

**Table 1 The formulation of Tannin/GDE Wood Adhesives**

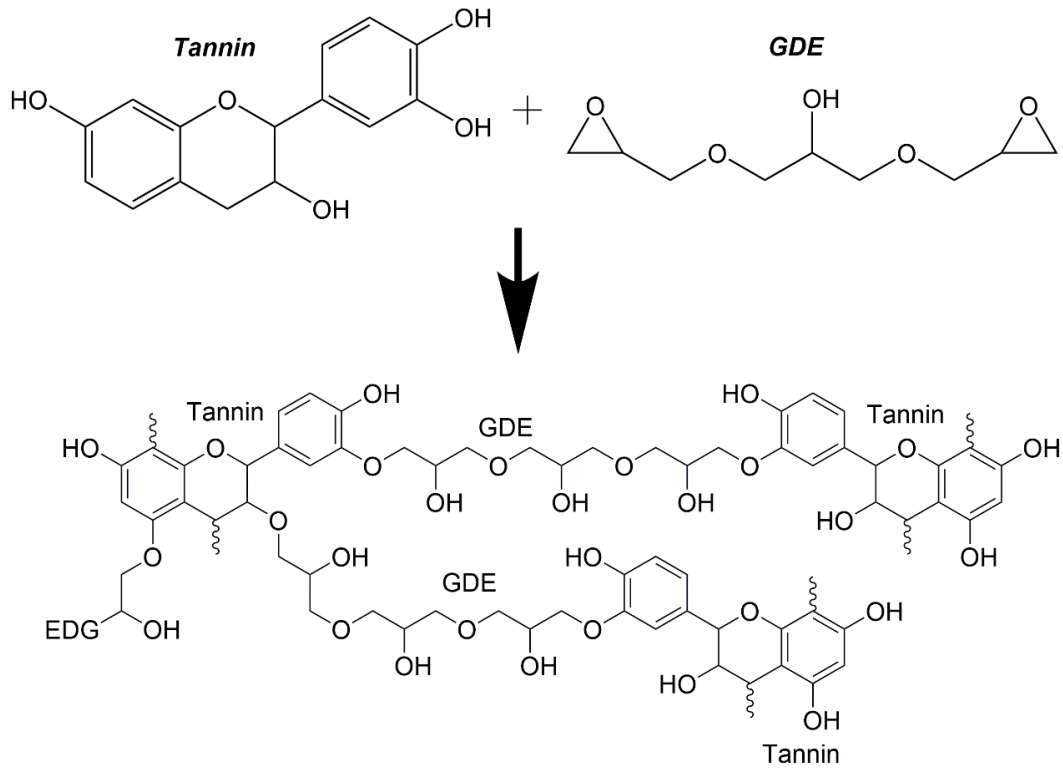
Names	Mimosa Tannin (g)	GDE (g)	Distilled water (g)
Tannin/GDE-1/1	6.6	6.6	6.6
Tannin/GDE-2/1	8.8	4.4	6.6
Tannin/GDE-3/1	9.9	3.3	6.6

**Table 2 The basic characterizations of tannin/GDE Wood Adhesives**

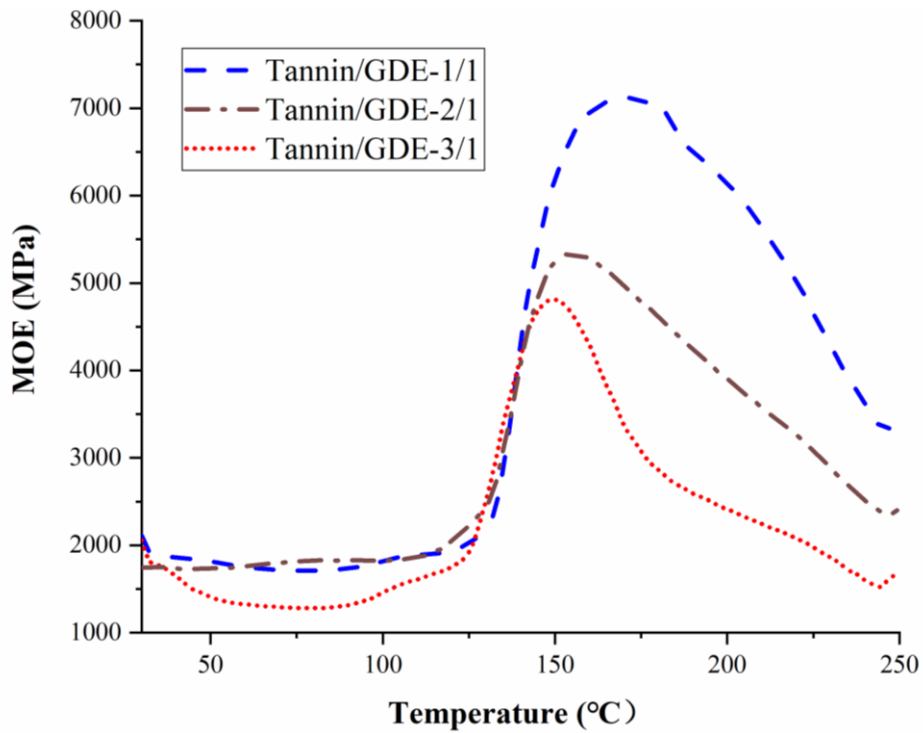
Adhesive types	pH	Solid content (%)	Viscosity (mPa·s)
Tannin/GDE -1/1	5.47	65.3	3100±156
Tannin/GDE -2/1	5.27	64.97	5600±192
Tannin/GDE -3/1	5.01	63.5	6480±135

**Table 3 Residual rate of tannin/GDE Wood Adhesives**

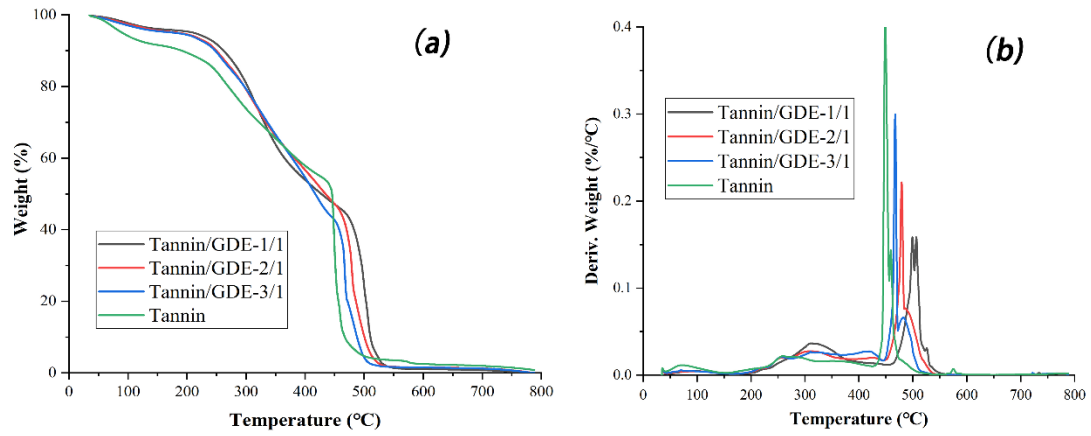
Adhesive types	Tannin/GDE-1/1	Tannin/GDE-2/1	Tannin/GDE-3/1
Residual rate (%)	96.29±0.023	94.41±0.031	90.05±0.037



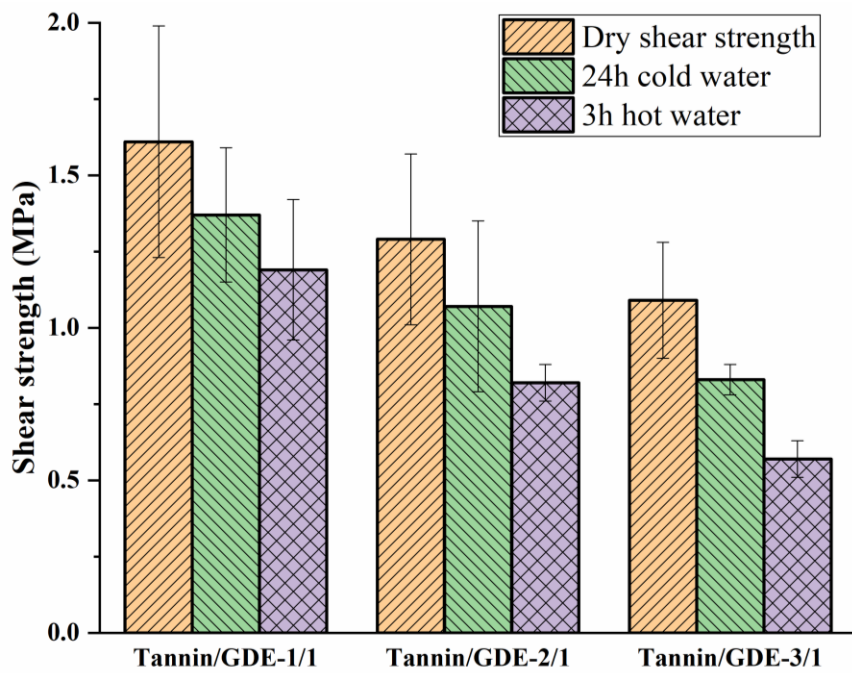
**Figure 1** A foreseeable reaction and structure between tannin and GDE



**Figure 2** Thermomechanical analysis (TMA) curves of Tannin/GDE adhesives with different proportion



**Figure 3 TGA (a) and DTG (b) curves of Tannin/GDE adhesives with different proportion (under air atmosphere)**



**Figure 4 The bonding performance of Tannin/GDE adhesives with different proportion**

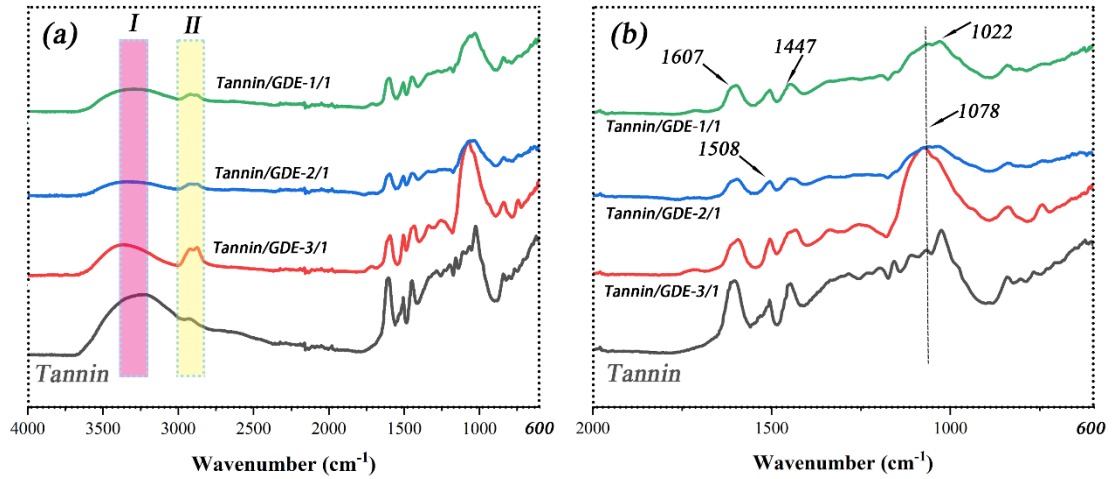


Figure 5 FT-IR spectra comparison of raw tannin and tannin/GDE wood adhesives.

(a) The wavenumber is from 600-4000  $\text{cm}^{-1}$ ; (b) The wavenumber is from 600-2000  $\text{cm}^{-1}$ .

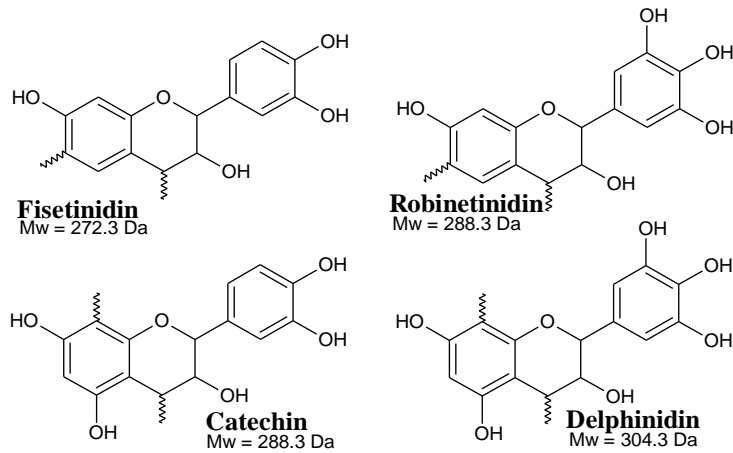
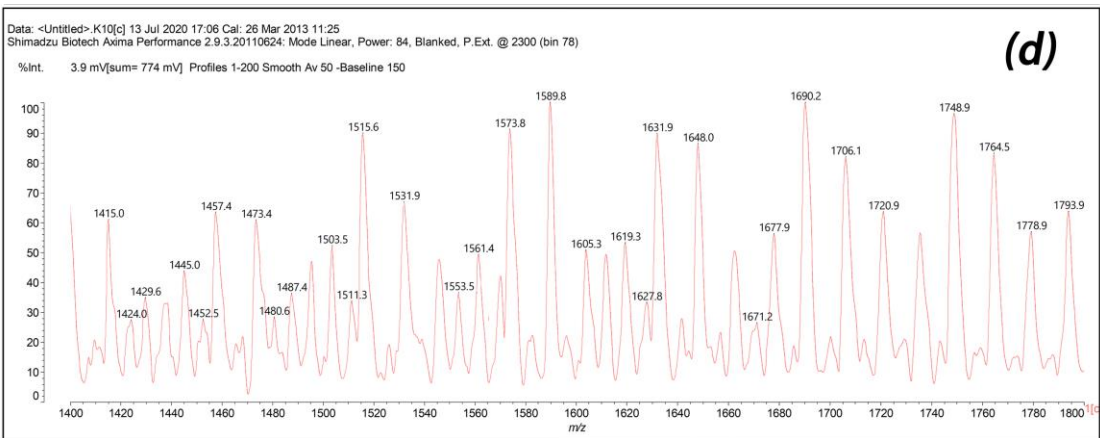
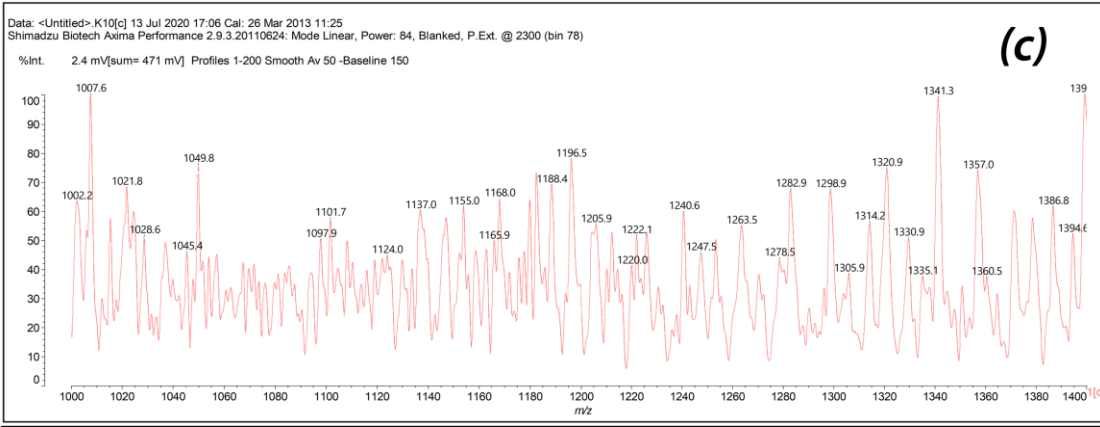
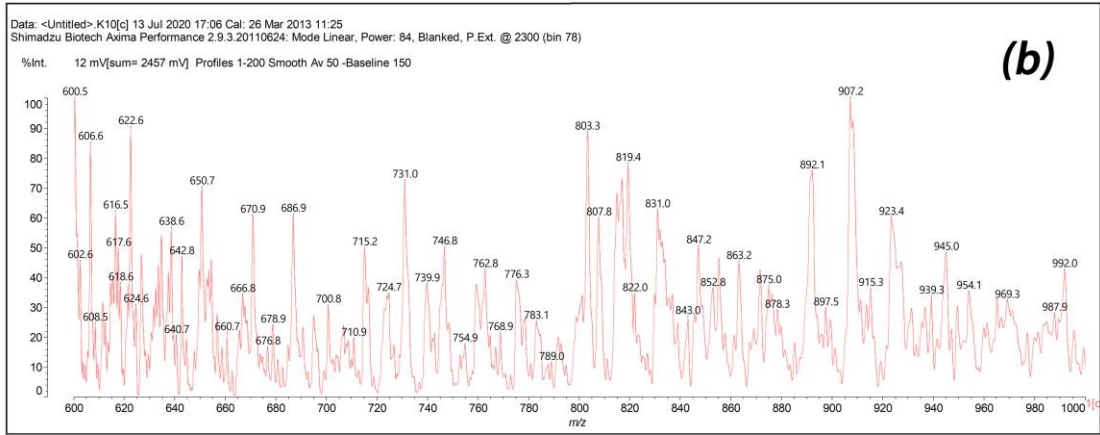
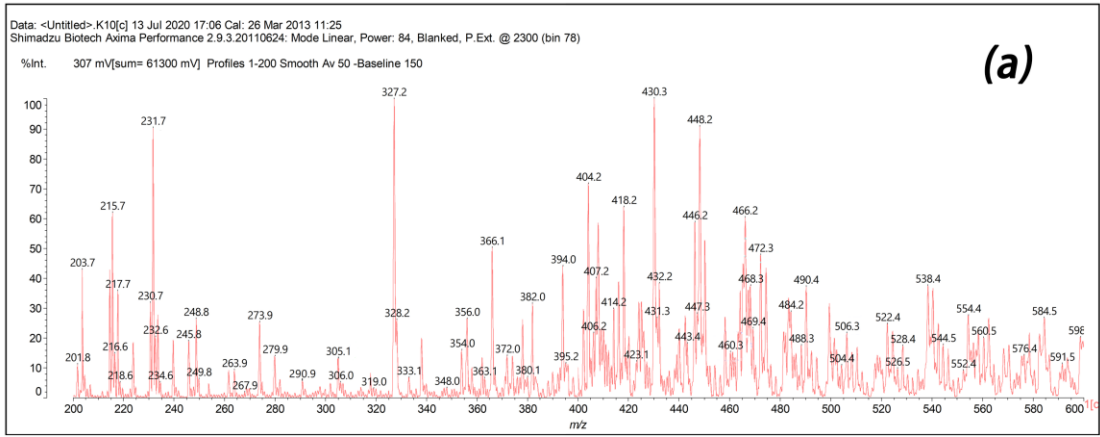
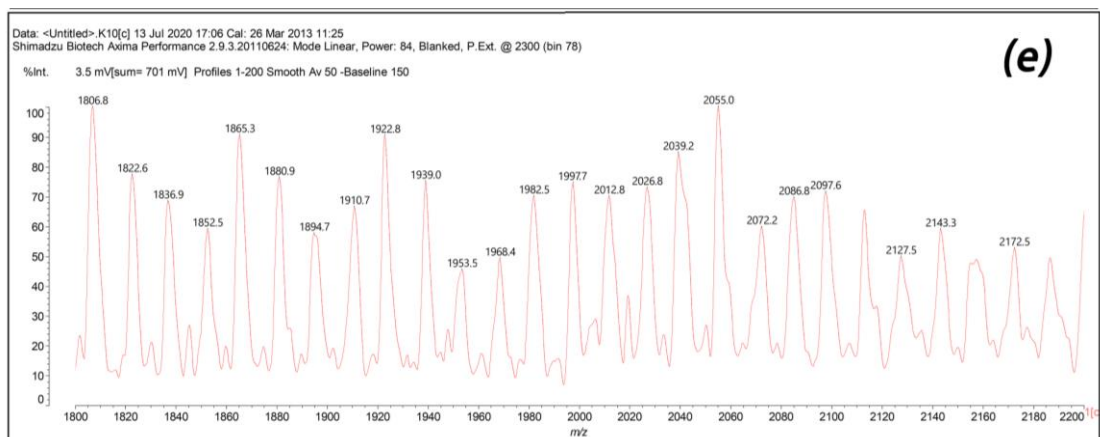
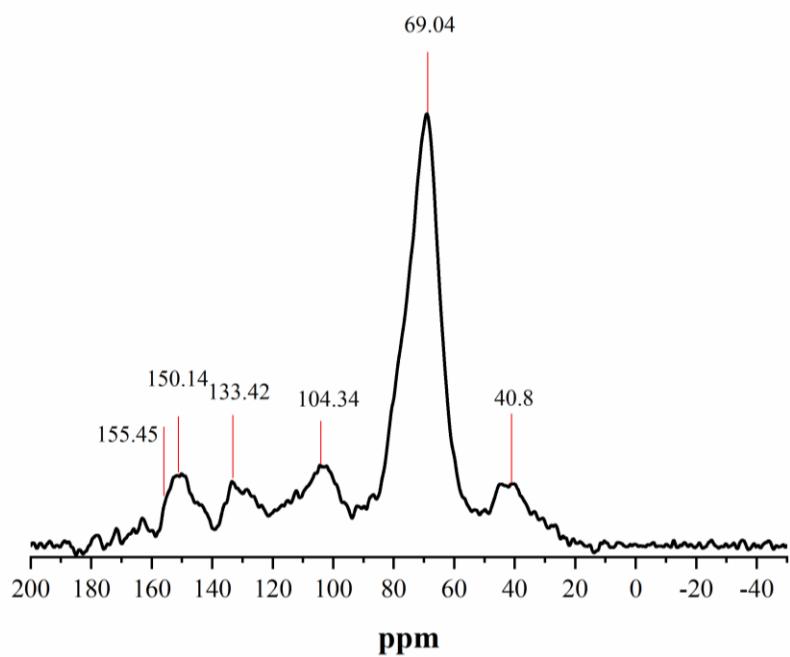


Figure 6 The four basic type structures of mimosa tannin





**Figure 7 The MALDI-TOF spectra of tannin/GDE wood adhesive (tannin/GDE-1/1), (a) 200-600Da, (b) 600-1000 Da, (c) 1000-1400 Da, (d) 1400-1800 Da and (e) 1800-2200 Da**



**Figure 8 Solid state  $^{13}\text{C}$  NMR spectrum of tannin/GDE-1/1 sample**