

Preparation of novel gelatine-based drug delivery systems – application to model anti-inflammatory drug

The combination of the chemical versatility of an ionic liquid with the morphological flexibility of gelatine has recently generated a new gelatine-based biomaterial, Ionjelly®. The excellent tuneable solvent power of ionic liquids mixed with the biocompatibility and bioavailability of a natural biopolymer like gelatine, makes this innovative material an excellent candidate for developing new drug delivery systems, an important potential application that remains unexplored.

In this work, supercritical fluid (SCF) technology will be explored for producing novel gelatine-based drug delivery systems. The work plan starts with the development of new Ionjelly® materials. Several non-toxic ionic liquids (ILs) will be synthesized in order to develop innovative biocompatible materials. A relevant breakthrough of this research work will be the opportunity to explore the use of '*Third Evolution of Ionic Liquids*', in which a specific biological activity is introduced through one of the ions, making of the ionic liquid the active principle ingredient (API). Then, the behaviour of Ionjelly® materials will be studied in scCO₂ which will be fundamental to determine the best SCF methodology to apply for the efficient preparation of the delivery systems. Finally, drug delivery systems will be prepared and characterized by Differential Scanning Calorimetry (DSC), Scanning Electronic Microscopy (SEM) and Transmission Electron Microscopy (TEM). In addition delivery systems will also be evaluated for drug load and release profiles in simulated gastric and intestinal fluids.