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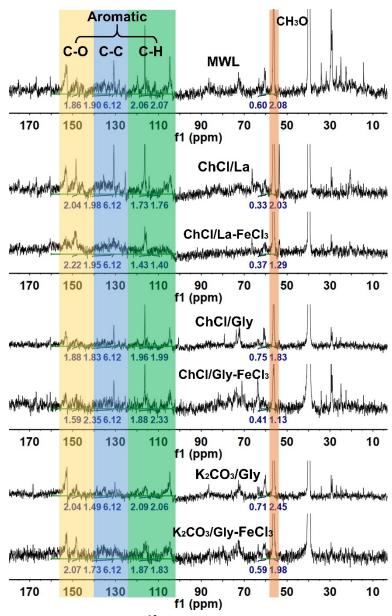


Fig. S1. Quantitative <sup>13</sup>C NMR spectra of MWL and DES lignins.

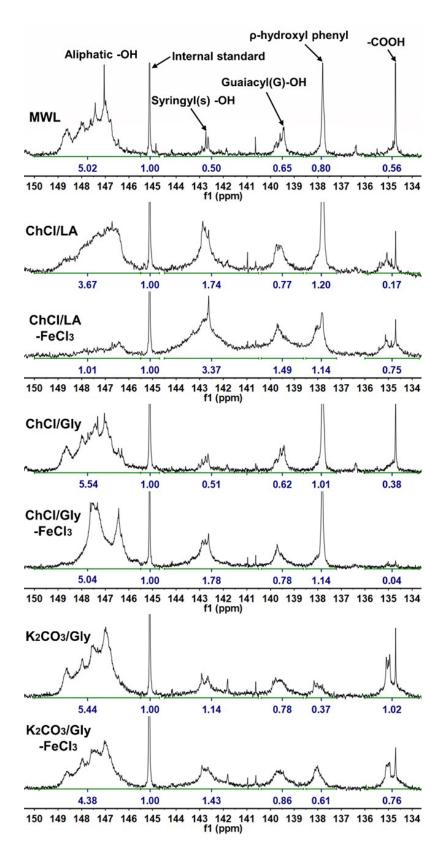
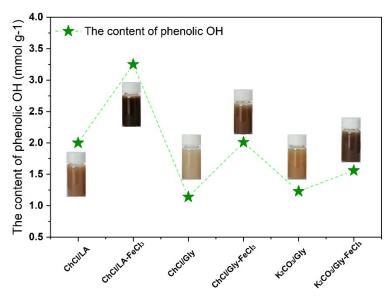


Fig. S2. Quantitative <sup>31</sup>P NMR spectra of MWL and regenerated lignins.



**Fig. S3**. The content of phenolic-OH and its corresponding digital photo of these DES lignin nanospheres.



Fig. S4. Photographs of Baby Bok Choy after feeding Mythimna separata at different times.