molecules

*Supportiing Information*

# Synthesis of lignin-based phenol terminated hyperbranched polymer

**Lionel Longe [1], Gil Garnier [2,*] and Kei Saito [1,*]**

[1] Monash University, School of Chemistry, Bioresource Processing Research Institute of Australia (BioPRIA), Clayton 3800, Australia
[2] Monash University, Department of Chemical Engineering, Bioresource Processing Research Institute of Australia (BioPRIA) Clayton 3800, Australia
* Correspondence: kei.saito@monash.edu ; gil.garnier@monash.edu

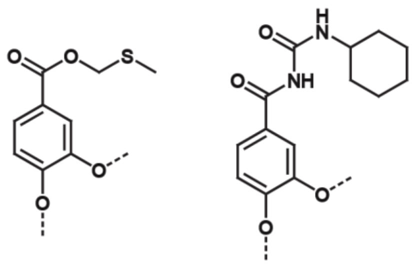

**Figure S2:** Carboxylic acid can react with activated DMSO or bind with DHU to form methylthiomethyl ester (left) or *N*-acylurea (right) structures

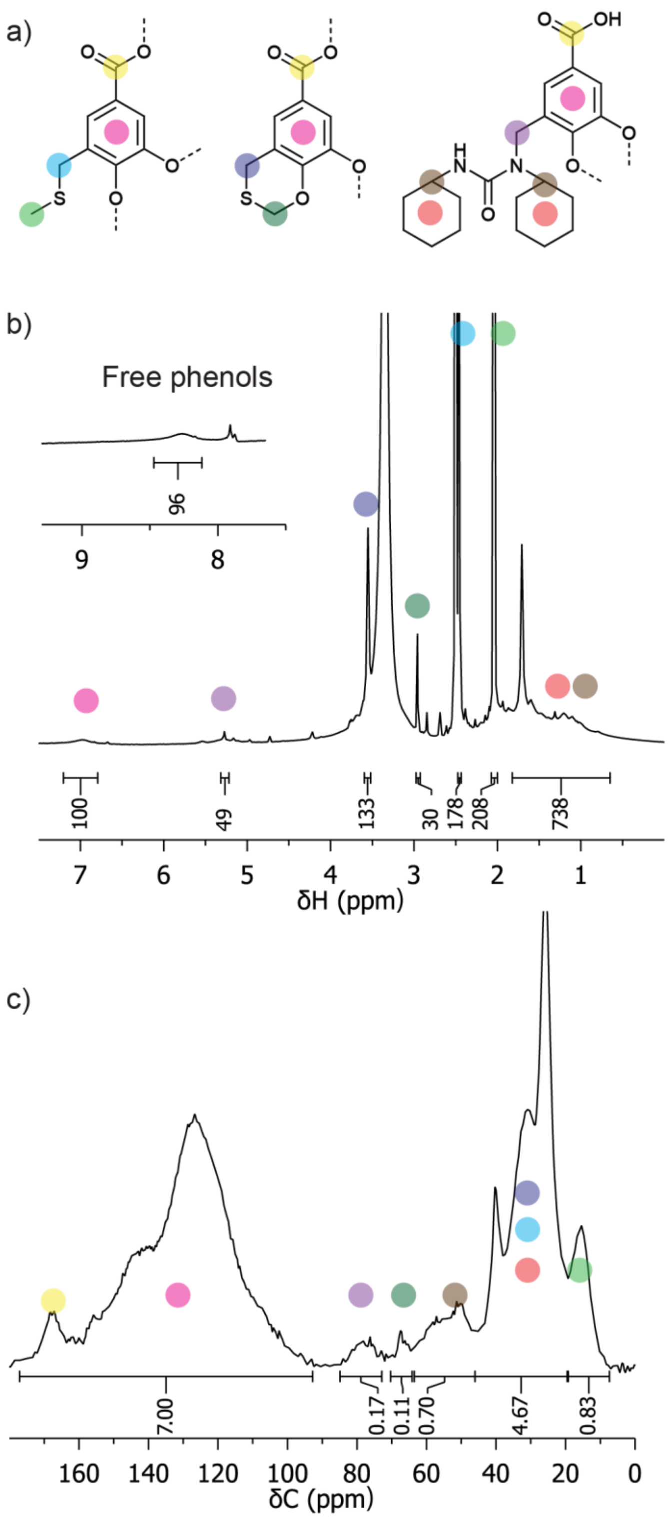


**Figure S1:** a) Three different structures that can arise from DMSO activation by DCC and reaction with PA b) 1H NMR of PA-polymer highlighting evidence of side reactions in d6-DMSO c) 13C NMR of PA-polymer in d6-DMSO

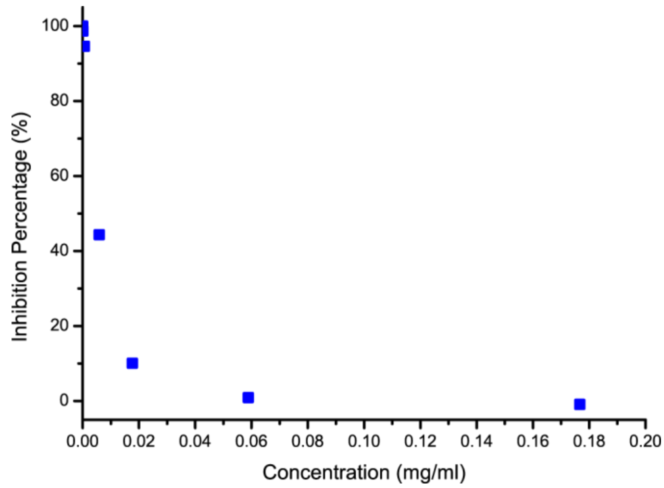


**Figure S3:** Inhibition percentage of ascorbic acid versus concentration. Measured by bleaching of DPPH at 515 nm during radical scavenging assays[1]

**Table S1:** Antiradical efficacy of ascorbic acid compared to literature

| | $EC_{50}$ (mg/ml) | Antiradical efficacy (mmol) [a] |
|---|---|---|
| ascorbic acid | 0.0052 | 12.7 |
| ascorbic acid [1] | / | 12.0 |

[a]: DPPH equivalents per gram of material

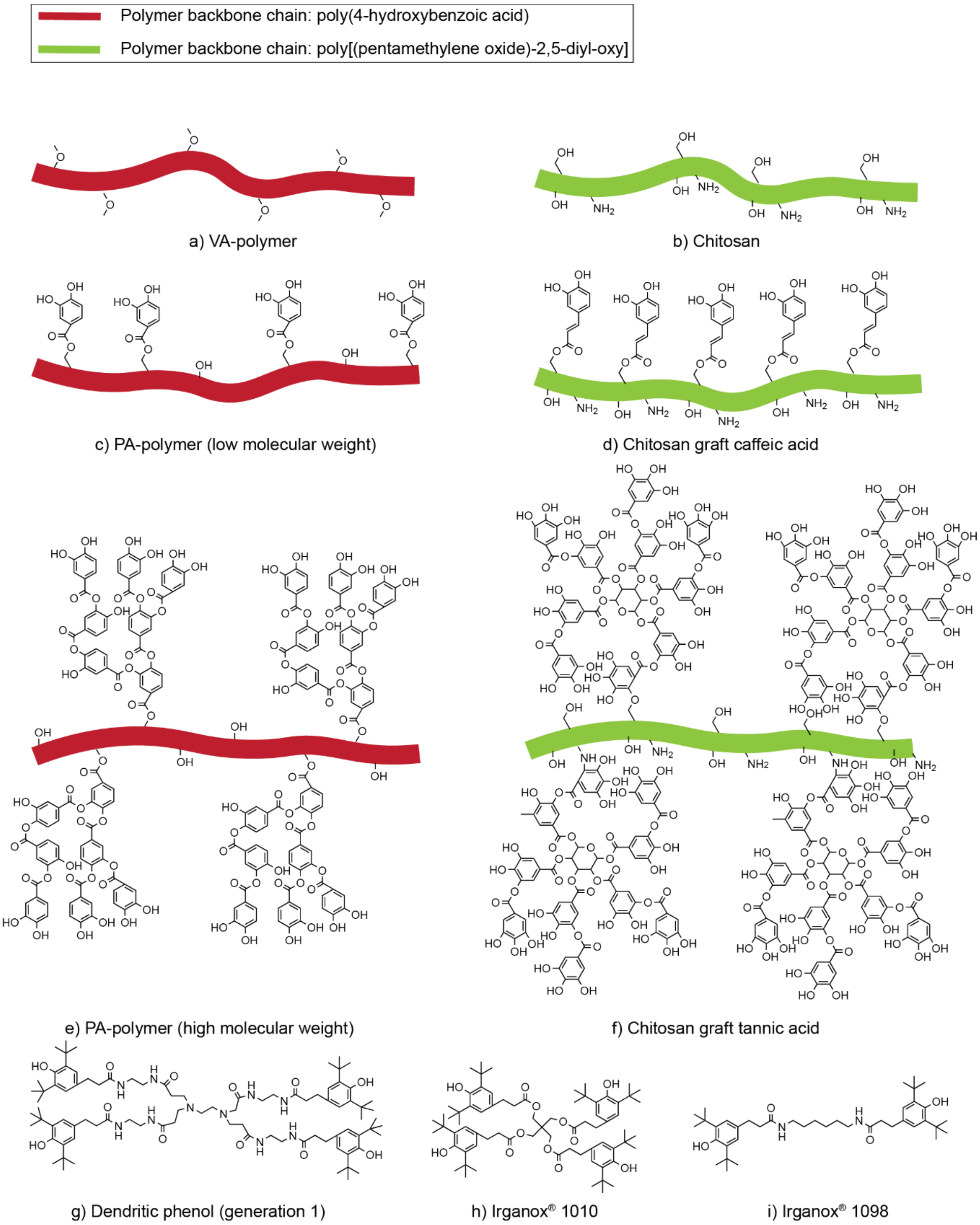


**Figure S4:** Structure of synthesised polymers (a, c, e) and literature (b, c, f, g) and commercially available (h, i) antioxidant.

## References

1. Omidi, S., Kakanejadifard, A. Modification of chitosan and chitosan nanoparticle by long chain pyridinium compounds: Synthesis, characterization, antibacterial, and antioxidant activities. *Carbohydr. polym.*, **2019** *15*; 477-485