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Impact of whey protein aggregates on texture perception in yogurts

Hanna Lesme, Cécile Rannou, Catherine Loisel, Delphine Queveau,
Marie-Hélène Famelart, Said Bouhallab, Carole Prost

► To cite this version:

Hanna Lesme, Cécile Rannou, Catherine Loisel, Delphine Queveau, Marie-Hélène Famelart, et al..
Impact of whey protein aggregates on texture perception in yogurts. Colloque Biopolymers 2017
(2017-11-29-2017-12-01) Nantes (FRA)., Nov 2017, Nantes, France. , 2017. hal-01698129

HAL Id: hal-01698129

<https://hal.science/hal-01698129>

Submitted on 2 Jun 2020

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CONTEXT



Valorization of milk proteins (PROFIL 2013-2019) :

- Promote their multifunctional properties
- Create dairy products without additives
- Create new textures

Development of novel whey protein aggregates with valuable properties

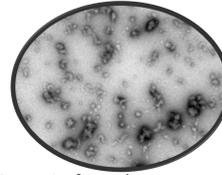
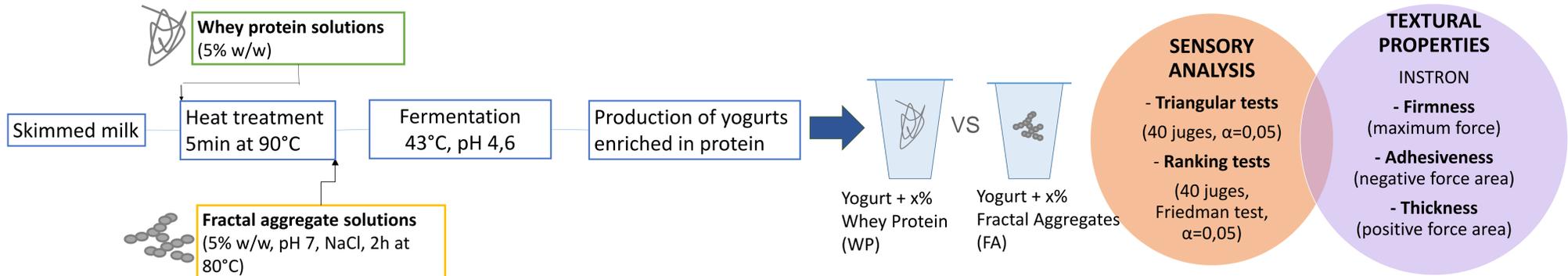


Figure 1 : fractal aggregates (TEM)



What is the impact of the addition of fractal aggregates on texture properties of low fat set yogurts?

MATERIAL AND METHODS



RESULTS AND DISCUSSION

The impact of fractal aggregates on texture of low fat yogurts was studied showing overall good correlation between instrumental measurements and sensory analysis

- Yogurt firmness \nearrow with the increase of protein concentration (figure 2) \Rightarrow which is perceived in sensory analysis leads to a significant \nearrow of firmness perception (figure 3).
 - **Fractal aggregates increase firmness of low fat set type yogurts**
- At the same protein concentration, yogurt enriched in fractal aggregates is significantly less firm than yogurt enriched with whey proteins (Figure 2) \Rightarrow The sensory difference between yogurts enriched with whey proteins and with fractal aggregates is perceived from 0,5% of protein added (Table 1).
- Same trend observed for other parameters measured instrumentally (adhesiveness and thickness)
 - **Regarding firmness, fractal aggregates are less effective than whey proteins however others texture characteristics may be modified (adhesiveness and thickness)**

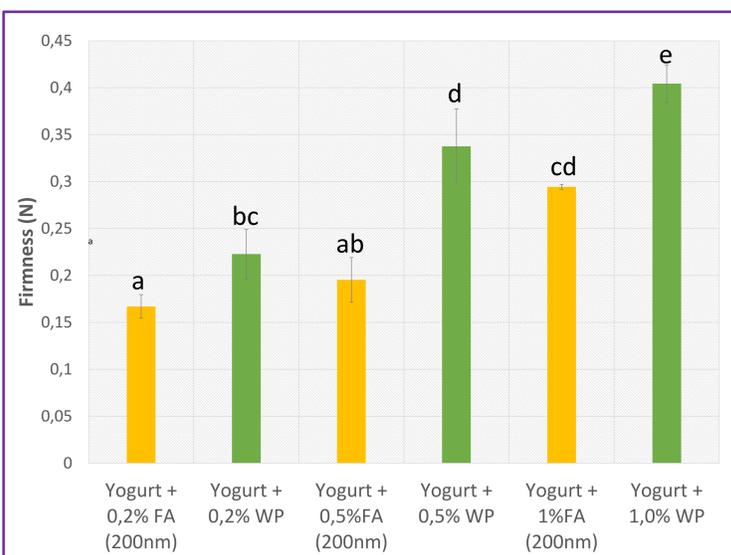


Figure 2 : firmness measurement in yogurts enriched in whey proteins or fractal aggregates.

| | Total number of judges | Number of correct answers | Significant difference between samples |
|----------------------------|------------------------|---------------------------|--|
| Yogurt+ 0,2% WPI/fractals | 40 | 17 | NO |
| Yogurt + 0,5% WPI/fractals | 40 | 24 | YES * (p=0,00049 < 0,05) |

Table 1 : Impact of whey proteins and fractal aggregates on the perception on low fat set yogurts at different concentrations

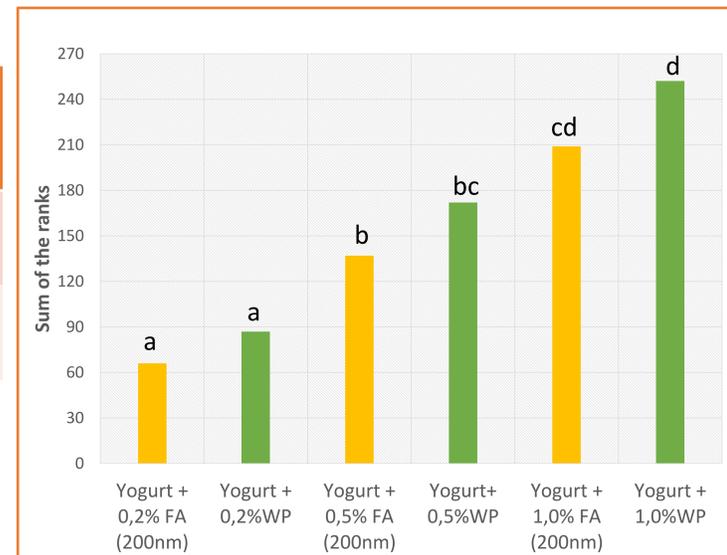


Figure 3 : texture perception of yogurts enriched in whey proteins and fractal aggregates at different concentrations.

- Panelists are not able to perceive texture differences at Yogurt+0,2%FA and Yogurt+0,2%WP of added proteins (figure 3) even if the samples are significantly different regarding firmness (figure 2).
- Panelists are able to perceive texture differences between Yogurt+0,2%FA (200nm) and Yogurt+0,5%FA (figure 3) even if there is no significant difference in firmness (figure 2).

➢ **The addition of fractal aggregates might have an impact on other texture parameters such as viscosity or smoothness**

CONCLUSIONS AND PERSPECTIVES

- Fractal aggregates can be used to modulate low fat set yogurt texture
- Similar trends were observed for bigger fractal aggregates (1000nm) but the increase of firmness was less important than the one with fractal aggregates (200nm)
- Textural properties of fractal aggregates < textural properties of whey proteins regarding firmness. However fractal aggregates might impact other texture parameters such as smoothness.
- Further sensory analysis will be conducted to characterize other texture attributes (smoothness, adhesiveness, thickness ...)
- Applications of fractal aggregates could be in high-protein yogurts : increase of the protein content while keeping a smooth texture