



## Nano structures for food applications

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Recently, nanotechnology emerged as one of the most promising and attractive research fields, with applications ranging from the aerospace to health industries. Food Industry can also benefit from nanotechnology applications – e.g. this technology offers the potential to improve bioavailability and solubility of different functional ingredients or multilayer films at the nano scale may improve transport properties of bioplastics.

The Pilot Plant Laboratory from CEB has been working on development different nanostructures with potential for food applications. Examples of such research are given in this presentation.

Nanoemulsions of  $\beta$ -carotene were prepared using a high-energy emulsification–evaporation technique. Process parameters such as time and shear rate of homogenization affected significantly particle size distribution in terms of volume-weighted mean diameter and surface-weighted mean diameter. Those nanoemulsions showed a good physical stability during 21 days storage. The stability was evaluated by the maintenance of size distribution. However,  $\beta$ -carotene retention inside the micelles and color were affected by storage.

As for nanolaminates, our research allowed characterizing the surface properties, water vapor permeability, and thermal and mechanical properties of a nanolayered film. The film was produced using two polysaccharides with opposite charges, chitosan and sodium alginate deposited on to aminolyzed/charged PET. Contact angle measurements showed differences in the films with a successively higher number of layers. SEM images allowed the measurement of the thickness of the layers. The properties of the obtained nanolayered film were significantly different from the ones measured in aminolyzed/charged PET, showing potential for application of such structures.