



How much protein kinds influence the morphology of the resulting powder?

Céline Sadek, Huashan Li, Pierre Schuck, Yannick Fallourd, Nicolas Pradeau, Cécile Le Floch-Fouéré, Romain Jeantet

► To cite this version:

Céline Sadek, Huashan Li, Pierre Schuck, Yannick Fallourd, Nicolas Pradeau, et al.. How much protein kinds influence the morphology of the resulting powder?. Food Structure and functionality forum symposium, Mar 2014, Amsterdam, Netherlands. Food Structure (Etats Unis), 2014, Food Structure. hal-01209598

HAL Id: hal-01209598

<https://hal.science/hal-01209598>

Submitted on 2 Jun 2020

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.

Title:

How much protein kinds influence the morphology of the resulting powder?

Authors & affiliations:

Céline Sadek ^{a,b,c}, Huashan Li ^b, Pierre Schuck ^{b,c}, Yannick Fallourd ^a, Nicolas Pradeau ^a, Cécile Le Floch-Fouéré ^{c,b}, Romain Jeantet ^{c,b}

^a United Pharmaceuticals, F-75000 Paris, France

^b INRA, UMR1253, F-35000 Rennes, France

^c Agrocampus Ouest, UMR1253, F-35000 Rennes, France

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Spray drying is a well-established technique to convert a liquid solution into individual and solid particles which is widely used in food industry especially in the dairy sector. This process allows formation of a large range of particle morphology all distinct from each other by their physical characteristics (distribution of the particle size, particle shape and particle density) providing to particles a typical aerodynamic behaviour and determining their final functionality (flowability, dispersibility, wettability, etc.). In dairy industries, controlling physical properties of powder represent a key issue to facilitate the industrial hand-use and optimize the rehydration. Therefore, understanding how the final shape of the particle is formed has recently become a huge scientific concern. So far, much attention has been paid to the so called process – product relationships, most often considering theoretical models based on drying kinetics to predict the shell formation and the morphology of dairy powders. However, the way the protein kind influence the particle morphology remains a hot topic. In this study we focused on the drying behaviour of two major milk protein concentrates: whey protein isolate and native micellar caseins. To acquire a better understanding on the role of each protein in the particle forming mechanisms, seven mixtures containing different ratios of caseins and whey proteins were investigated. A micro-fluidic-jet-spray-dryer (MFJSD) was used to produce uniform particles by drying monodisperse droplets in a hot and dry air flow. Powders were characterized with regard to their physical characteristics and their rehydration properties. Besides, characterisation of particle size and shape was ensured by means of a dynamic image analysis system. It is shown that particle morphology is mainly governed by the protein material type, almost regardless of the drying kinetics; controlling the product formulation thus represents a potential means to tune particle morphology, and therefore powder functional properties.