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► To cite this version:

Marie Chevallier, Alain Riaublanc, Christelle Lopez, Pascaline Hamon, Florence Rousseau, et al.. Stability of whey protein emulsions to heat treatments is mainly governed by the stability of the proteins in the aqueous phase. 16. Food Colloids Conference, Wageningen University and Research Centre (WUR). Wageningen, NLD., Apr 2016, Wageningen, Netherlands. 33 p. hal-02743577

HAL Id: hal-02743577

<https://hal.inrae.fr/hal-02743577v1>

Submitted on 3 Jun 2020

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**pEI-17****Stability of whey protein emulsions to heat treatments is mainly governed by the stability of the proteins in the aqueous phase**

Marie CHEVALLIER^{1,2}, Alain RIAUBLANC³, Christelle LOPEZ^{1,2}, Pascaline HAMON^{1,2}, Florence ROUSSEAU^{1,2}, Thomas CROGUENNEC^{1,2}.

¹ INRA, UMR 1253 – STLO, 65 rue de Saint Briec 35000 Rennes, France.

² Agrocampus Ouest, UMR 1253, 65 rue de Saint Briec 35000 Rennes, France.

³ INRA, UR 1268 – BIA, rue de la Geraudière, F-44316 Nantes, France.

Native milk proteins are natural surfactants used to emulsify and to stabilize dairy emulsions. However, at high protein concentrations, they do not sufficiently stabilize emulsions against flocculation, coalescence, aggregation or gelation during processing such as heat treatments and manufacturers used to add non-dairy additives to prevent above mentioned detrimental instabilities. Identification of alternative ways to protect dairy emulsions against instabilities without using non-dairy additives is an active research area in order to match with new market trends (clean label tendency). Alternatives using whey protein aggregates were suggested to be more efficient than native whey proteins to stabilize emulsions at high protein concentration (Çakir-Fuller, 2015) but the exact mechanism is not completely clarified especially in an industrial context where whey protein ingredients contain variable amounts of caseins, peptides, etc.

To address this question we investigated the protein interfacial composition and the stability of dairy emulsions reconstituted with 30% milk fat and 3 to 6% whey protein (model whey protein ingredient) solutions unheated or heated prior to homogenization. Heating whey protein solutions at pH 7.0 prior to homogenization allowed the production of 70 nm-sized protein aggregates. Emulsions stability was determined by visual observation, granulometry and confocal laser scanning microscopy (CLSM) after heating the samples at 120°C up to 30 min. Emulsions prepared with unheated whey proteins did not show any sign of macroscopic instabilities up to 30 min of heating at 120°C at low protein concentration (3%) but a gradual decrease of heat stability when protein concentration increased. Instability at high protein concentration is due to protein aggregation or gelation in the aqueous phase with the participation of protein-coated fat globules. In the opposite, emulsions formed with whey protein aggregates are destabilized as soon as 10 min of heating at 120°C for low protein concentration (3%) but are more stable at higher concentration. The destabilization at low protein concentration is governed by the aggregation of interfacial whey protein aggregates leading to fat globule flocculation and emulsion thickening. The stability of the emulsions at protein concentration higher than 4% is correlated to the stability of the aggregates in the aqueous phase and the decrease of the proportion of whey protein aggregates at the oil/water interface due to increasing competition with peptides and caseins naturally present in the model whey protein powder.

E, Çakir-Fuller (2015) Food Hydrocolloids, 47, 41-50.