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Said Bouhallab, Guilherme Miranda-Tavares, Anne Laure Chapeau, Pascaline Hamon, Thomas Croguennec. Interaction/Coacervation between food proteins : Mechanisms and potential application. Journées scientifiques Matière molle pour la science des aliments : Compréhension et Structuration, Oct 2015, Montpellier, France. hal-01454546

HAL Id: hal-01454546

<https://hal.science/hal-01454546>

Submitted on 5 Jun 2020

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Interaction/Coacervation between Food Proteins: Mechanisms and Potential Application

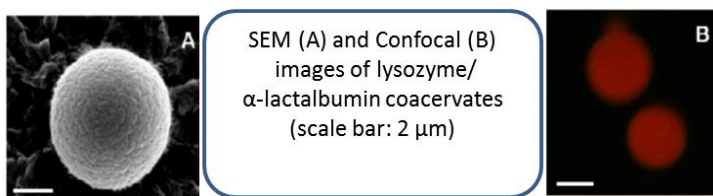
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Abstract: The application of fundamental physicochemical concepts for rational design of functional assemblies from food proteins constitute a response to the growing trend toward the development of new and innovative food products and also an opportunity to generate new protein-based supramolecular structures with new applications. Because of their omnipresence in food systems and their biodegradability, proteins are the focus of many attempts for their use as building blocks for such supramolecular structures. Controlled self- co-assembly of proteins can generate a variety of supramolecular structures that vary in shape, size and density (fibrils, spherulites, nanotubes, etc). For instance, coacervates can be formed in heteroprotein systems by control mixing of oppositely charged proteins.¹ The objective of our research is to understand the mechanisms behind such spontaneous coacervation process from molecular interaction to micro-scale characterization. In this presentation, we will summarize the results obtained on several binary protein systems and will show that co-assembly of proteins into coacervates (Figure 1) is a generic process that is, de facto, independent of the amino acid composition. We will report on the requirements that drive such spontaneous co-assembly: protein conformational state and flexibility, molar stoichiometry, total protein concentration, charge anisotropy, etc. Mention will be made to the research challenges and the promising uses of these supramolecular structures in food and non-food sectors (encapsulation of bioactives, design of edible films).



[1]: S., Bouhallab and T., Croguennec. Adv. Polym. Sci. 2014,256, 67–102