

Utilization of renewable bio-based resources viz. sorbitol, diol, and diacid in the preparation of two pack PU anticorrosive coatings

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Table. S1.Characterization details of polyester polyol.

Sr. No.	Diacid used in formulation	Reaction Step	Yield/ conversion (%)	Acid value	Hydroxyl value
1.	Succinic	Ist	94	360	0
		IIInd	86	54	299
		IIIrd	79	10	170
2.	Adipic	Ist	92	354	0
		IIInd	87	51	293
		IIIrd	80	9.8	163
3.	Suberic	Ist	93	338	0
		IIInd	85	48	280
		IIIrd	77	10	157
4.	Sebacic	Ist	92	345	0
		IIInd	83	52	287
		IIIrd	78	10	168

Table. S2.Relative frequencies of functional groups present in FT-IR of polyester polyol.

Sr. No.	Functional group	Relative frequency (cm⁻¹)			
		Succinic acid	Adipic acid	Suberic acid	Sebacic acid
1.	-OH	3409	3418	3417	3413
2.	>CO	1734	1731	1732	1732
3.	-CH ₃ , -CH ₂ - stretching	2925, 2850	2925, 2855	2927, 2857	2925, 2855
4.	-CH ₂ - bending	1463, 1377	1462, 1377	1462, 1361	1463, 1377

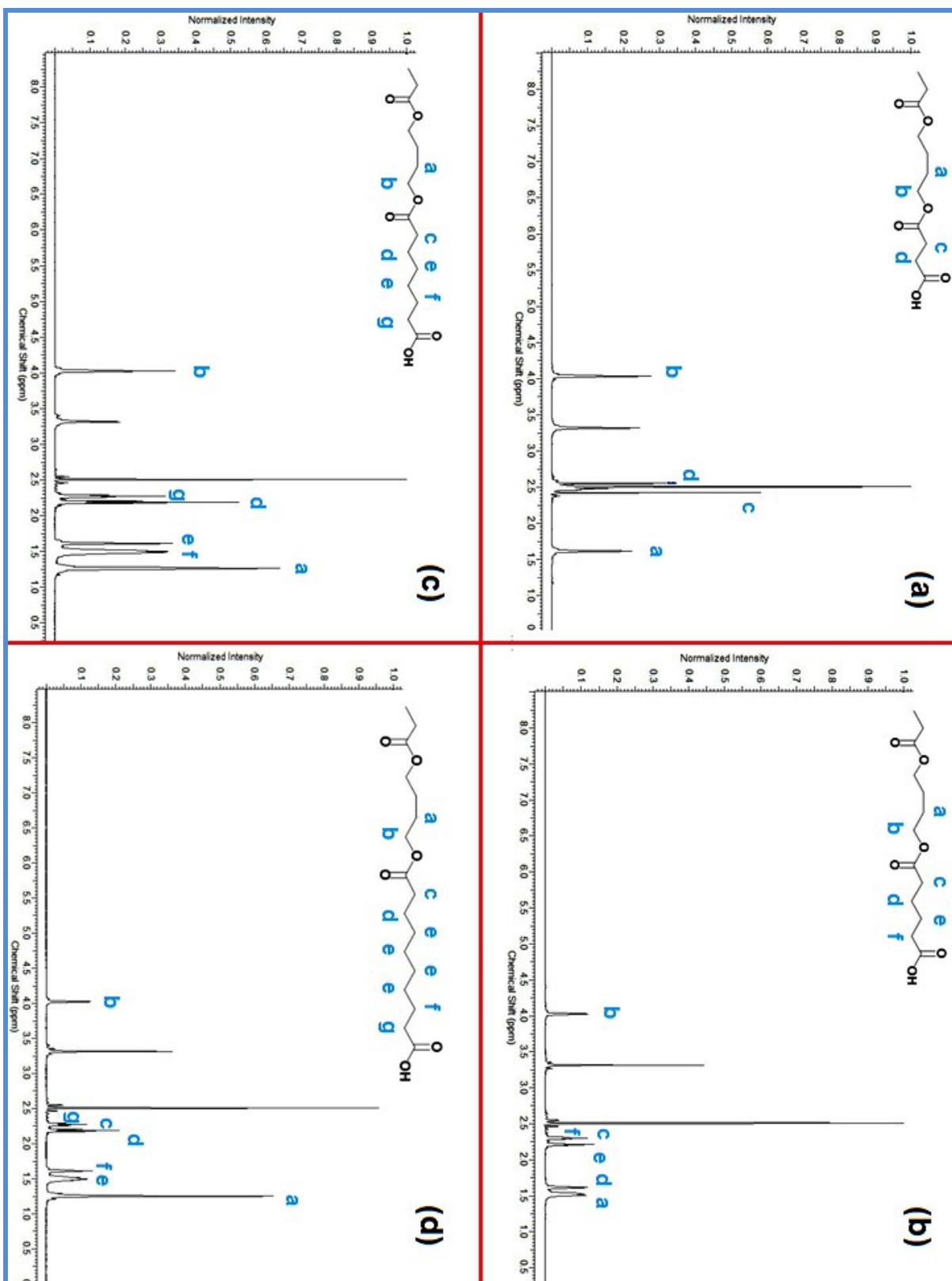


Fig. S1. NMR of polyester polyol (first intermediate product based on (a) succinic, (b) adipic, (c) suberic, and (d) sebacic acid).

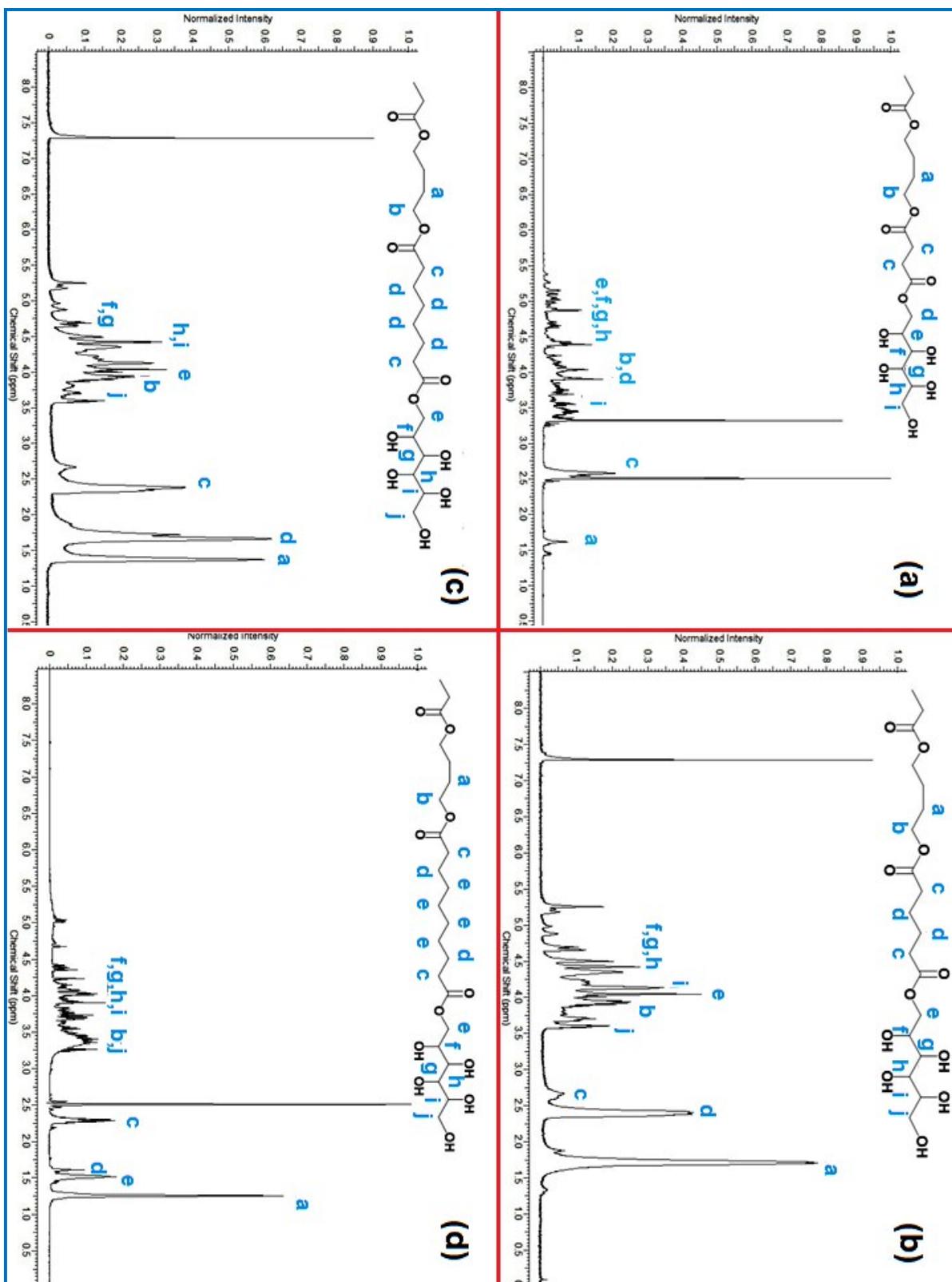


Fig. S2. NMR of polyester polyol (second intermediate product based on (a) succinic, (b) adipic, (c) suberic, and (d) sebacic acid).

Table. S3. Physical properties of polyester polyol

Physical properties / formulation	Polyester polyol comprises of difunctional acid			
	Succinic acid	Adipic acid	Suberic acid	Sebacic acid
Colour	Light brown	Light brown	Light brown	Light brown
Mw	2997	2582	2943	3462
PDI	1.886	2.807	2.819	4.181

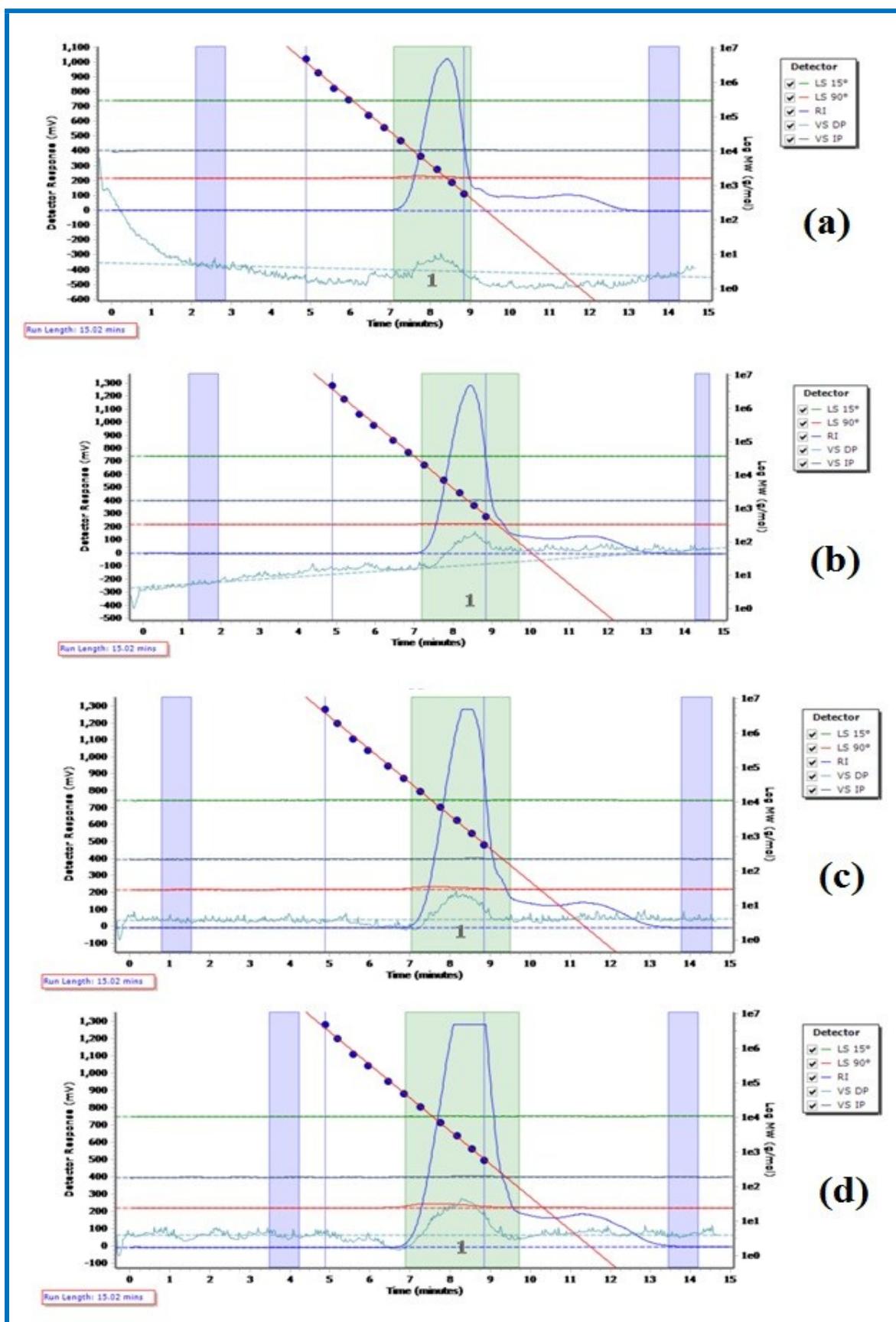


Fig. S3. GPC curve of polyester polyols prepared from sorbitol and difunctional acids *viz.* – (a) succinic, (b) adipic, (c) suberic, and (d) sebacic acid.

Table. S4.Coating properties of PU formulations

Prop./PU coatings	PU formulation comprises of difunctional acid			
	Succinic acid	Adipic acid	Suberic acid	Sebacic acid
Gloss	98.4	99.7	107.3	110.4
Bending test	Pass	Pass	Pass	Pass
Adhesion test	100 %	100 %	100 %	100 %
Pencil hardness	4H	4H	5H	6H
Mar resistance	200	400	800	800

Table. S5. Electrochemical study for corrosion measurement in PU coatings

	E_{corr}	I_{corr}	CR(myr)
Blank	-1.004	3.738	9.216
Succinic	-0.909	2.87	3.268
Adipic	-0.874	2.563	3.103
Suberic	-0.85	1.222	2.536
Sebacic	-0.828	1.11	2.127

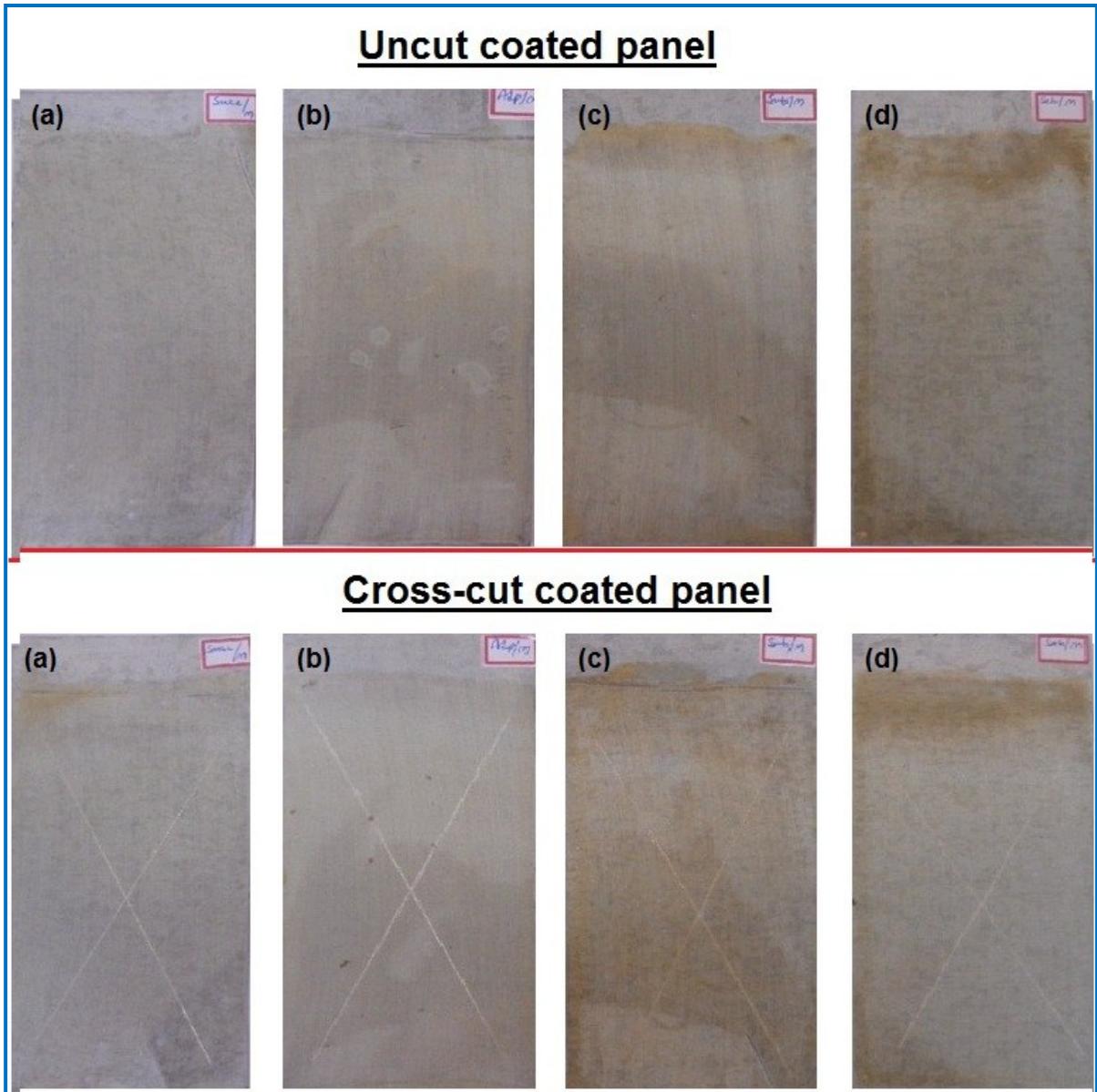


Fig.S4. Images (before corrosion test) of PU coatings based on (a) succinic, (b) adipic, (c) suberic, and (d) sebacic acid.

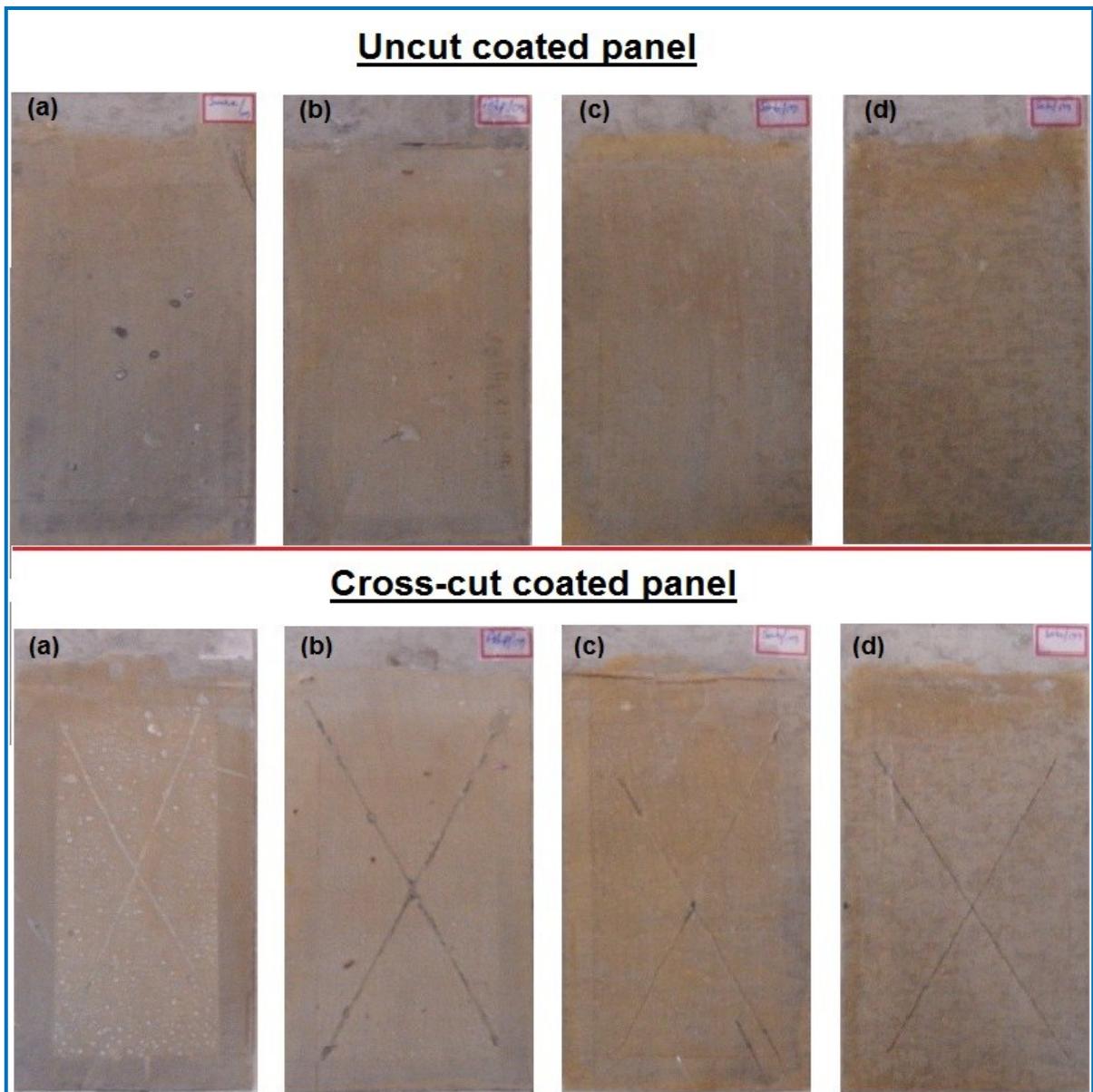


Fig.S5. Images (after 72 h of corrosion test) of PU coatings based on (a) succinic, (b) adipic, (c) suberic, and (d) sebacic acid.