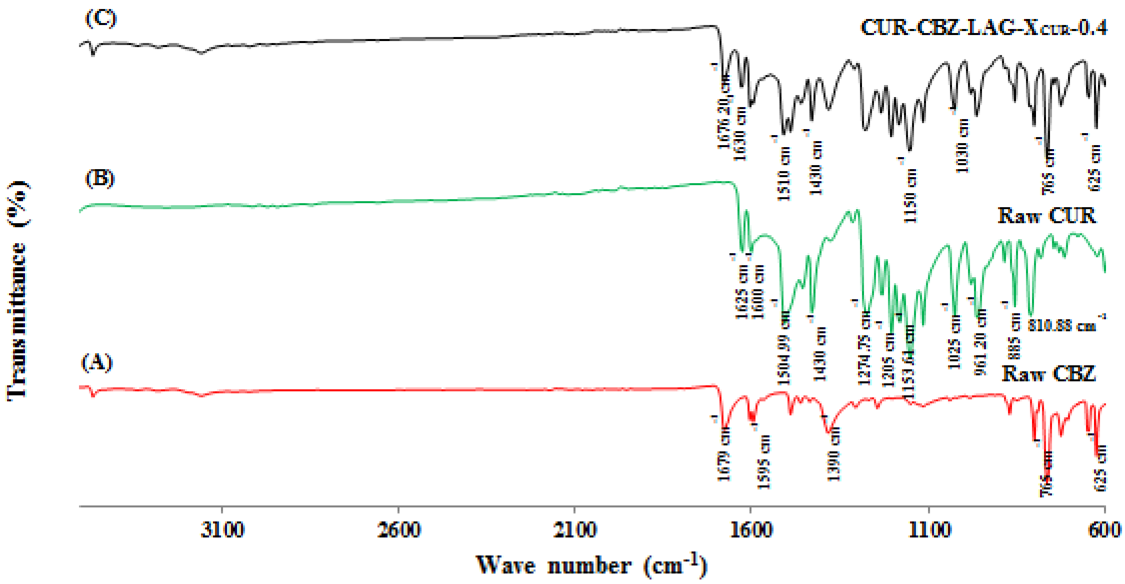

Figure S13. Overlay of FT-IR spectra of (A) Raw CBZ, (B) Raw CUR and (C) CUR-CBZ-LAG-X_{CUR}-0.4

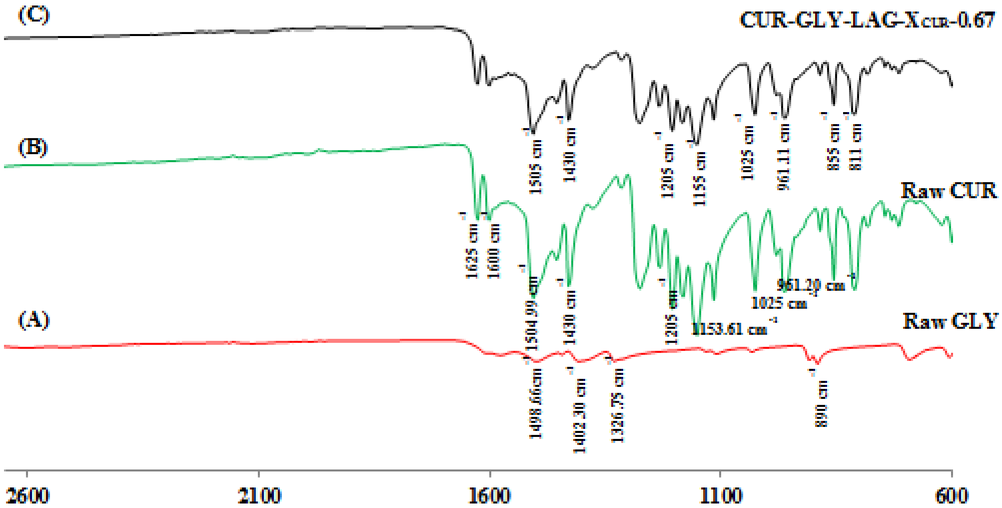

Figure S14. Overlay of FT-IR spectra of (A) Raw GLY, (B) Raw CUR and (C) CUR-GLY-LAG-X$_{CUR}$-0.67

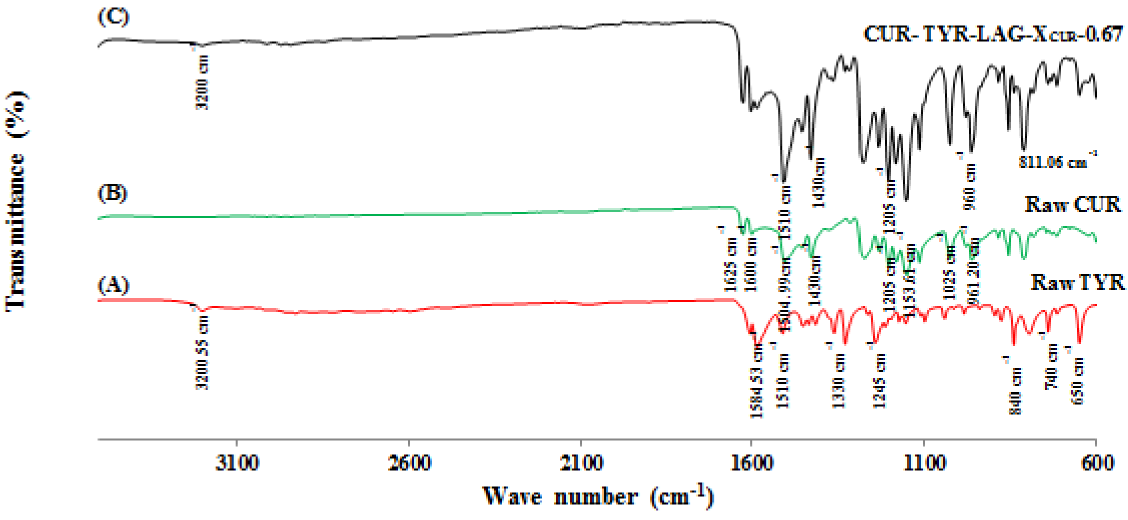

Figure S15. Overlay of FT-IR spectra of (A) Raw TYR, (B) Raw CUR and (C) CUR-TYR-LAG-X$_{CUR}$-0.67

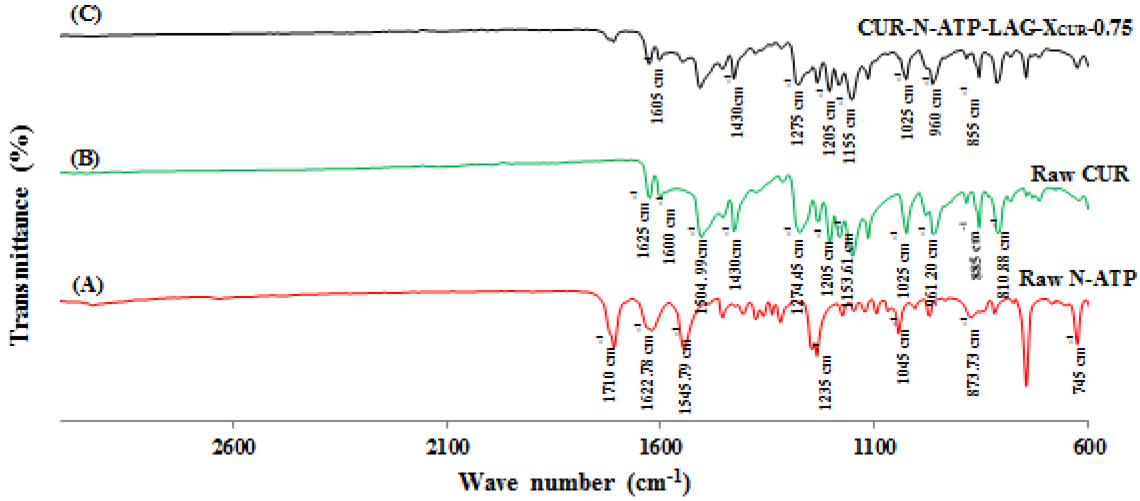

Figure S16. Overlay of FT-IR spectra of (A) Raw N-ATP, (B) Raw CUR and (C) CUR-N-ATP-LAG-X_{CUR}-0.75

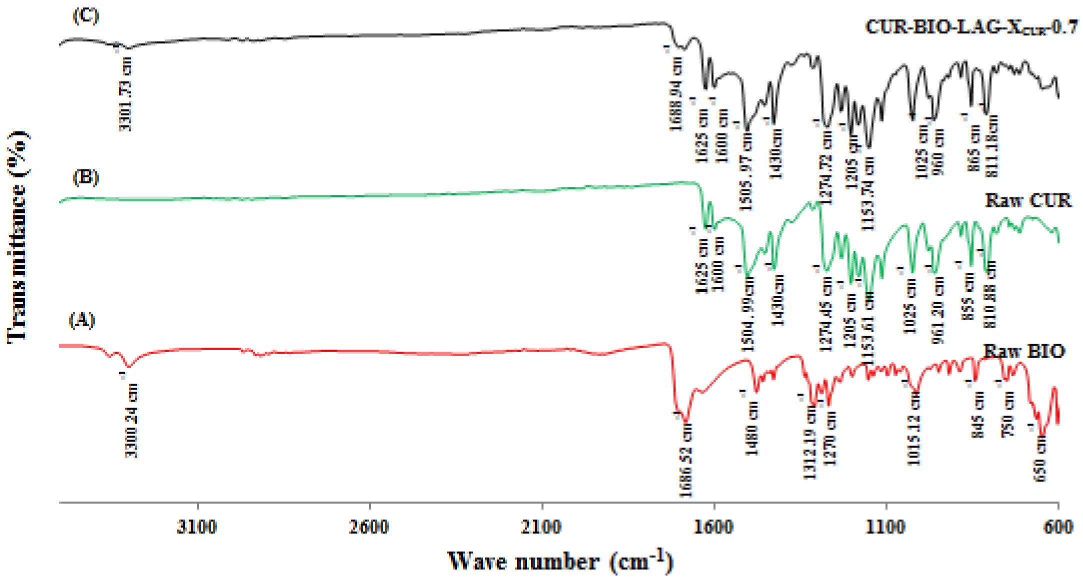

Figure S17. Overlay of FT-IR spectra of (A) Raw BIO, (B) Raw CUR and (C) CUR-BIO-LAG-X_{CUR}-0.7

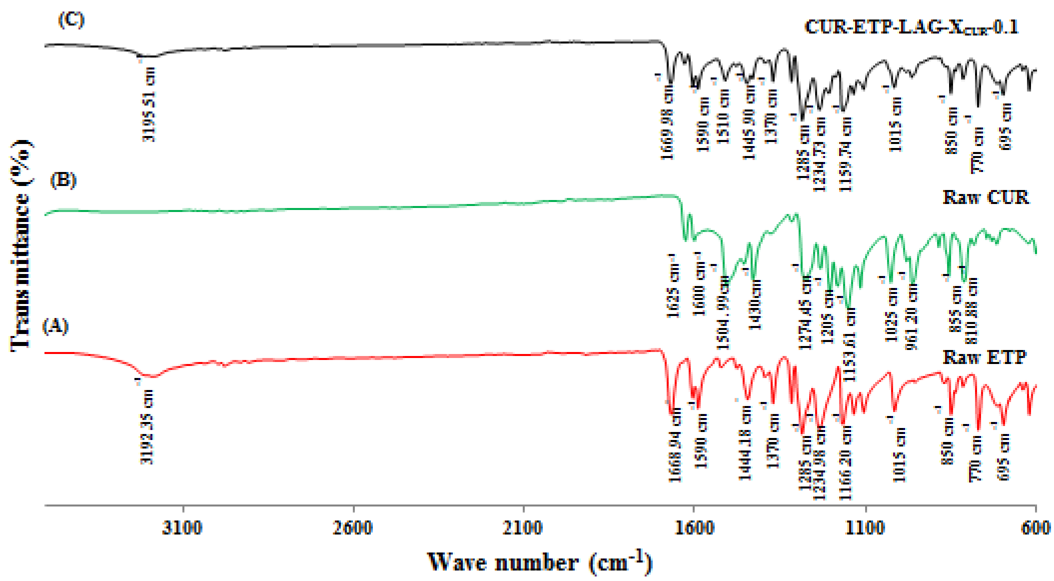

Figure S18. Overlay of FT-IR spectra of (A) Raw ETP, (B) Raw CUR and (C) CUR-ETP-LAG-X$_{CUR}$-0.1

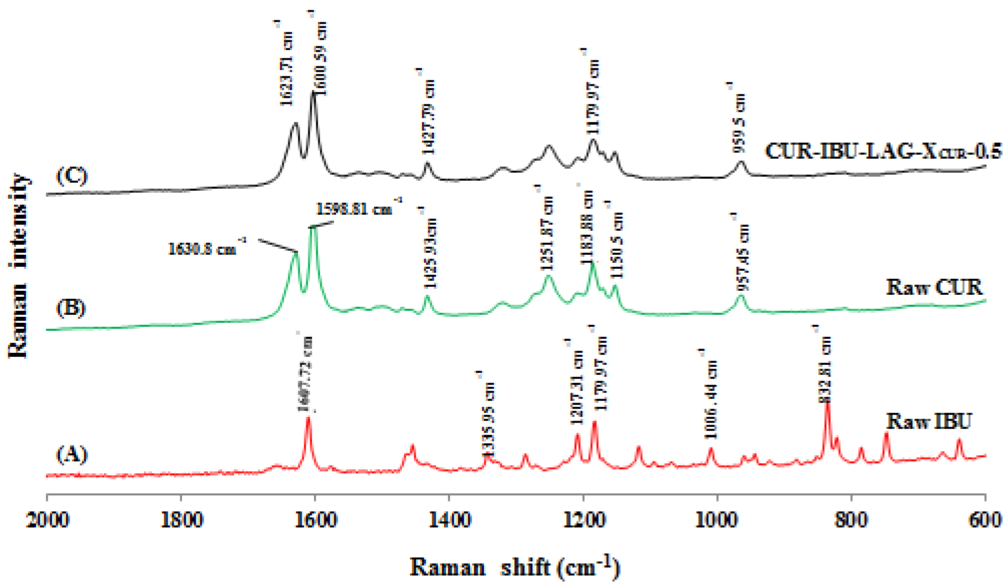

Figure S19. Overlay of Raman spectra of (A) Raw IBU, (B) Raw CUR and (C) CUR-IBU-LAG-X$_{CUR}$-0.5

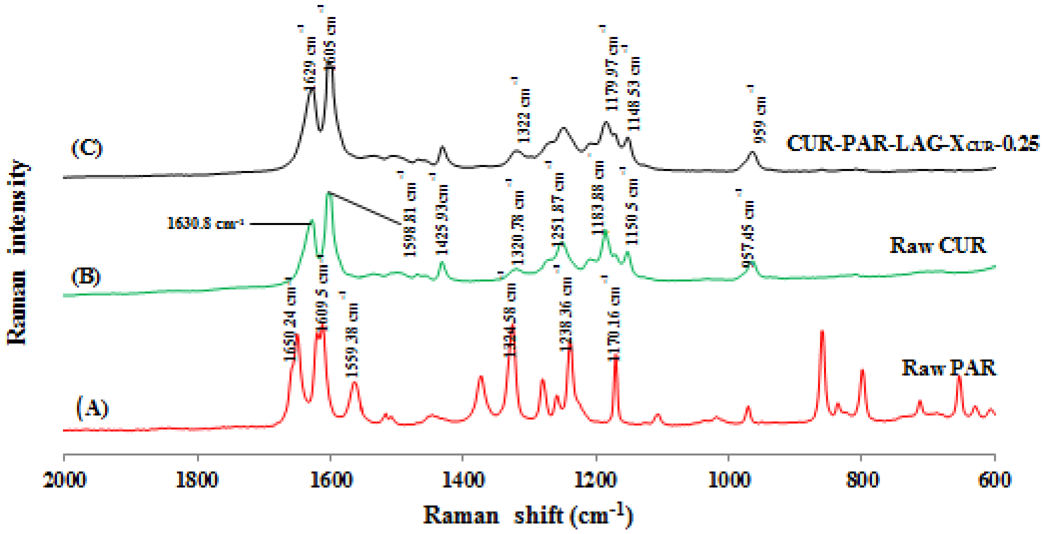

Figure S20. Overlay of Raman spectra of (A) Raw PAR, (B) Raw CUR and (C) CUR-PAR-LAG-X$_{CUR}$-0.25

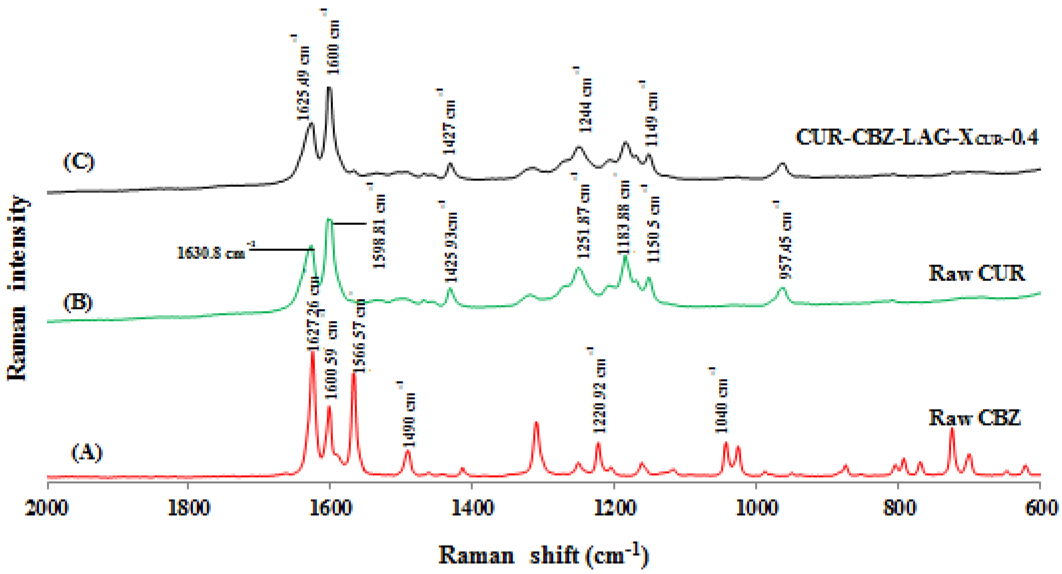

Figure S21. Overlay of Raman spectra of (A) Raw CBZ, (B) Raw CUR and (C) CUR-CBZ-LAG-X$_{CUR}$-0.4

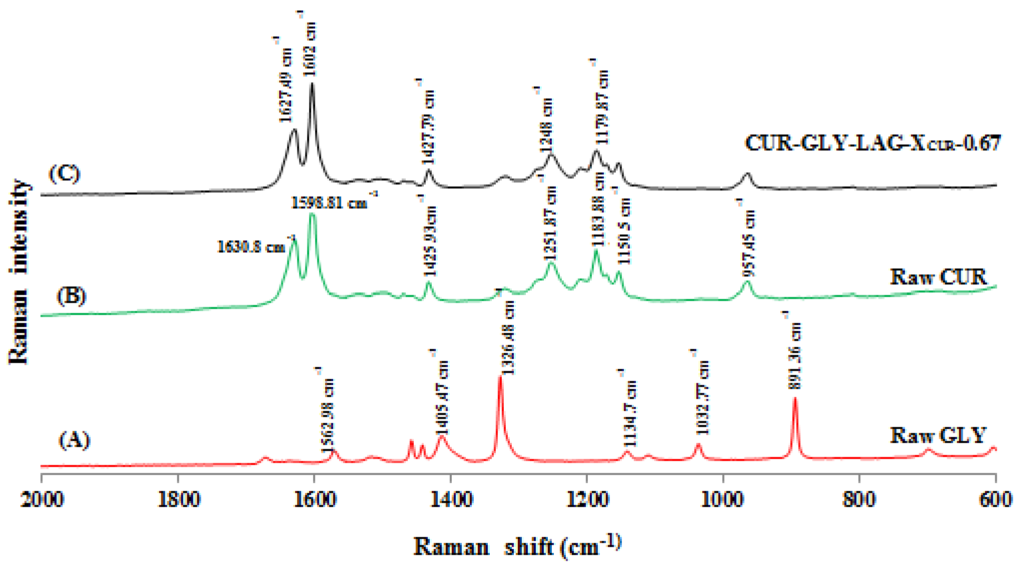

Figure S22. Overlay of Raman spectra of (A) Raw GLY, (B) Raw CUR and (C) CUR-GLY-LAG-X_{CUR}-0.67

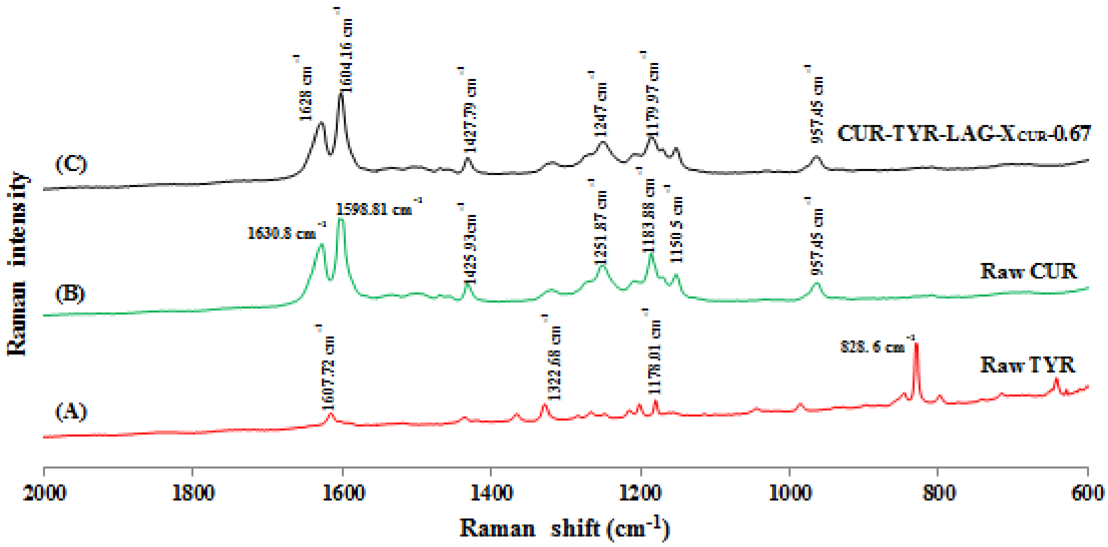

Figure S23. Overlay of Raman spectra of (A) Raw TYR, (B) Raw CUR and (C) CUR-TYR-LAG-X_{CUR}-0.67

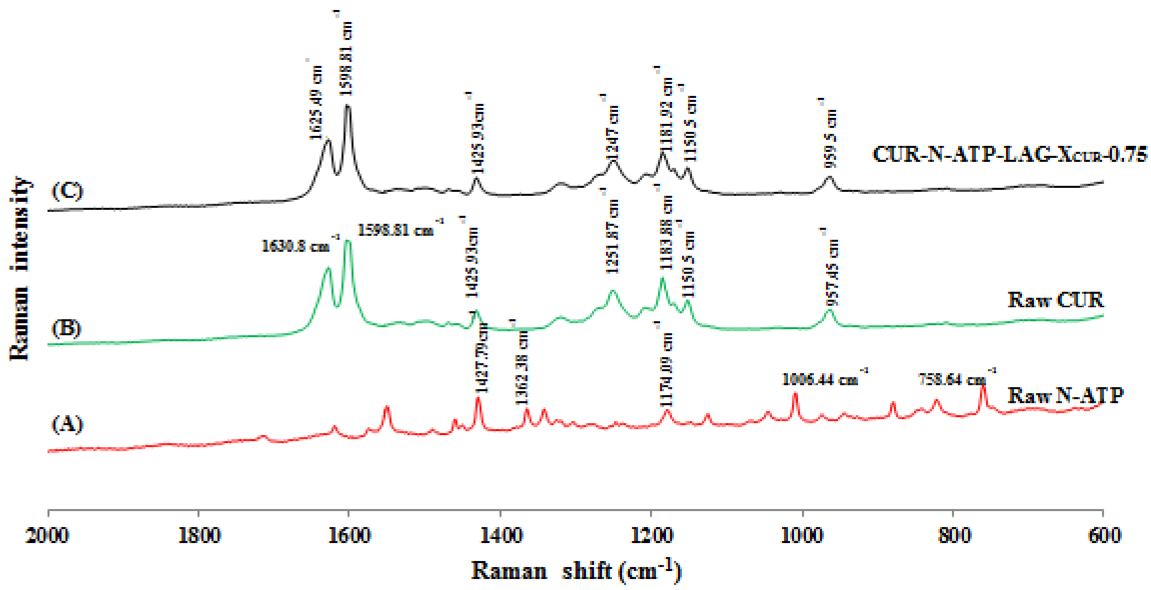

Figure S24. Overlay of Raman spectra of (A) Raw N-ATP, (B) Raw CUR and (C) CUR-N-ATP-LAG-X_{CUR}-0.75

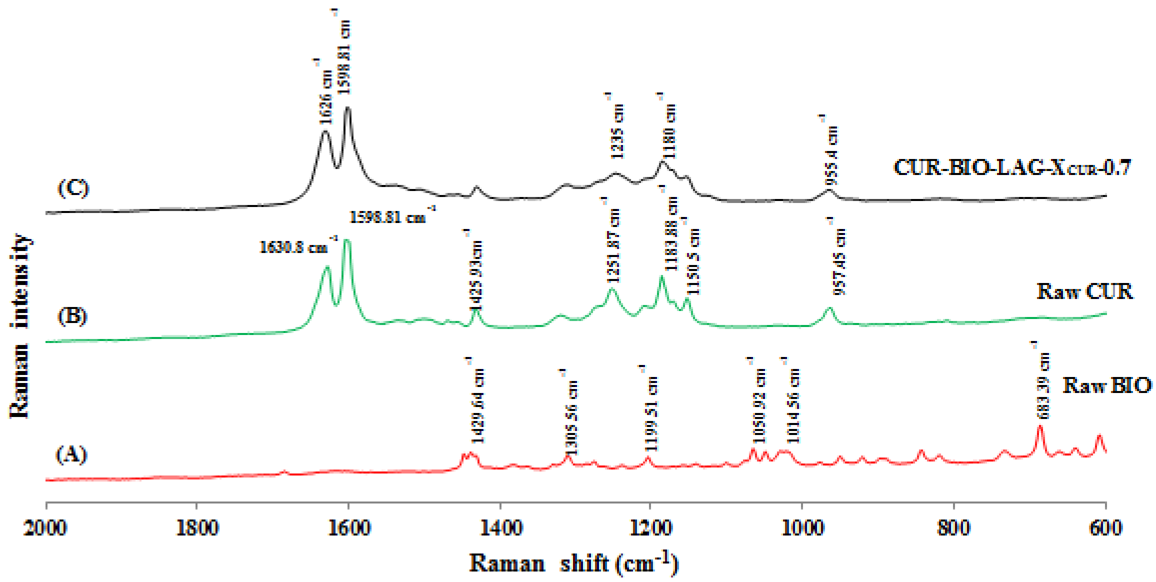

Figure S25. Overlay of Raman spectra of (A) Raw BIO, (B) Raw CUR and (C) CUR-BIO-LAG-X_{CUR}-0.7

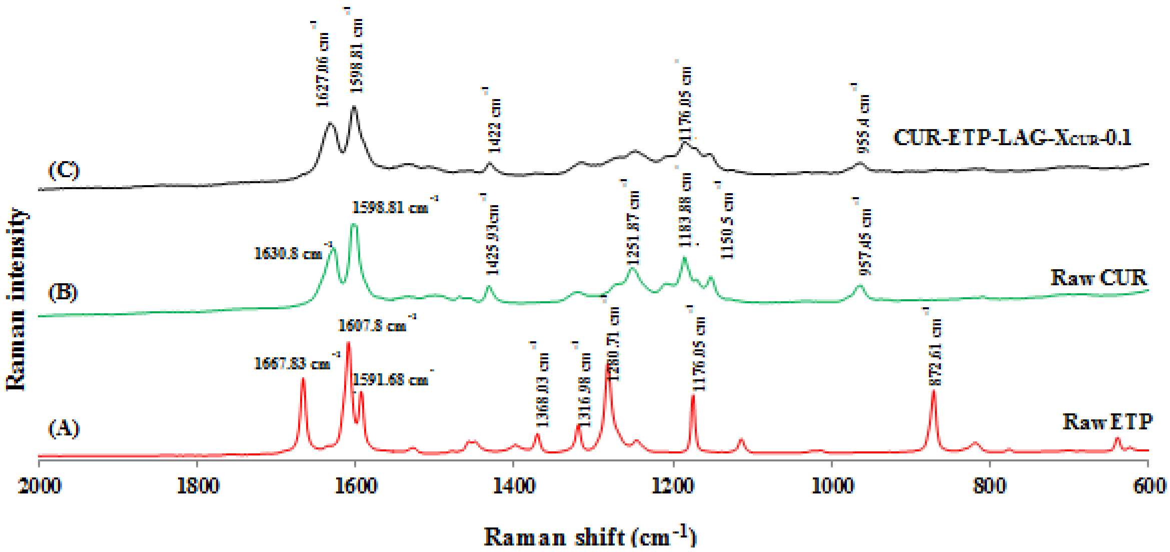

Figure S26. Overlay of Raman spectra of (A) Raw ETP, (B) Raw CUR and (C) CUR-ETP-LAG-X_{CUR}-0.1

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