FOODGRADE AEROGELS

Intelligent nutrient and drug release

nanohybrids.eu

NEW GENERATION OF NANOPOROUS ORGANIC AND HYBRID AEROGELS FOR INDUSTRIAL APPLICATIONS

Nano Hybrids

Which substances are represented

Alginate and cellulose based aerogels proved to be appropriate for the application in the food sector: edibility, renewability, sustainability and relatively low cost of these polysaccharides make them an attractive starting material of functional food. The aqueous biopolymer solutions can easily be processed to highly porous networks without the need and production of health endangering substances. For instance, the substance requirements for the production of small alginate particles are limited to $CaCO_3$, acetic acid, ethanol and rapeseed oil.

Properties and advantages

Small (1 – 30 µm) and spherical aerogel particles are advantageous for consumption, particularly for a comfortable mouthfeel during chewing and swallowing. The accessibility of the pores and the affinity of the surface to flavors, drugs and other functional ingredients are important factors for the application of aerogels as additives in food and as drug delivery systems. The controlled drug release depends on factors such as pH dependent swelling and dissolution, which contribute to the overall release kinetics. Furthermore, release profiles vary on network density and cross-linking degree allowing the precise modulation of release kinetics. Drug delivery kinetics may also be varied by the application of coating on the particle's surface.

Application potential

Perhaps the most studied application area suggested for polysaccharide aerogels is drug delivery, as aerogels may serve as a hosting matrix for active compounds and nutraceuticals. In food formulations, polysaccharide aerogels could also function as dietary fibre (e.g., cellulose) or as a source of energy. They can also be utilized as mechanical support structures in food packaging and water absorbents in active packaging.

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