

Edible aerogels: new materials for food industry?

Raman Subrahmanyam^{1),3)}, David Andlinger²⁾, Baldur Schröter¹⁾, Ulrich Kulozik²⁾, Xinyang Zhang¹⁾, Isabella Jung¹⁾, Pavel Gurikov¹⁾, Irina Smirnova¹⁾,

¹⁾ Institut für Thermische Verfahrenstechnik, Hamburg University of Technology (D)

²⁾ ZIEL, Technical University of Munich

³⁾ Aerogelx UG

Aerogels are highly porous materials, which can be produced from a large variety of starting compounds. Among those are polysaccharides, proteins and other biomolecules (to name a few), which are biocompatible by nature. By now, the potential of such bioaerogels is still not fully understood. However, this class of aerogels can be produced from several bio-feedstock and biomass sources with highly desirable properties such as biocompatibility, biodegradability, tunable density and high accessible functionalized surface. These properties are highly attractive in the development of novel high added-value bio-products for nutrition, foods, pharma, bio-medical, personal care as well as other market sectors.

Recently, we have prepared several classes of aerogels, which can be directly consumed and therefore used in the food industry as carrier of active compounds, fillers, dietary fibers, thickening agents etc. Among those are aerogels based on cellulose, alginates, whey proteins, potato proteins etc. (fig.1)

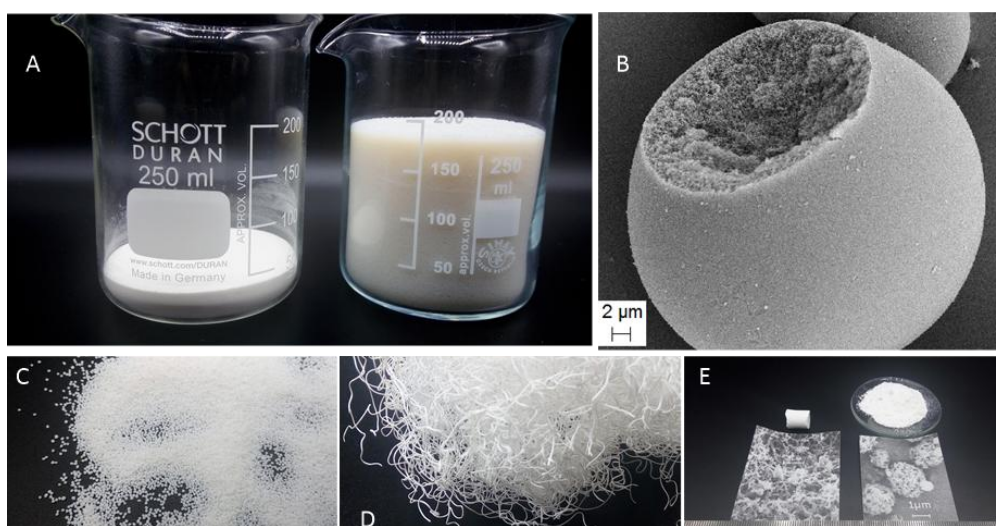


Figure 1. A) dry **alginate** biopolymer: conventional (left) vs aerogel (right); B) **whey protein** aerogel nano-structure C) granular **cellulose** aerogel D) vs **cellulose** aerogel fiber; E) **starch** aerogel monolith and powder (picture source: TUHH and Aerogelx)

In this contribution we discuss different techniques of producing edible aerogels in form of monolith, particle and fibers and demonstrate their properties and potential applications in the food industry. Special attention is given to the gel formation, solvent exchange and supercritical drying of each type of aerogels in terms of the full process optimization.