

Structure and Formation of Dairy Yogurts Based on Different Casein: Whey Protein Ratios

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Background

Dairy proteins are precursors of a variety of bioactive peptides that can improve human health. As a preliminary step to investigate the role of dairy peptides on **Type II Diabetes**, the aim of this study is to formulate fat-free, high protein content model yogurts with a higher ratio of **whey** to casein proteins.

Methods

Thermal treatment

70 C for 27 min | 75 C for 16 min
80 C for 5 min

Rheology: thermal treatment

Geometry: cup & bob | Frequency: 0.5Hz | Strain: 0.01%
Temperatures: up to 70 C for 27 min, 75 C for 16 min, 80 C for 5 min at 1 C/min

Fermentation

Sample inoculation and incubation at 42 C until pH 4.6 is reached

Rheology: fermentation

Geometry: cup & bob | Frequency: 0.5Hz | Strain: 0.01% Temperature: 42 C

Microscopy

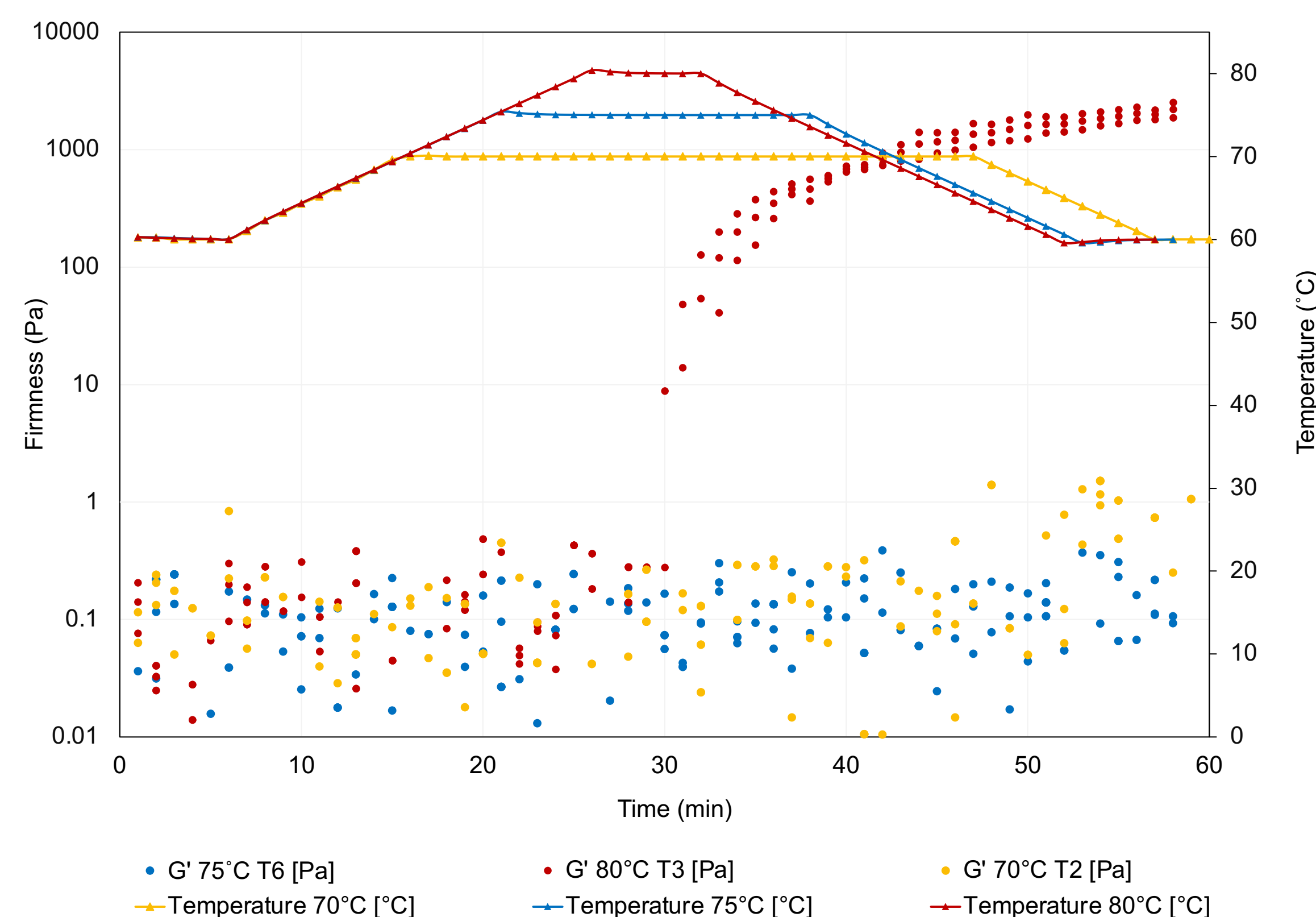
Rhodamine B 1%

Composition

Solutions	4:1 (g)	1:1 (g)
Skimmed Milk Powder	26.7	16.7
Whey Protein Isolate	0	4.1
Water	72.3	73.1
Yogurt Bacterial Culture	1	1
Lactose	0	5.1

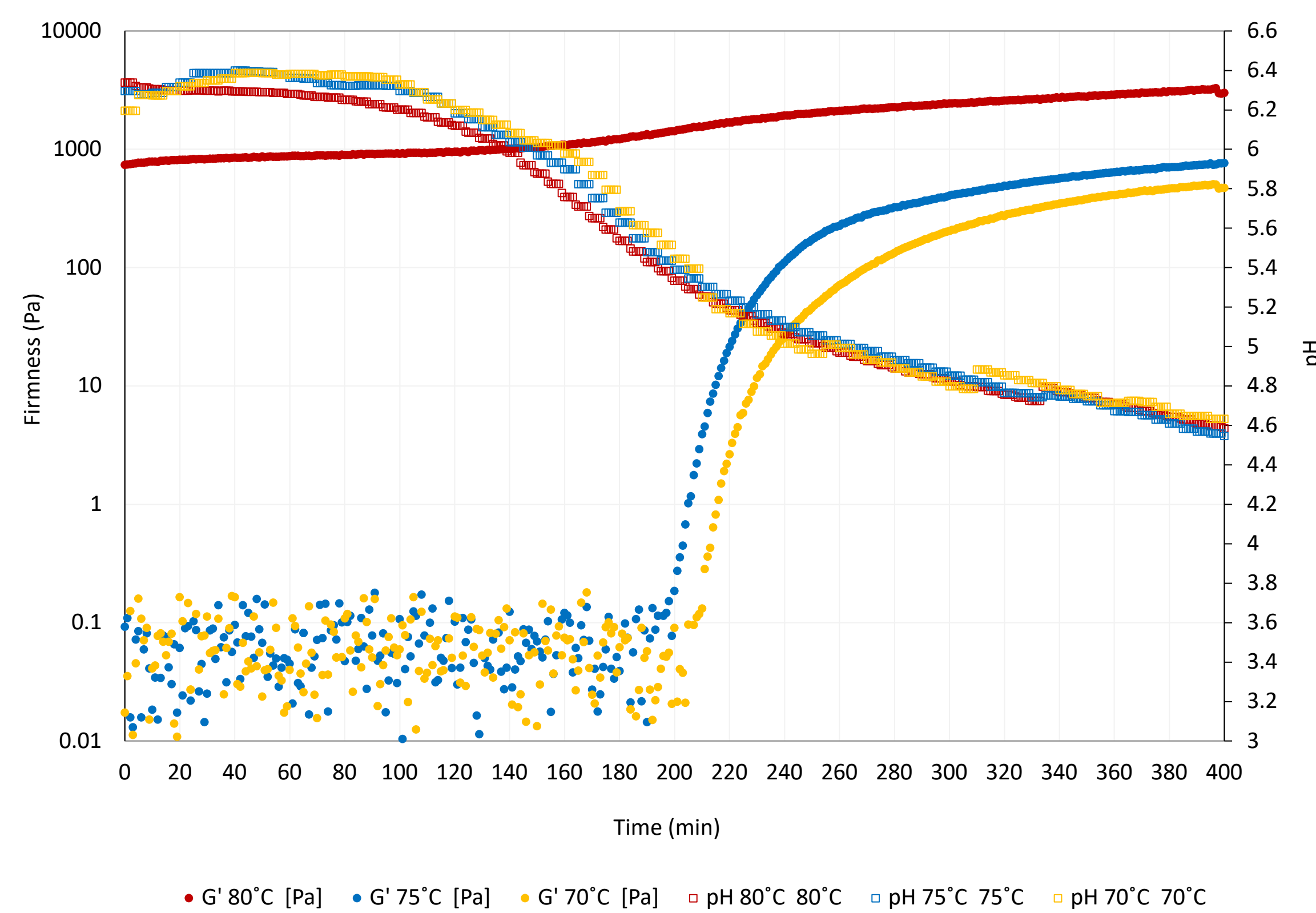
Rheology: Thermal Treatment

Gelling profile of **1:1 dairy solution** 10% protein at different temperatures and durations

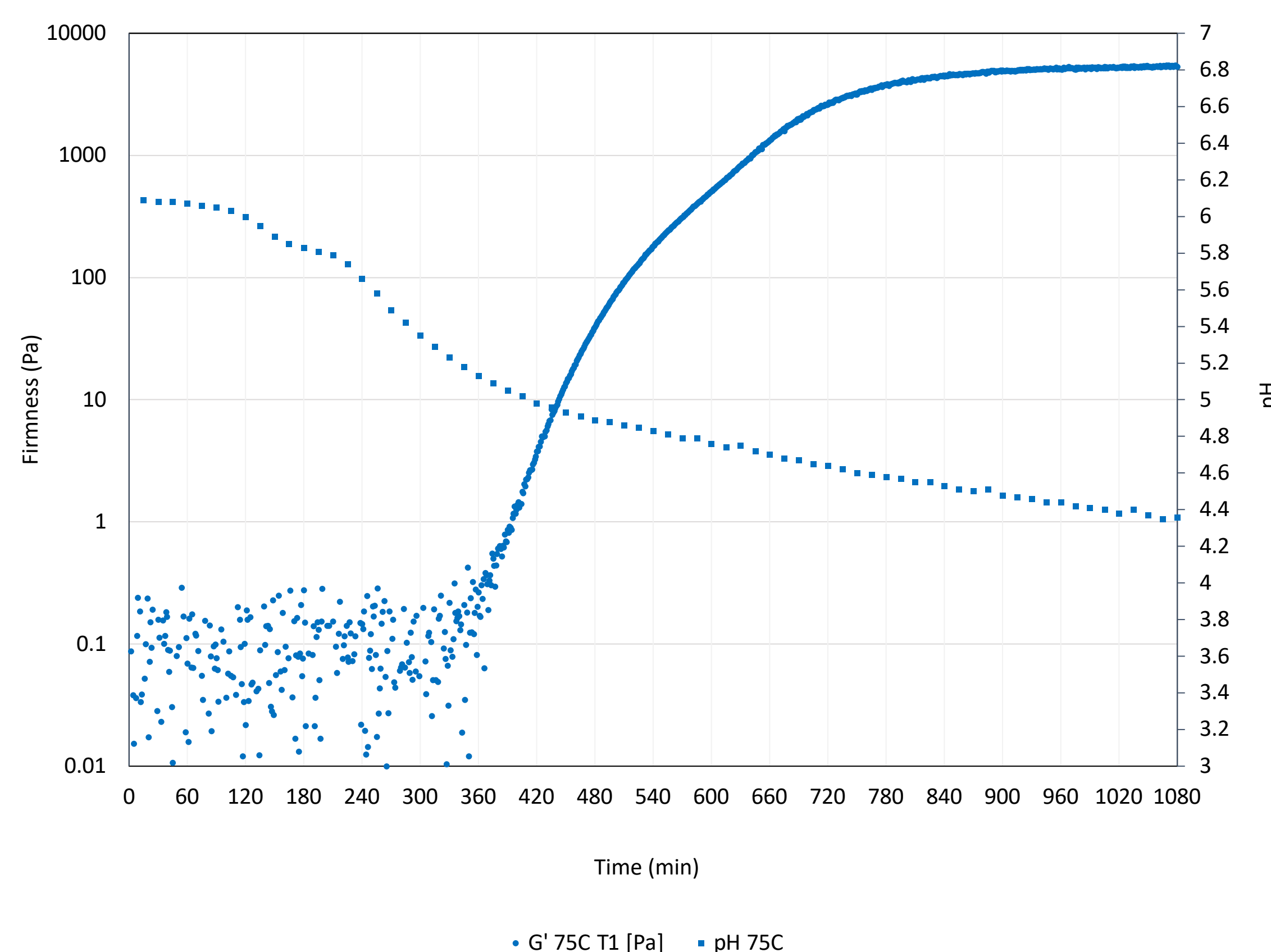


Rheology: Fermentation

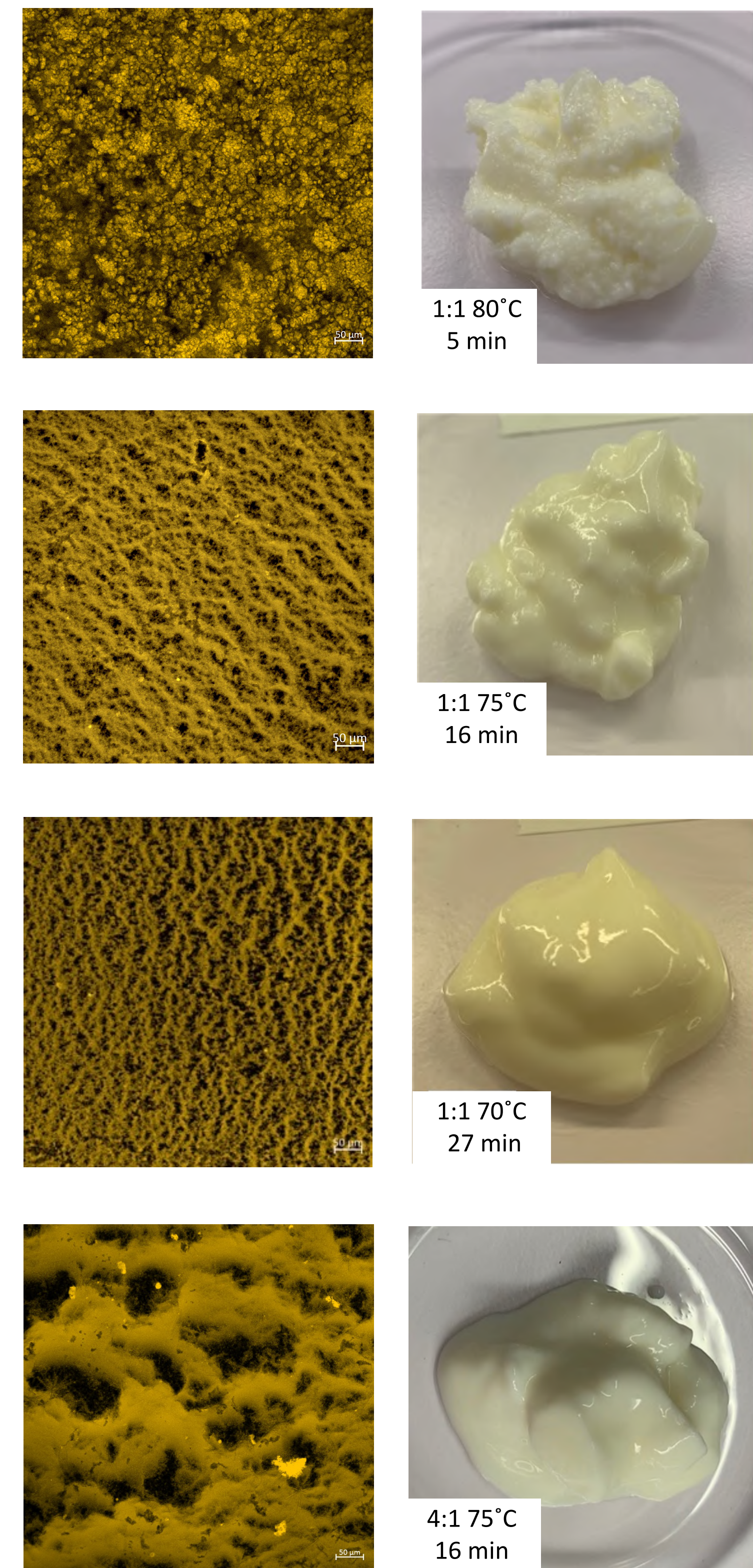
Gelling profile of **1:1 yogurts** heat treated at different temperatures and durations



Gelling profile of yogurt **4:1 (control)** heat treated at 75 C for 16 min during fermentation



Confocal Laser Scanning Microscopy



Conclusion

Thermal treatment temperature highly impacts the microstructure of final yogurt. Yogurt 75 C showed a firmer gel structure with smaller pore size and appropriate texture. This is an indication of sufficient thermal treatment temperature and duration for obtaining a yogurt gel with a higher ratio of whey protein.

References



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