

OR076

Biomass valorization: antioxidant supramolecular ionic liquid gels from cellulose acetate and cellulose

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Gels are soft materials, very common in everyday life (toothpaste, hair gels), and used in a wide range of applications, for example to remove emerging pollutants from wastewaters [1], or in controlled drug release [2]. On the other hand, nowadays, the use of lignocellulosic biomass has sparked great interest due to its abundance, eco-compatibility, and renewability. In addition, it does not compete with food production, and can be obtained at lower costs as compared to agriculturally valuable food crop feedstocks.

This work presents the use of biomass-derived polymers and ionic liquids to obtain gels. In particular, cellulose acetate and cellulose are employed as gelators while ionic liquids are used as solvent. We tested their swelling, porosity and self-healing ability. We also carried out rheological analysis, which revealed peculiar rheological properties. Finally, we evaluated their antioxidant ability using the 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) assay, and we found that some of them are efficient as antioxidants.

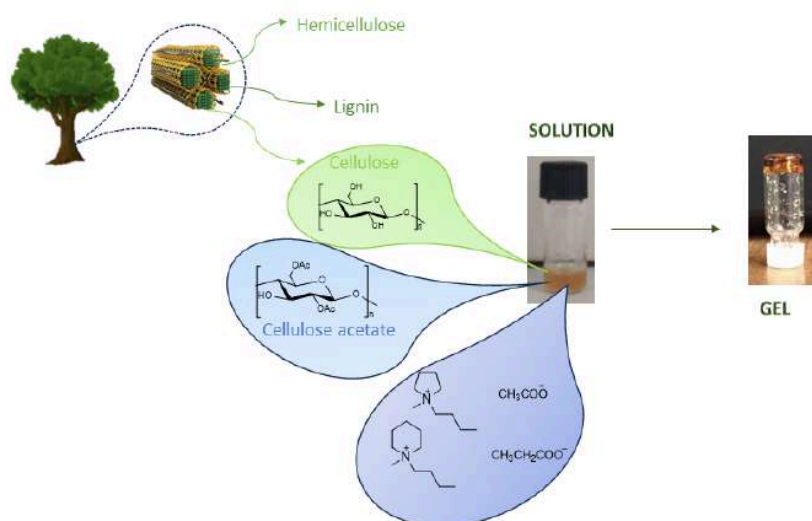


Figure 1: General scheme.

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[2] J. A. Sa'ez, B. Escuder, J. F. Miravet, *Chem. Commun.*, 46, (2010), 7996–7998