Rheological properties of lactoferrin/β-lactoglobulin complex coacervates

Hachfi Soussi Rima, Marie-Hélène Famelart, Florence Rousseau, Pascaline Hamon, Said Bouhallab

▶ **To cite this version:**

Hachfi Soussi Rima, Marie-Hélène Famelart, Florence Rousseau, Pascaline Hamon, Said Bouhallab. Rheological properties of lactoferrin/β-lactoglobulin complex coacervates. 17èmes Journées de la Matière Condensée, la Division de Physique de la Matière Condensée de la Société Française de Physique, Aug 2021, Rennes Edition virtuelle, France. hal-03279359

HAL Id: hal-03279359
https://hal.inrae.fr/hal-03279359v1

Submitted on 6 Jul 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

Minicolloque n° 2 **√ Oral** **□ Poster**

RHEOLOGICAL PROPERTIES OF LACTOFERRIN/β-LACTOGLOBULIN COMPLEX COACERVATES

Soussi, H.R.*, Famelart M.H., Rousseau F., Hamon, P., Bouhallab S.

INRAE, Institut Agro, STLO, F-35042 Rennes, France

* email : rima.hachfi-soussi@inrae.fr

Complex coacervation is a liquid-liquid phase separation that leads to the formation of a highly concentrated phase or coacervates. The formed coacervates are proposed as carriers for bioactives thanks to their high encapsulation efficiency under mild processing conditions.

Despite its multiple use, especially in the fields of food science, little has been reported on heteroprotein complex coacervation. In our previous work, we reported on the ability of two globular proteins, lactoferrin (LF) and β-lactoglobulin (β-LG) to form coacervates under specific physicochemical conditions [1]. In the present work, we aimed to characterize the rheological properties of the formed LF/β-LG coacervates. We show that unlike some polysaccharide/protein systems, LF/β-LG coacervates has a liquid-like behavior; the loss modulus G" being 100 times higher than the storage modulus G'. This behavior was confirmed under creep-recovery tests. In addition, the coacervates exhibited a Newtonian viscous flow under low shear rate and a shear thinning behavior above 10 s-1. These results suggest a structural change probably due to the weaknesses of electrostatic interactions inside the proteins network at high shear rates. The structural rearrangement was proved to be reversible and time-dependent.

These results bring a new light on the interactions involved in concentrated protein solutions and open new avenues for the use of coacervates as texturizing agents in food matrices.

Key words: Complex coacervation, Co-assembly, Rheology, β-Lactoglobulin, Lactoferrin.

[1]. Tavares, G. M., Croguennec, T., Hamon, P., Carvalho, A. F. & Bouhallab, S. Selective coacervation between lactoferrin and the two isoforms of β-lactoglobulin. (2015) Food Hydrocolloids 48, 238–247.