

## Polysaccharide-based ionogels as sustainable antioxidant and antimicrobial materials

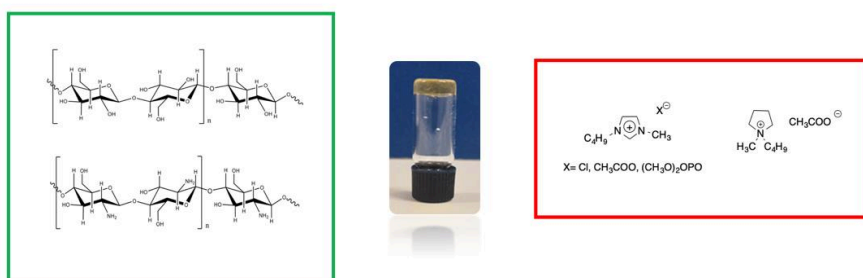
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Materials are ubiquitous in everyday life, which makes their impact relevant from an environmental point of view. Consequently, the use of functional materials deriving from safe and renewable resources can be a viable strategy to pursue sustainable development. In this context, biocompatible materials endowed with antioxidant and antimicrobial abilities are especially sought in fields like food packaging and medical equipment. Bearing this in mind, in the framework of our interest in supramolecular and polymer gels in non-conventional solvents,<sup>1-3</sup> we obtained and characterized polysaccharide-based gels in ionic liquids (ILs). In particular, we considered naturally occurring polymers like the cellulose, chitin, lignin as well as chitosan.

Both single polymers or their binary mixtures were employed as gelators. Moreover, we employed ILs bearing aliphatic or aromatic cations, with anions like acetate, chloride and dimethylphosphate, reported in Figure 1.



An advantage of these gels is that they can be obtained without requiring any cross-linker agent. We characterized the gels obtained for their porosity and swelling as well as for their mechanical properties by oscillatory rheology measurements. In addition, we probed the morphology of our gels by Scanning Electron Microscopy (SEM). Then, we assessed the antioxidant ability of our gels, by the DPPH assay, finding that all the gels are efficient and fast antioxidants, with the gels in acetate-based ILs acting faster.

Finally, we investigated the antimicrobial activity of the gels towards *E. Coli*, finding in all cases significant antimicrobial activity, particularly for the gels of Chitosan/Chitin in the IL [bmim][Cl].

### References:

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- [2] B. Saavedra, A. Meli, C. Rizzo, D. J. Ramon, F. D'Anna, *Green Chem.* **2022**, *23*, 6555.
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