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# SCALE-UP OF ALGINATE AEROGEL MICROPARTICLES PRODUCTION: DEVELOPMENT OF A CONTINUOUS EMULSION-GELATION METHOD

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Due to their large surface area, aerogels can be efficiently used in the development of functional food and in pharmaceutical formulations as carriers for minor components and active ingredients [1,2]. A wider range of potential applications in gas treatment, humidity control and other areas can also be foreseen. To fulfil requirements of many potential applications aerogels should be often prepared in the form of round (micro)particles of a specific size.
The idea that a gelling system (sol) may be shaped into spherical particles underlies the so-called emulsion gelation method. In this process the gelation reaction takes place in a continuous phase (oil) that is immiscible with the sol. Stirring and surfactants keep the sol dispersed and once the desired emulsion is formed the gelation is triggered either chemically or physically. The resulting gel particles of micrometer sizes (0.5 – 200 µm) should be recovered, solvent exchanged and supercritical dried. The emulsion gelation process is exemplified by various gelling systems such as polysaccharides (e.g. alginate, chitosan, starch) [3–6] and silica [7].
This contribution focuses on the scale-up of the emulsion-gelation process with a continuous set-up applied to the alginate system. The high shear rate developed in an inline rotor stator machine during the emulsification allows for a significant decrease in both particle size (4 – 120 µm) and surfactant concentration. Parameters controlling the gelation in emulsion are discussed and an approach to separate the gel microparticles from the oil is presented. Finally, the gel microparticles are solvent exchanged to ethanol and supercritically dried to obtain aerogel microparticles.

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