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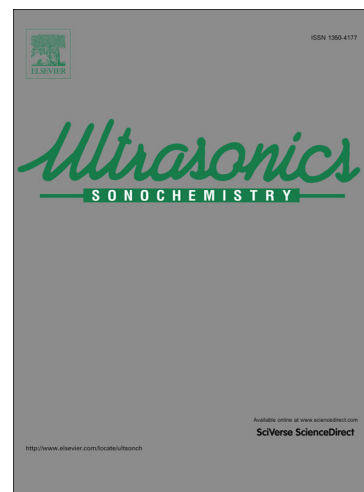
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Functionalised dairy streams: Tailoring protein functionality using sonication and heating

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Highlights

- Casein and whey protein functionality was modified by ultrasound and heat
- Heating of concentrated casein alone or in the presence of whey proteins, resulted in impaired gel formation
- Heating of whey protein in isolation prior to combining with casein, did not impair gelation
- Ultrasound could partially reverse the effects of heating less concentrated whey protein solutions

Abstract

Ultrasound can be used to modify the functional interactions between casein and whey proteins in dairy systems. This study reports on ongoing developments in understanding the effect of ultrasound and heating on milk proteins in systems with modified casein-whey protein ratios (97:3, 80:20 and 50:50), prepared from milk protein concentrates that were fractionated by microfiltration, based on protein size. Heating of concentrated casein streams (9% w/w) at 80 °C for up to 9 minutes resulted in reduced gelation functionality and increased viscosity, even in the absence of added whey proteins. 20 kHz ultrasonication at 20.8 W calorimetric power for 1 min was able to break protein aggregates formed during heating, resulting in improved gelation and reduced viscosity. Interestingly, when heated whey protein was recombined with unheated casein the gelation properties were similar to unheated controls. In contrast, when heat treated casein streams were recombined with unheated whey protein, the gel forming functionality was reduced. This study therefore shows that using specific combinations of heat and/or ultrasound, fractionated dairy streams can be tailored for specific functional outcomes.

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