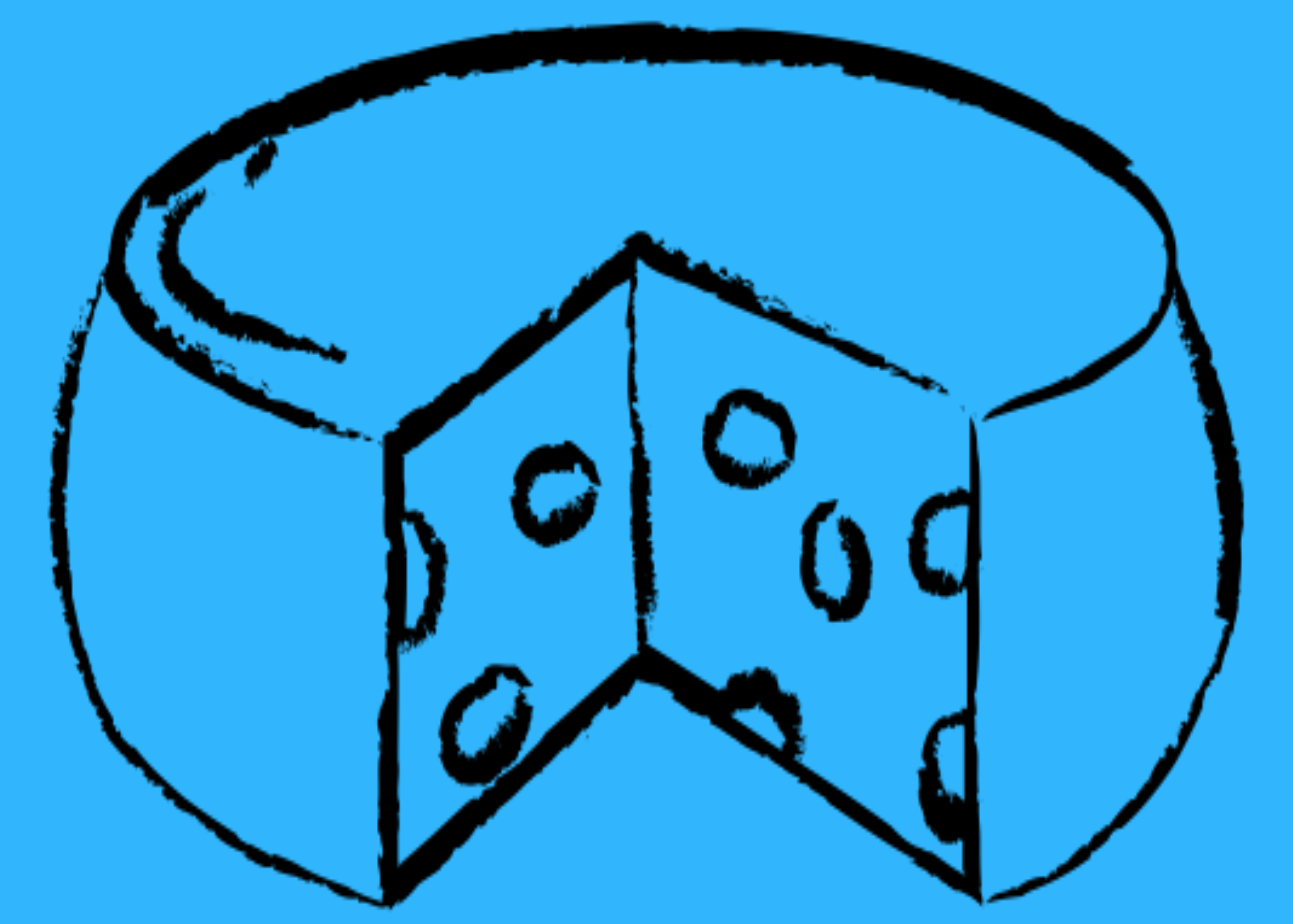


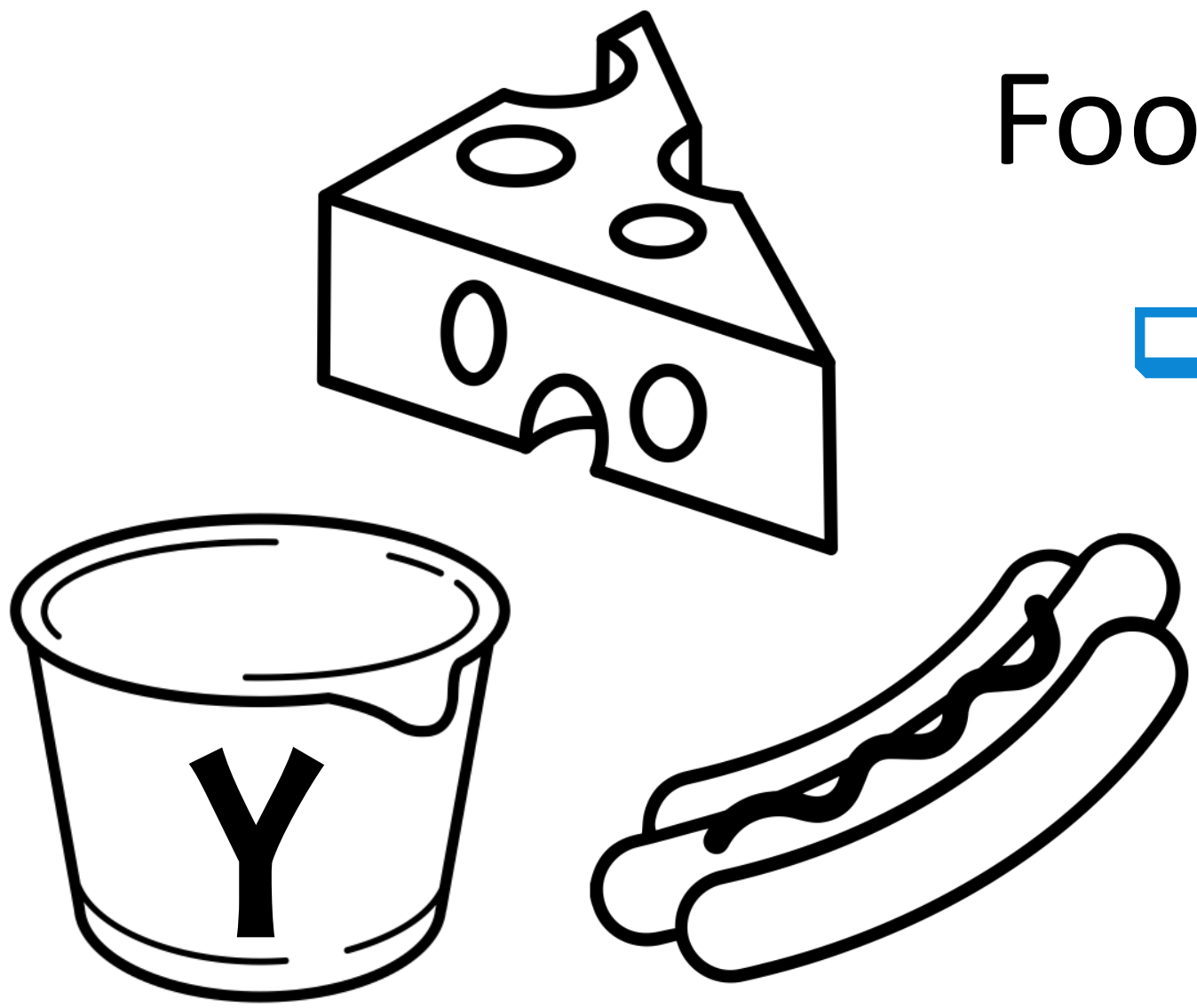
Fats for Structure

Using edible fillers in food protein gels to tailor product performance

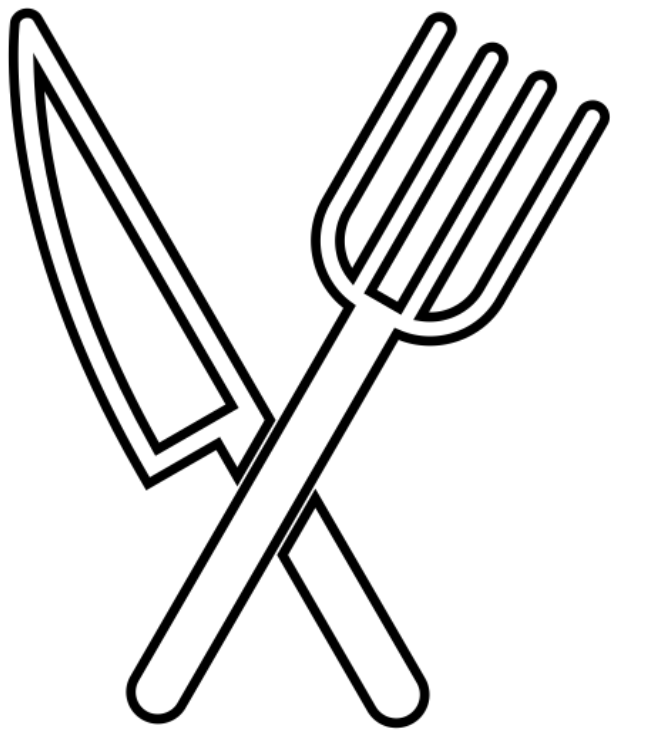


Foods like cheese, yogurt, and frankfurters can be described as fat-filled protein gels

⇒ Fat droplets act as edible fillers, reinforcing gel matrix



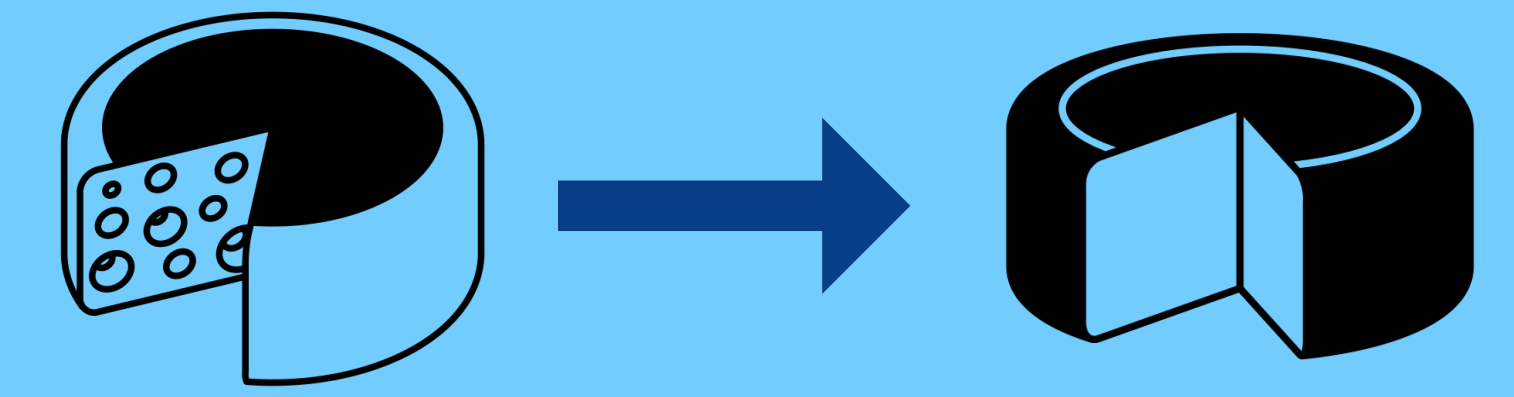
Functional and sensory properties are highly dependent on the amount, and arrangement and physical state of the fat droplets



The ever-changing world of food products

Adapt → Changing dietary guidelines, evolving consumer perception

Improve → Alter products to increase appeal
 Maintain desirable traits during reformulation



Expand → Improve performance of alternative proteins (e.g. plant-based)



PARTICLE REINFORCEMENT

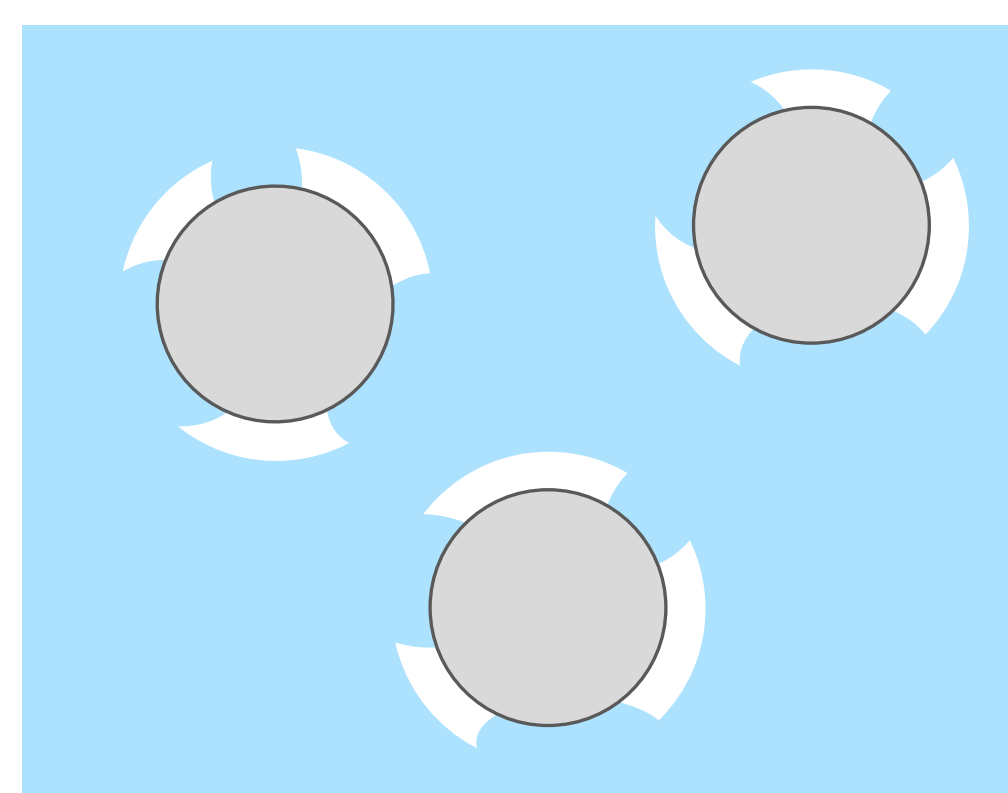
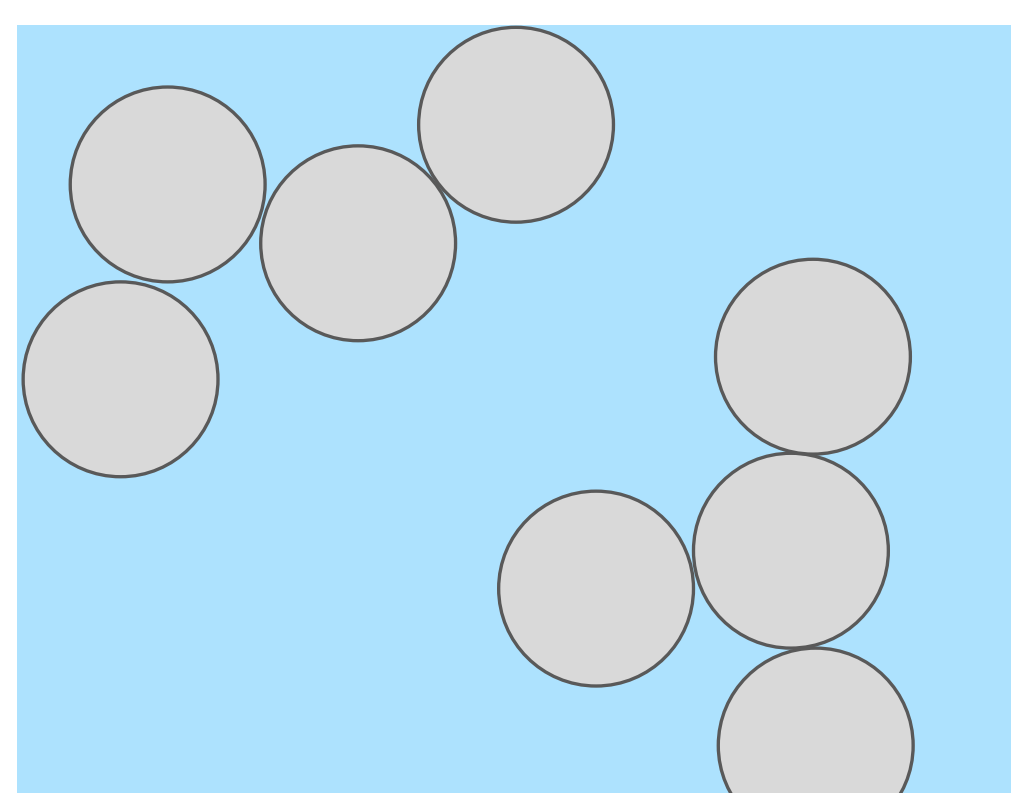
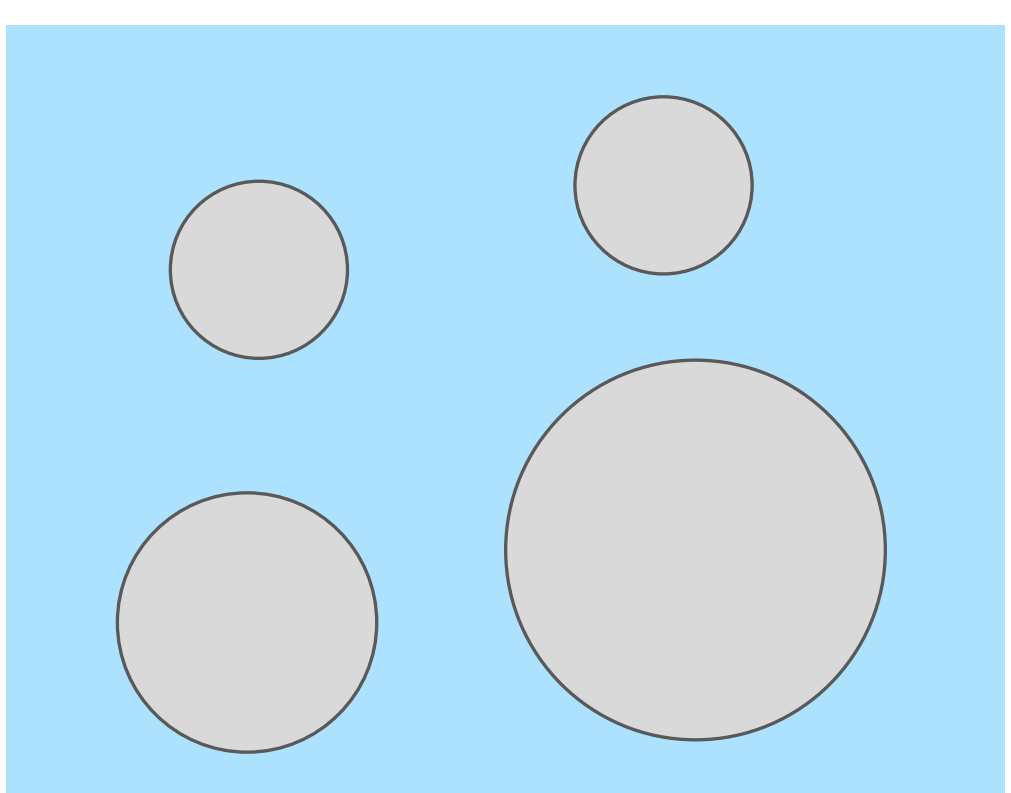
- Modelling foods as composite materials
 Fat droplets → Particles
- Theory used to predict performance
- Established models are very limited for foods
- Filler packing limit is generally only fitting parameter

Models cannot account for

Size

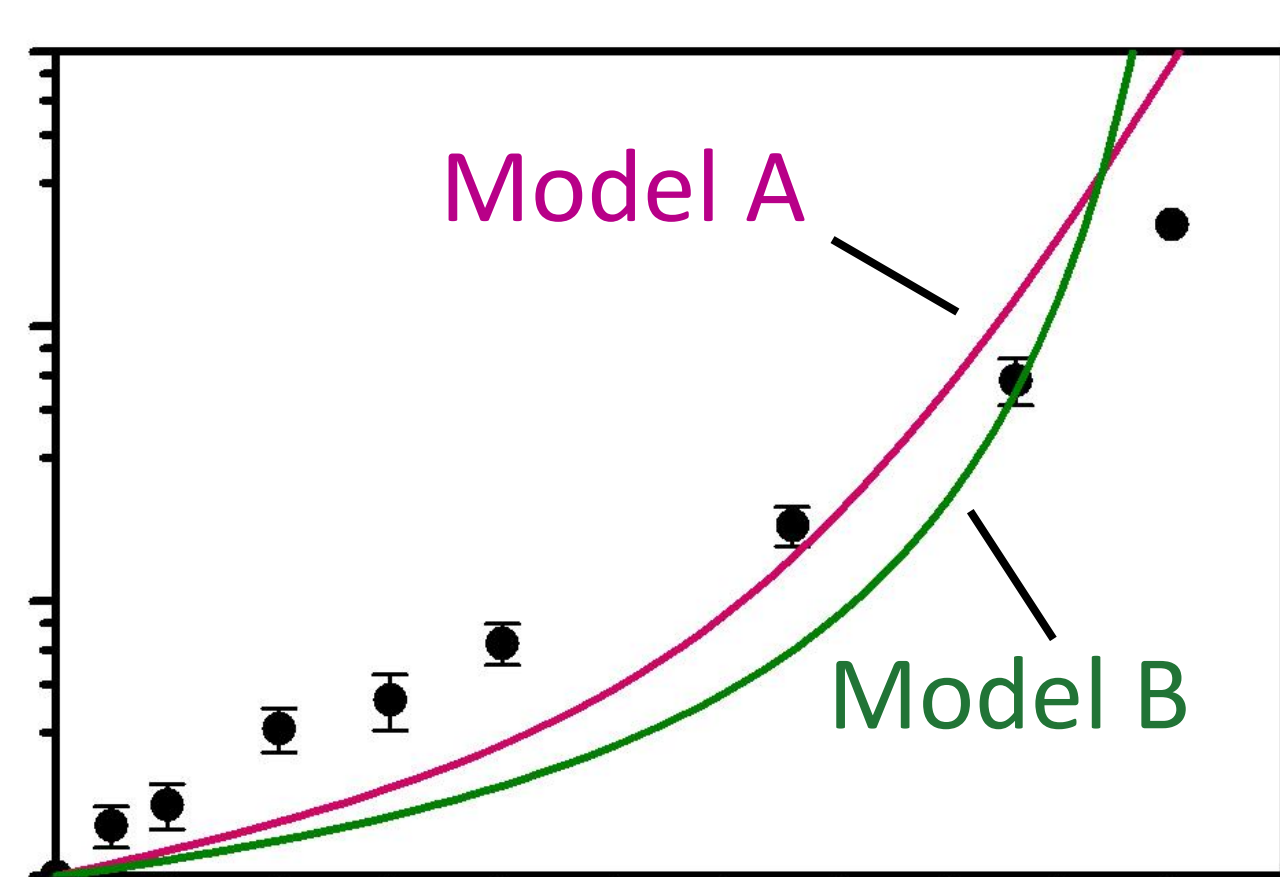
Clustering

Partial binding



The **BIG** issue

- Existing models do not follow trends in data



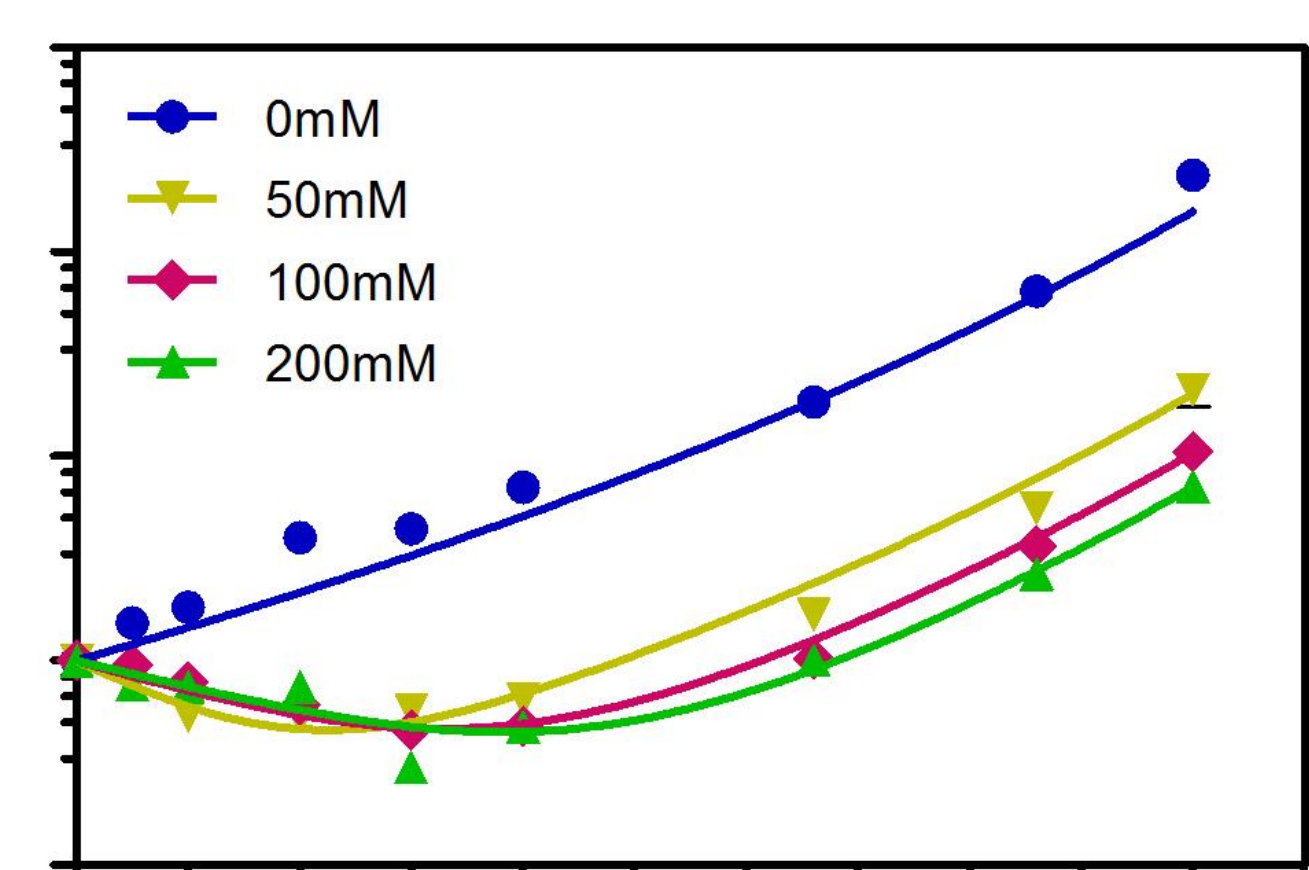
DEVELOPING A NEW THEORY

Model system

Matrix: Whey protein $\xrightarrow{+\text{salt (NaCl)}}$ Partial binding
 Filler: Glass microspheres $\xrightarrow{\text{vary sizes}}$ Filler size

Proposed empirical model

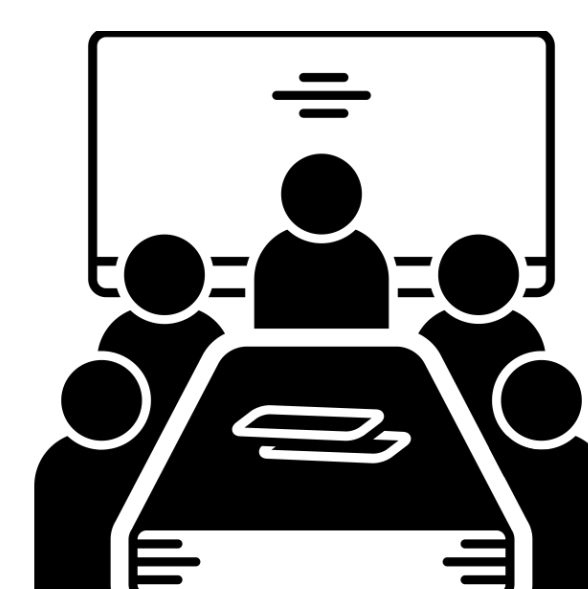
- Greatly Improved fits
- Realistic filler packing limits
- Can describe partial binding



Moving forward

- Derive expression using mathematical framework
- Validate model in realistic food systems (fat-filled gels)

Knowledge/Technology Transfer



Information sharing with industry representatives



Engage researchers at academic conferences



Report to funding partners



DEPARTMENT OF FOOD SCIENCE



NSERC CRSNG



Canadian Dairy Commission

*All icons from thenounproject.com