Fungal modified lignin enhanced physicochemical properties of collagen-based composite films

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Table S1. The relative abundance of aromatic compounds by unmodified and biomodification APL as determined by GC-MS

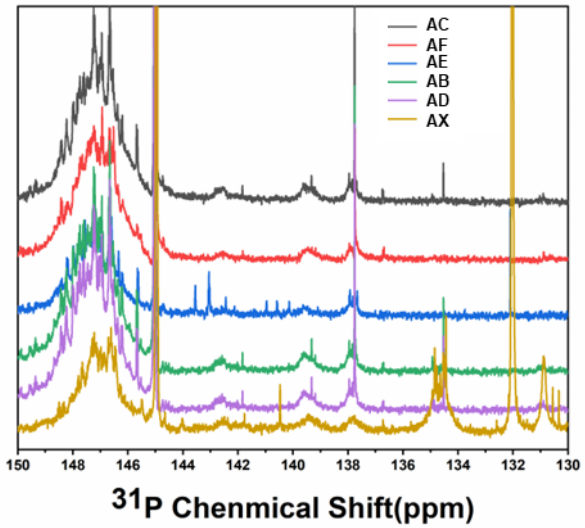
	Aromatic compounds	AC	AF	AB	AE	AD	AX
1	Guaiacol	0.0945	0.0766	0.0532	0.0753	0.0174	0.0478
2	Benzoic Acid	0.0554	0.0477	0.0898	0.0430	0.0308	-
3	Benzeneacetic acid	0.0450	0.0501	-	0.0362	-	-
4	4-Hydroxybenzaldehyde	0.5529	0.4126	0.3892	0.5037	0.0555	-
5	4'-Hydroxyacetophenone	-	0.1830	0.3011	0.1399	-	0.1533
6	4-Isopropylphenol	0.2182	-	-	-	-	-
7	2,4-Dihydroxybenzaldehyde	-	-	-	0.1062	-	-
8	Butylated Hydroxytoluene	0.1796	0.1540	0.1643	0.1420	0.0879	0.1397
9	Vanillin	0.1676	0.2404	0.2658	0.3185	0.0319	0.0579
10	3-Hydroxybenzoic acid	0.0243	0.0253	0.0319	0.0235	0.0104	-
11	Acetovanillone	-	-	0.1833	0.1750	-	-
12	4-Hydroxybenzoic acid	0.3795	0.3421	0.5875	0.3121	0.5797	0.0679
13	4-Hydroxybenzeneacetic acid	0.0828	0.0790	0.1274	0.0658	0.0327	0.1020
14	Phloretic acid	-	-	0.1232	0.0973	0.0461	-
15	Vanillic Acid	-	-	0.2977	-	0.1999	-
16	Acetosyringon	0.8145	-	-	-	-	-
17	Homovanillic Acid	0.1353	0.1021	0.1259	-	0.0435	0.1188
18	4-Coumaric acid	9.0262	8.2180	7.1692	7.1723	2.4794	1.1333
19	Vanillylmandelic acid	-	-	0.1465	-	0.0189	0.0763
20	Syringic acid	0.5774	0.4618	0.1939	0.3196	0.1108	0.0891
21	(Z)-2-hydroxy-3-(4-hydroxyphenyl) acrylate	-	-	0.1288	0.1658	-	-
22	Ferulic acid	2.0813	1.3407	0.4910	1.3120	0.4039	0.3279
23	2-hydroxy-3-(4-hydroxy-3-methoxyphenyl) propanoic acid	0.0853	0.1283	0.1096	0.0645	0.0222	0.0424
24	m-Coumaric acid	-	0.0959	-	-	-	0.0868
	Total	**14.5198**	**11.9573**	**10.9793**	**11.0727**	**4.1708**	**2.4431**

Table S2. Typical chemical shifts and integration regions for APL in a 31P NMR spectrum

structure	δ(ppm)
(1) Aliphatic OH	145.4-150.0
(1) Phenols	133.6-144.0
C5 substituted	140.0-144.5
Syringyl	~142.7
Guaiacyl	139.0-140.2
Catechol	~138.9

Table S3. Hydroxyl group contents of APL as determined by 31P NMR analysis

	Aliphatic OH mmol g^{-1}	Phenolic, mmol g^{-1}					COOH mmol g^{-1}
		C5 substituted	Syringyl	Guaiacyl	Catechol	Phenols	
AC	1.477	0	0	0	0	0	0
AF	1.116	0.014	0.018	0.022	0	0.162	0
AE	1.242	0	0	0.022	0.007	0.007	0
AB	1.101	0.069	0.036	0.029	0.014	0.119	0.022
AD	1.217	0.181	0.018	0.047	0.014	0.134	0.087
AX	0.772	0	0	0.003	0	0	0.054



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