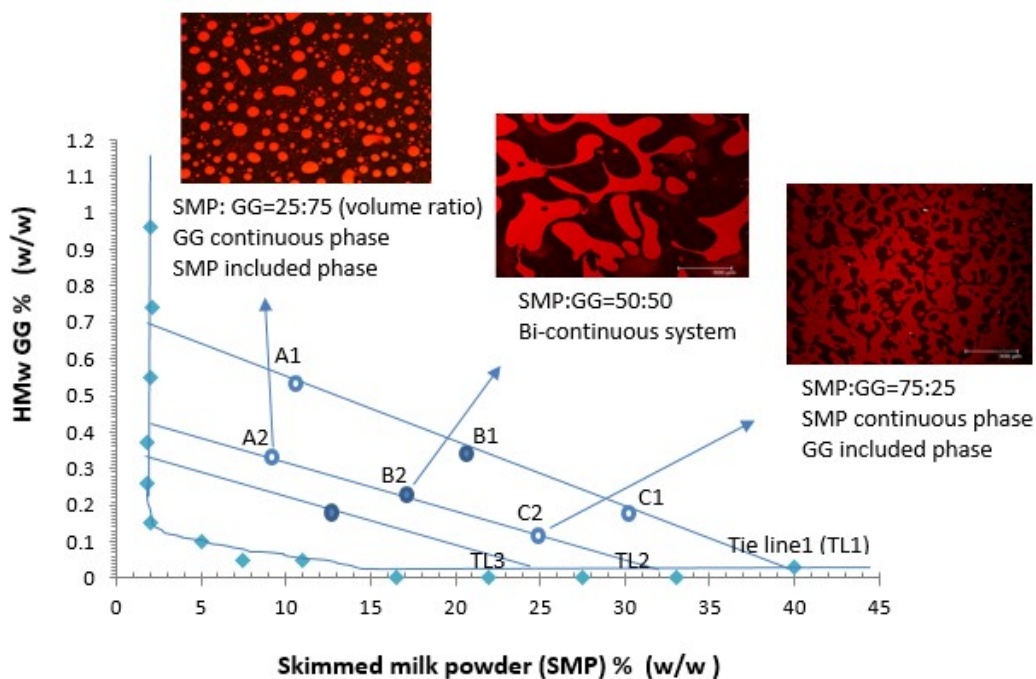
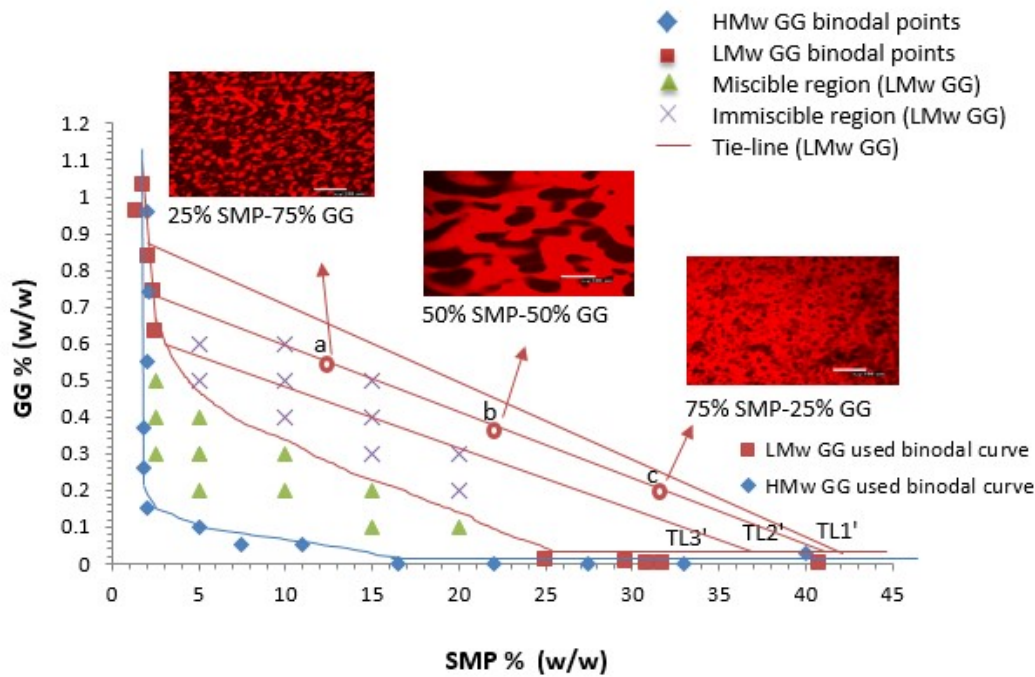


Supplement data

Phase diagrams established in our previous study (Liu, & Foster, 2021).



Result 1. Phase diagram of Skimmed Milk (SMP)/HMw GG mixture system (pH~6.5), at 5 °C; ♦, points of the binodal curve; ●, points of the rectilinear diameter established using the phase volume method; ○, points A2, B2, C2 were different starting mixtures and presented respectively at 25%, 50% and 75% of the length of a same tie line. Tie-line 1 (TL1): SMP-39.5% and GG-0.7%; Tie-line 2 (TL2): SMP-32% and GG-0.43%; Tie line 3 (TL3): SMP-24.5% and GG-0.34%. (Image scale bar: 100µm).

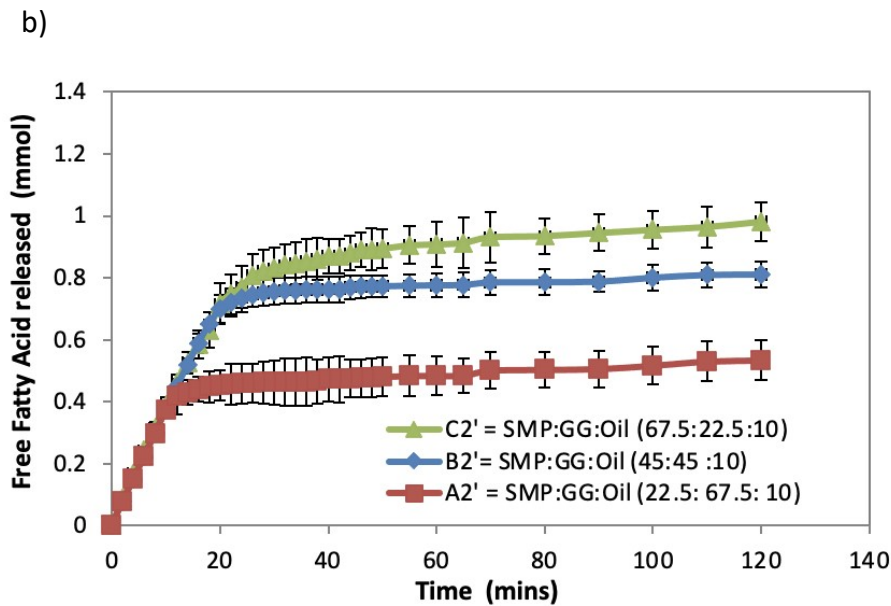
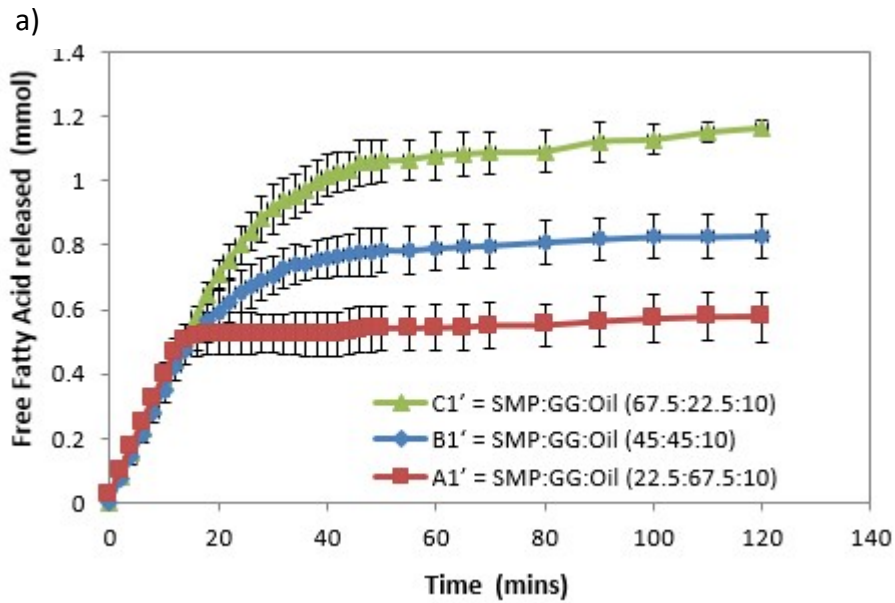


Result 2. Phase diagrams of Skimmed Milk (SMP)/ LMw and HMw GG mixture systems (pH 6.5) at 5 °C; LMw GG phase diagram: Tie-line 1 (TL1'): SMP-42% and GG-0.88%; Tie-line 2 (TL2'): SMP-41% and GG-0.73%; Tie-line 3 (TL3'): SMP-37% and GG-0.6%.

Result 1&2, show the phase diagrams we established previously (Liu & Foster, 2021) using skimmed milk powder (SMP) and guar gum (GG) (with high and low molecular weight). Based on the tie-lines on the phase diagram, it enabled the designation/creation of different emulsion formulations and microstructures.

In this submitted paper manuscript (main text), our research interest is that: we have selected a few typical formulations with different microstructures created previously in result 1&2 (e.g. A1, B1, C1, etc) as a study, to further investigate their *in vitro* digestibility (e.g. to investigate how the structures would change of the designed emulsion during *in vitro* digestion, and whether or not such systems/microstructures can control nutrient digestion and release etc). The samples preparation was available in the method section in main text.

Lipolysis of emulsions with addition of 10% (v/v) sunflower oil.



Result 3: Lipolysis of emulsions A1', B1', C1' from TL1 (a) and emulsions A2', B2', C2' from TL2 (b) with addition of 10% (v/v) sunflower oil (in pH Stat, HMw GG used).

In the submitted manuscript (main text), we have shown the lipolysis of emulsions/formulations at the addition of 20% (v/v) sunflower oil, which shows the lipolysis as following order, $C1' > B1' > A1'$.

In this supplementary data, we also show that, when changing the amount of oil, for instance, at 10% oil, as a comparison to 20%, it was also found that the lipolysis of samples still showed $C1' > B1' > A1'$; $C2' > B2' > A2'$, which conforms the findings presented in the submitted main text (Fig 2).

Reference:

W. Liu, T. J. Foster, *Food Hydrocolloid for Health*. 2021, 100048.