Dissolution of Biopolymers in Biocompatible Ionic Liquids

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In this work, we present a novel process for achieving an efficient dissolution of a natural composite using biocompatible ionic liquids. Cork, a material of vegetable origin, is the bark of the cork oak (*Quercus suber*), whose main component is suberin, a complex aromatic biopolymer structurally related to lignin and, accordingly, highly resistant to degradation and dissolution. The characteristics of the cork infra-red spectrum are fully known. This allows the use of ATR-FTIR fingerprints as a methodology for the high-throughput screening of the compositional and/or structural alterations caused by a given solvent in contact with it. Ionic liquids are classified as "green" alternative solvents, entirely composed of ions, cations (positively charged) and anions (negatively charged). Their complex dual nature controls their solvent quality. Five main cations and a set of inorganic or carboxylated anions, were tested. Remarkably, the biocompatible cholinium-based ionic liquids showed impressive solvent qualities, both at the efficiency and the selectivity level. We have recently verified that this cation family presents low toxicity and provokes minor metabolic alterations in the growing cultures of the eukaryotic organisms. Therefore, this constitutes one the first reports where a proven biocompatible ionic liquid acts as an excellent solvent for biopolymers, opening avenues for further exploitation of ionic liquids in white technology processes.