Supporting Information

Valorisation of Chitosan Natural Building Block as a Primary Strategy for the Development of Sustainable Fully Bio-Based Epoxy Resins

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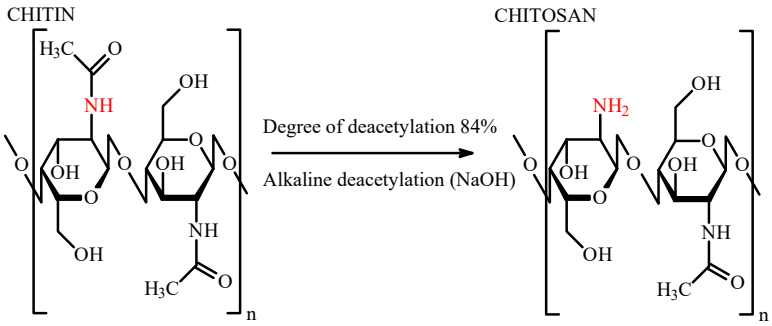

Figure S1. Alkaline deacetylation of chitin.

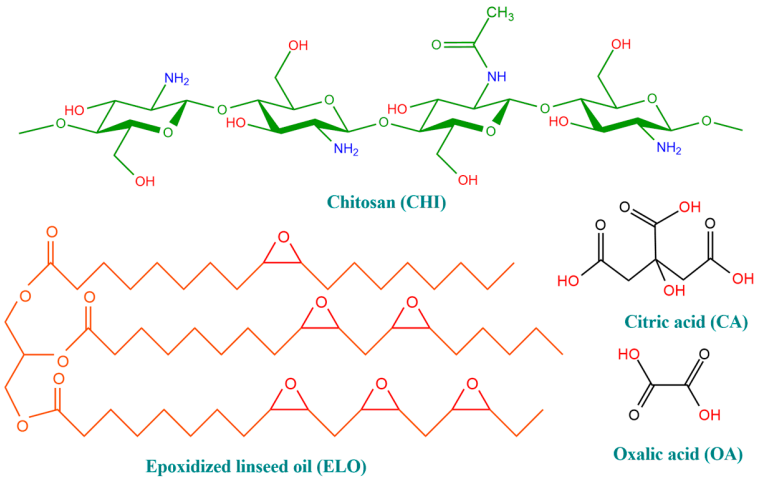

Figure S2. Chemical structures of the reactants.

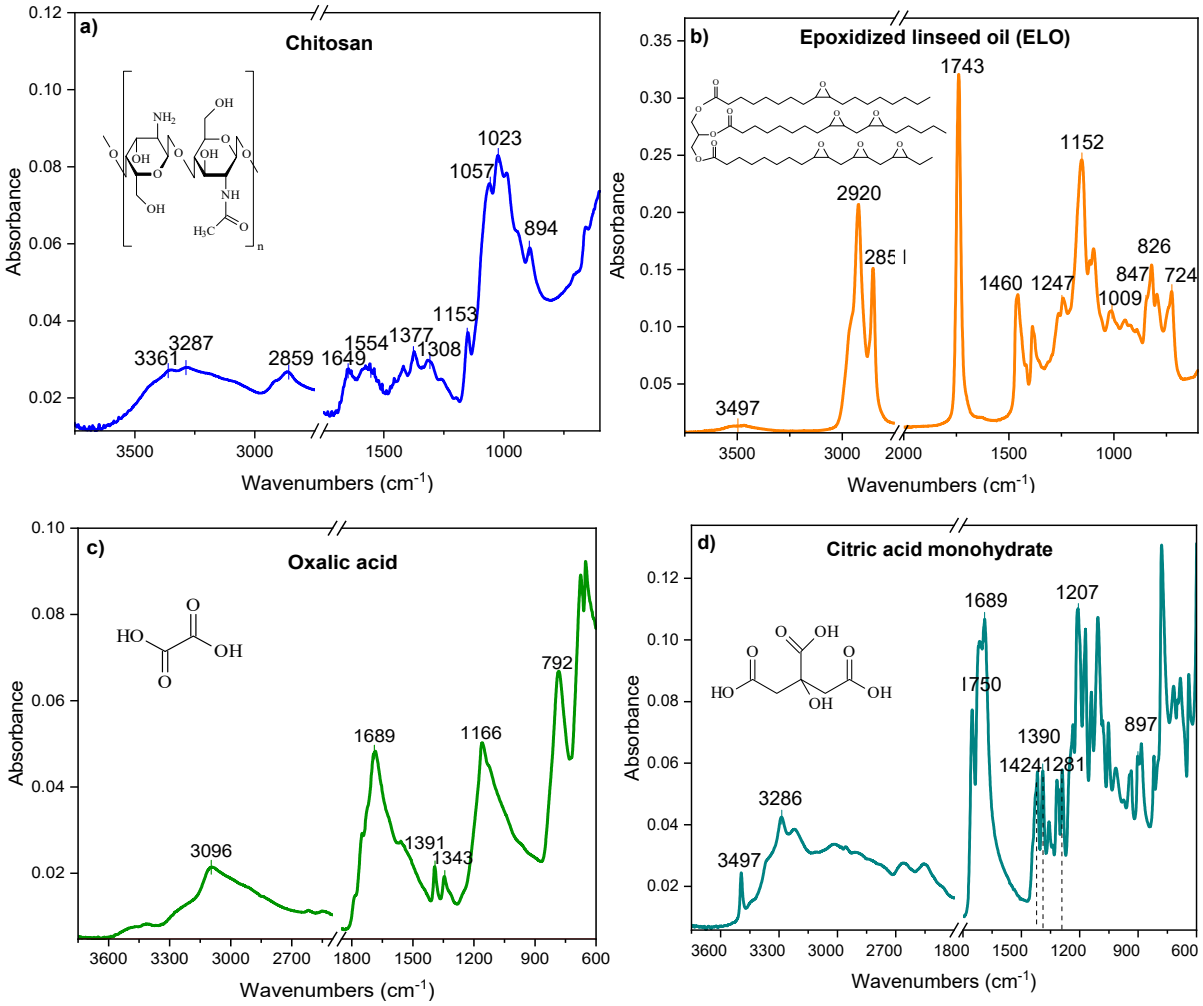

Figure S3. FT-IR spectra of a) chitosan, b) ELO, c) OA (oxalic acid), and d) CA (citric acid).

Table S1. FT-IR assignments for the characteristic bands of ELO, CHI, OA and CA compounds.

Monomers	**Group**	**Absorption peak (cm^{-1})**
ELO	–O–H stretching (weak)	3497
	–C–H, asymmetric stretching of CH_2, CH_3	2920
	–C–H symmetric stretching of CH_2, CH_3	2851
	Triglyceride carbonyl of ester C=O	1743
	Scissoring of CH_2, asymmetric bending of CH_3	1508
	–CH_3 symmetric deformational	1383
	C–O–C stretching of epoxy groups	1247
	C–O asymmetric of ester groups (O=C–O)	1152
	C–O stretching of O–CH_2	1098

	Oxirane ring, C–O or C–H wagging of epoxy groups	847-826
Citric acid	O–H stretching (COOH), H bonding	3500-2500
	C=O stretching mode in the carboxylic dimer	1750, 1689
	scissoring type –CH_2 bending vibration	1424
	C–O–C scissoring vibration	1390
	C–O vibrations	1281, 1207,1105
	COOH	897
Oxalic acid	–OH stretch, H bonding	3430-2500
	C=O stretching	1689
	β (OH) symmetric stretching	1343
	–OH asymmetric stretching	1166
	COOH	792
Chitosan	N–H, O–H stretching, H bonding	3361, 3287
	C-H stretching	2859
	Amide band I C=O	1649
	Amide band II –NH_2 due to deacetilation	1554
	Amide band III- C–N	1377
	bridge –O– stretch; Saccharide structure of chitosan C–O–C	1153
	C–O stretch, secondary hydroxyl group	1057
	C–O stretch, primary hydroxyl group	1023
	Pyranose ring	894

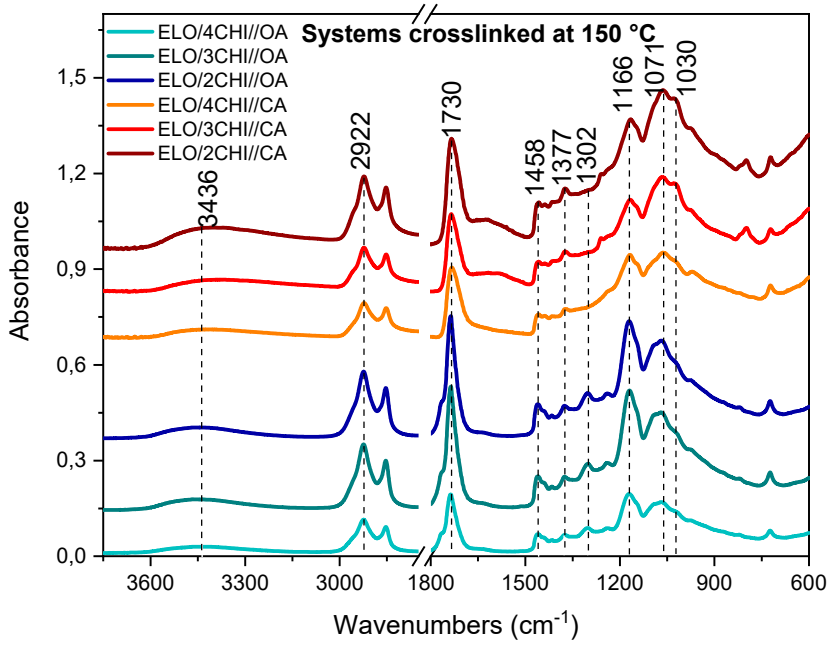

Figure S4. FT-IR spectra for crosslinked bio-resins.

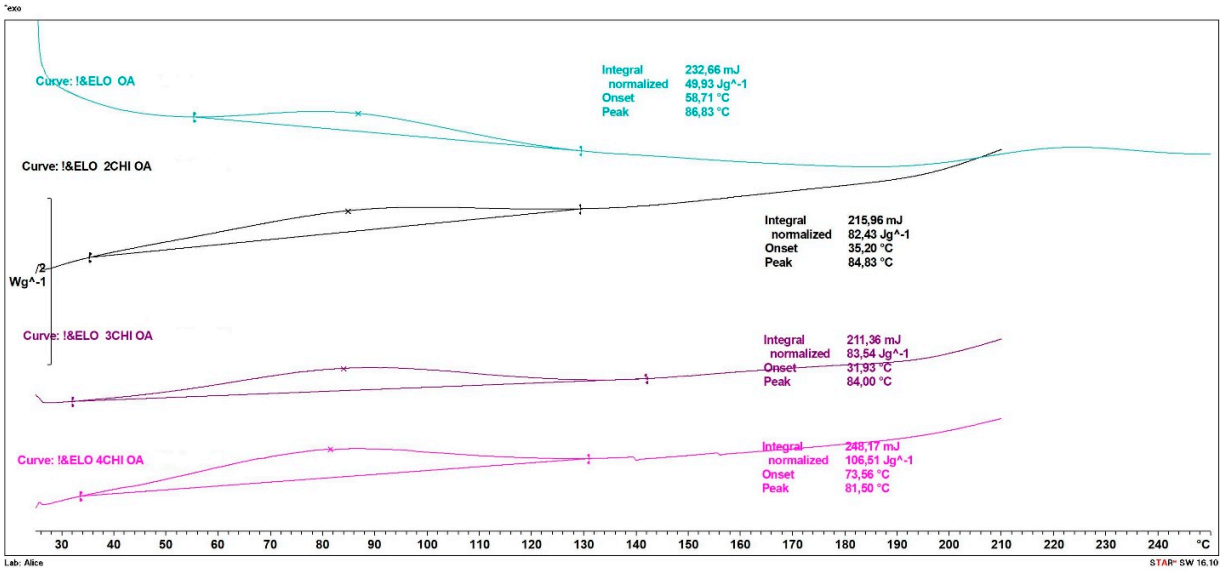

Figure S5. Dynamic DSC thermograms for ELO//OA systems with different percentage of chitosan

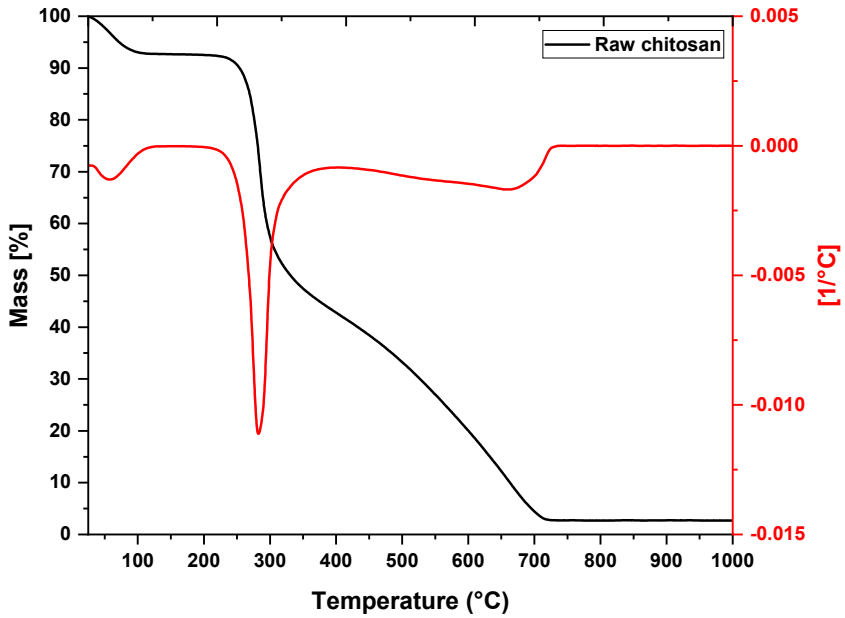

Figure S6. TGA and DTG curves of the raw chitosan.

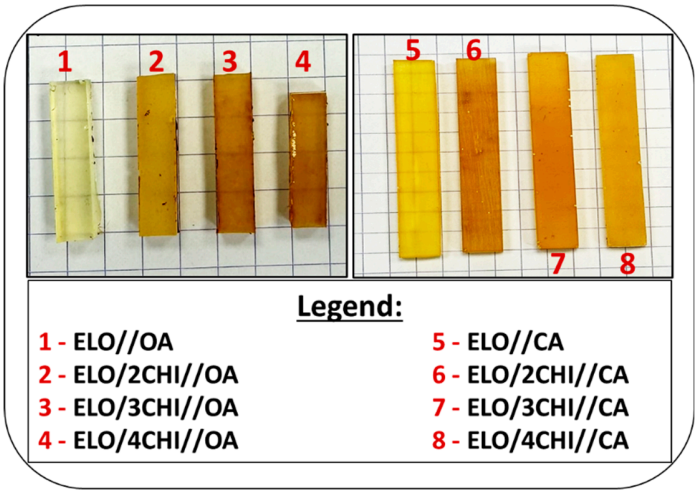

Figure S7. Physical appearance of the biobased thermosets