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Control of the whey protein-stabilized emulsion texture in a large range of concentration

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Research Questions

- How to design whey protein emulsions at high protein concentrations (replace native whey proteins by heat-stable aggregated whey proteins)
- New trends in Europe driven by consumer’s expectations
- How to control the texture of whey protein emulsions in a large range of protein concentrations without non-dairy additives?

How to control the texture of whey protein emulsions in a large range of protein concentrations without non-dairy additives?

How to design whey protein emulsions at high protein concentrations that are fluid after heating in the absence of non-dairy additives?

Heat stable emulsions are obtained at high whey protein concentration in the absence of stabilizing agent:
- By adding sufficient amount of caseins to cover oil droplets surface (control of the size and stability of the oil droplets)

Heat stability of whey protein emulsions (pH 7)

- By selecting large and dense whey protein aggregates (small number, low interfacial adsorption rate and low reactivity on heating)

Emulsion texture changes with the oil droplet surface composition

Heat stable emulsions are obtained at high whey protein concentration in the absence of stabilizing agent:
- By selecting low density/elongated whey protein aggregates
- In combination with the homogenization pressure, use caseins as emulsifiers to control the size of the oil droplets (distance between oil droplets)

Texturized emulsions are obtained at low whey protein concentration in the absence of gelling agent:
- By selecting low density/elongated whey protein aggregates
- By using whey protein strands as « connector » at the surface of the oil droplets (size of the aggregates – distance between oil droplets)
- In combination with the homogenization pressure, use caseins as emulsifiers to control the size of the oil droplets (distance between oil droplets)

Heat induced whey protein network

Caseins (with homogenizing pressure, they control the oil droplet size and the distance between oil droplets)

Caseins

Oil droplets

Whey protein strands

(networking agent)