

## **Tailoring hybrid aerogels for drug delivery**

The biodegradability and biocompatibility of hybrid aerogels of natural polysaccharides makes them promising as drug delivery systems. They possess good biological compatibility and cell or enzyme-controlled degradability, while having very high porosity and specific surface areas that makes them highly attractive in drug delivery. Drug bioavailability is a major challenge in the use of several compounds for the treatment of human ailments, and the loading of aerogels with drugs has been shown to enhance their bioavailability. One of the ways in which the aerogel enhances the bioavailability of a drug is by increasing its solubility, by interrupting the organized crystalline network of the solid drug. Additionally, the aerogels may be tailored to target specific organs or cells, by making them respond to changes in pH, temperature and general chemical environment. Our project aims to develop methodology for an easy, rapid and cost-effective synthesis of polysaccharide aerogels, while researching their potential as drug delivery systems by immobilizing model drugs in the matrix. For this purpose, commercially available and extracted polysaccharides will be combined with biocompatible crosslinkers through the sol-gel method to develop hydrogels, which will then be supercritically dried with CO<sub>2</sub> to produce the aerogels. Then, physicochemical properties of model drugs will be compared, as free solids and immobilized in the aerogel matrix.