

# **STUDING MICROSTRUCTURE OF MEAT EMULSIONS AND BATTERS**

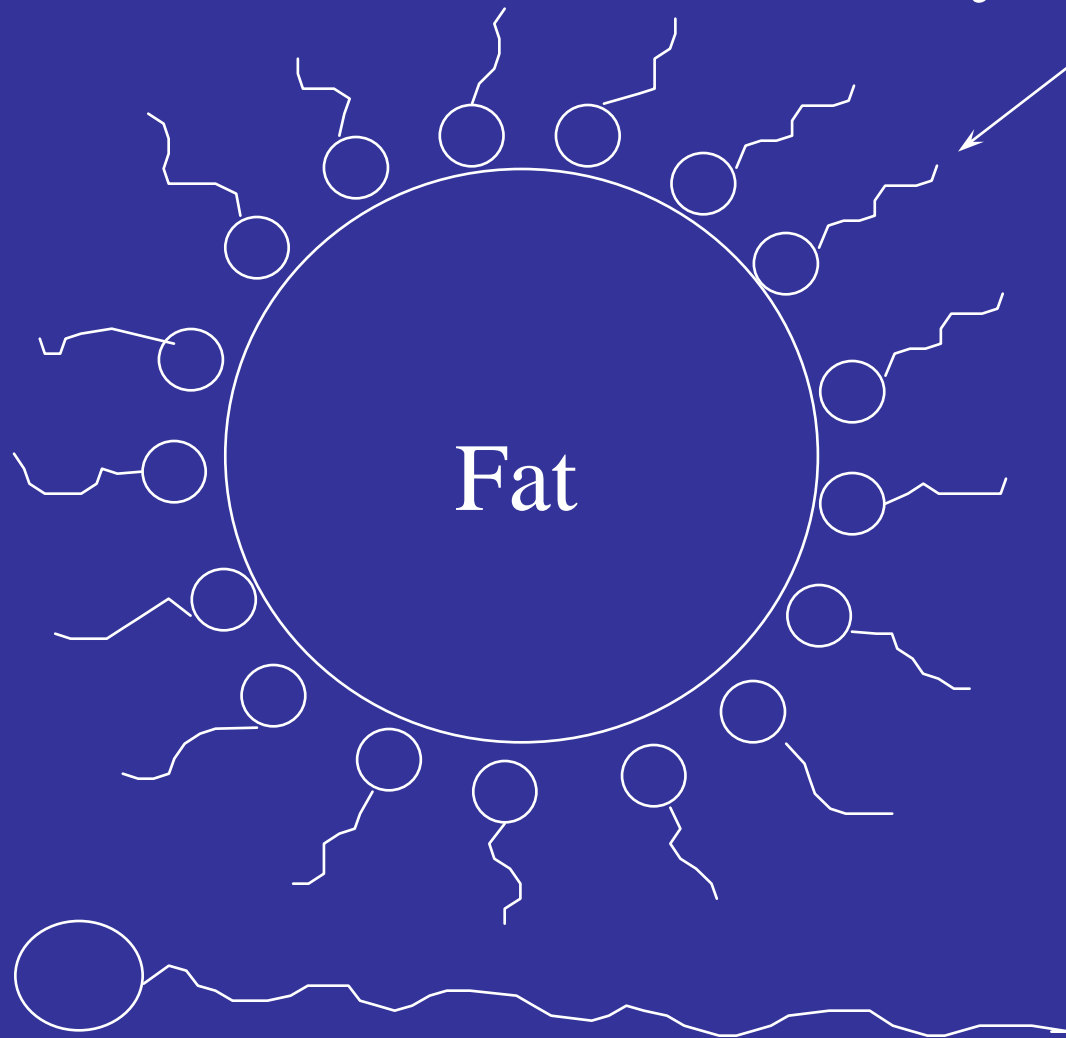
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# Why it is Important to Study the Mechanisms of Meat 'Emulsification'

- Meat products in this category (bologna, frankfurters) represent a large segment of the processed market
- 'Emulsion breakdown' (fat separation during cooking) is costly in high volume lines

Mono-layer of proteins

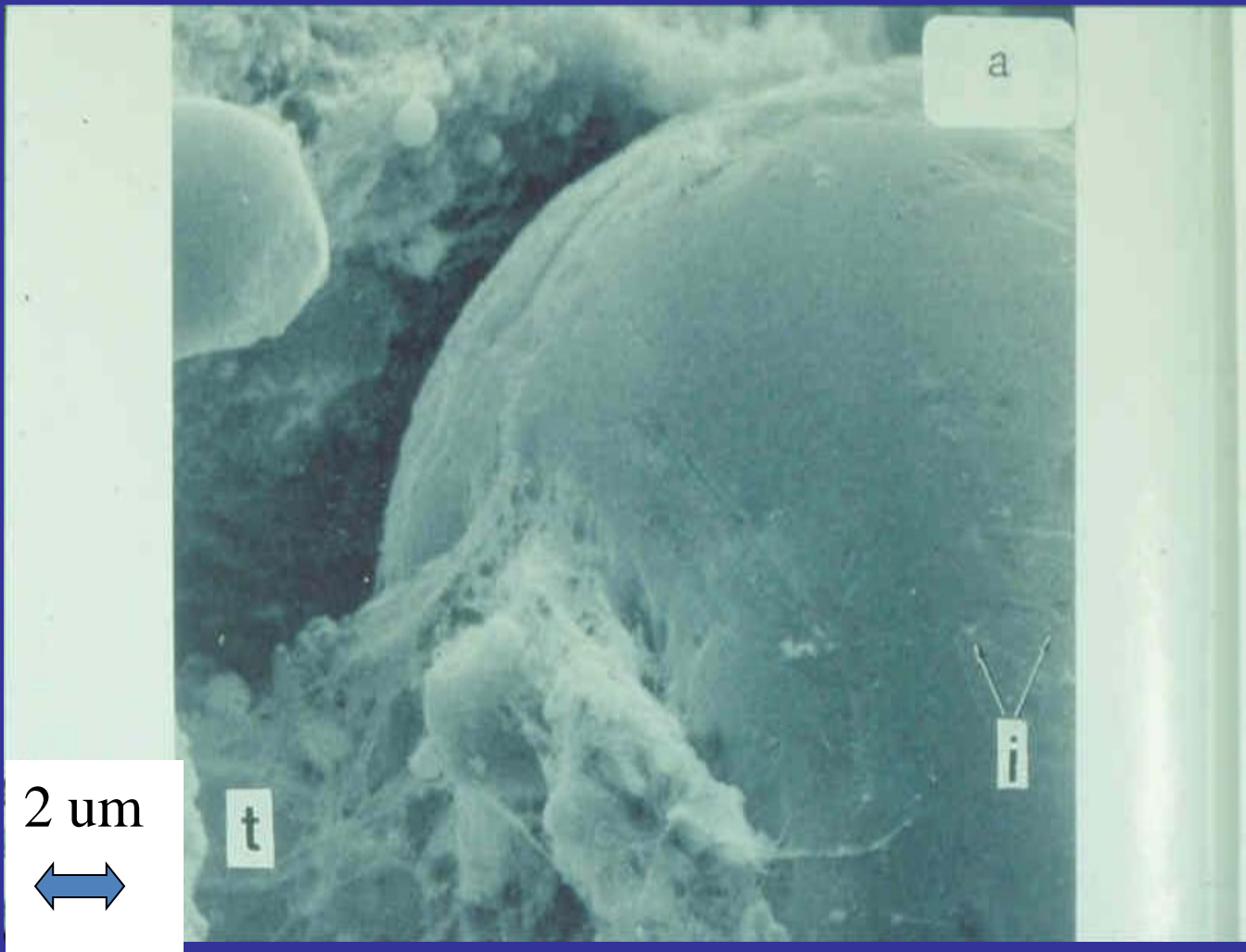


Fat

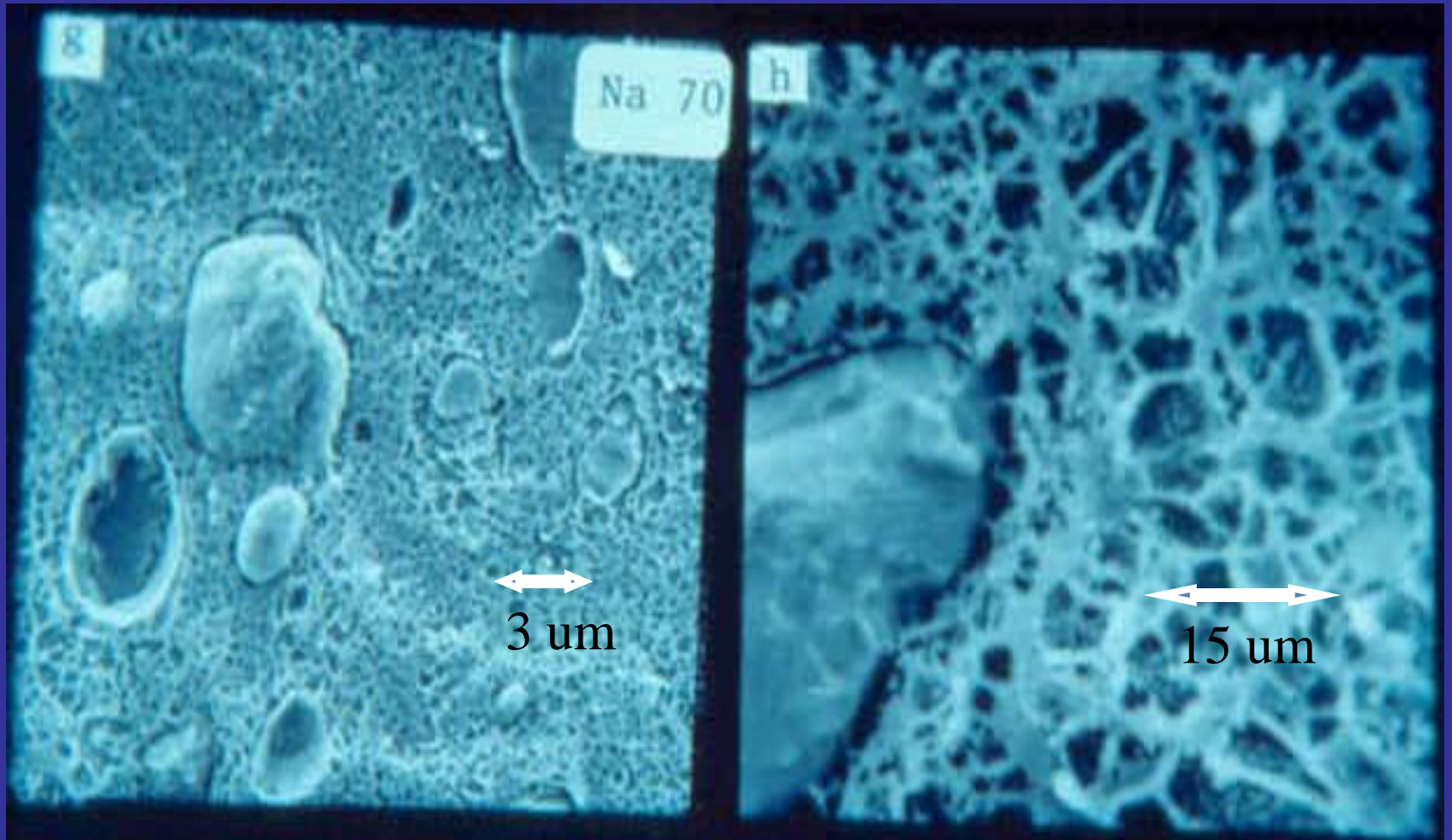
Hydrophobic

Hydrophylic portion

# Conventional Electron Microscopy (fat dispersion in a meat product)



# Cryo Scanning Electron Microscopy (fat dispersion in a meat products with salt and phosphate)



# Is Bologna/ Frankfurter a Real Emulsion ?

## I. Emulsion Theory

- need protein
- form a protein coat around fat globules

# EFFECT OF CHOPPING TIME ON PORK

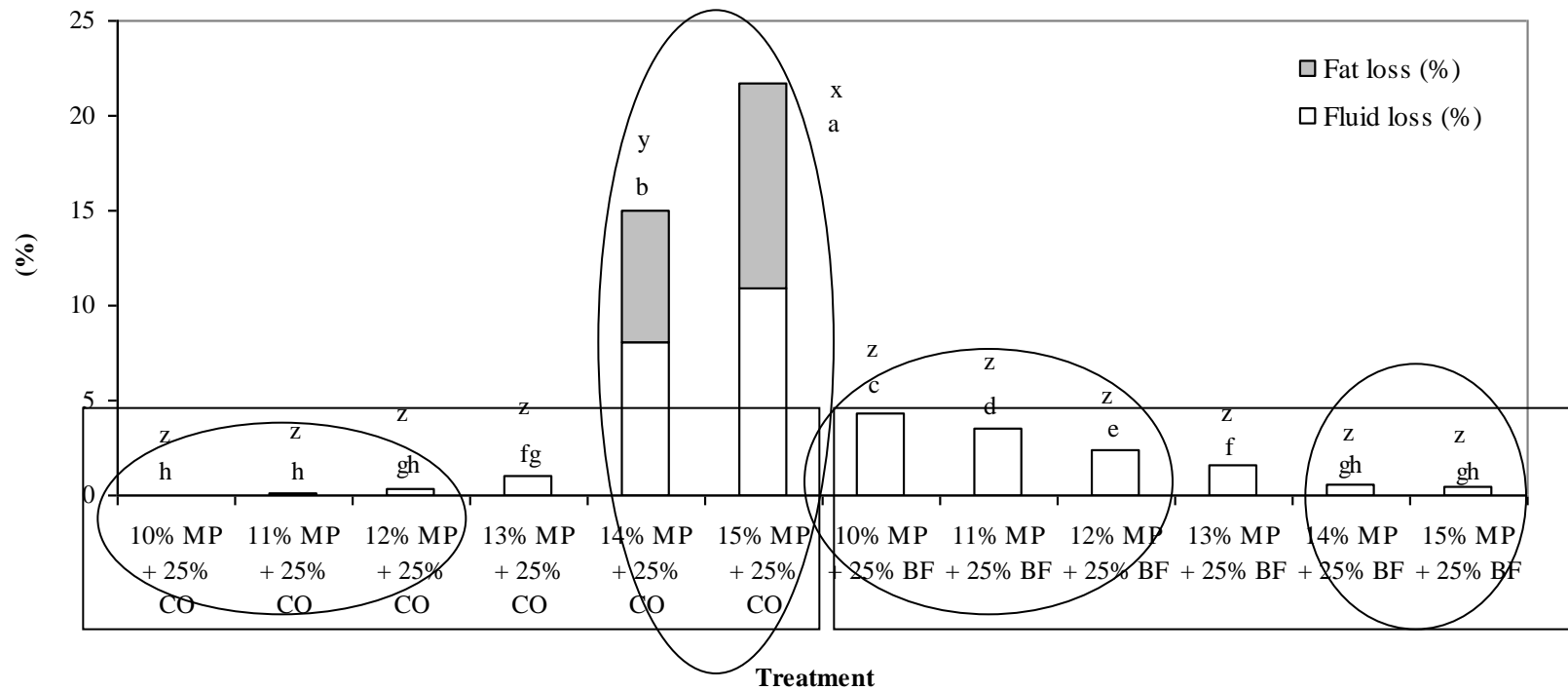


# Example II

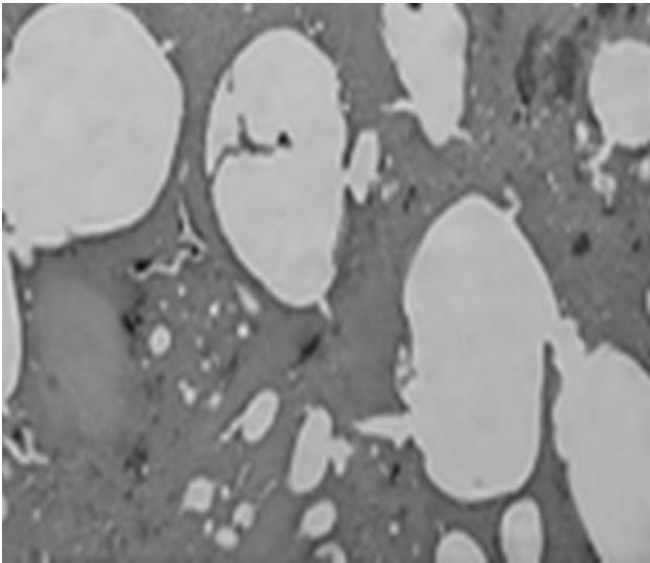
- Objectives: study the effects of using beef fat vs. vegetable oil on emulsion stability and products' performance
  - Compare between canola oil and beef fat at different protein levels
  - Compare between beef fat, rendered beef fat, canola oil, palm oil, and hydrogenated palm oil at different protein levels



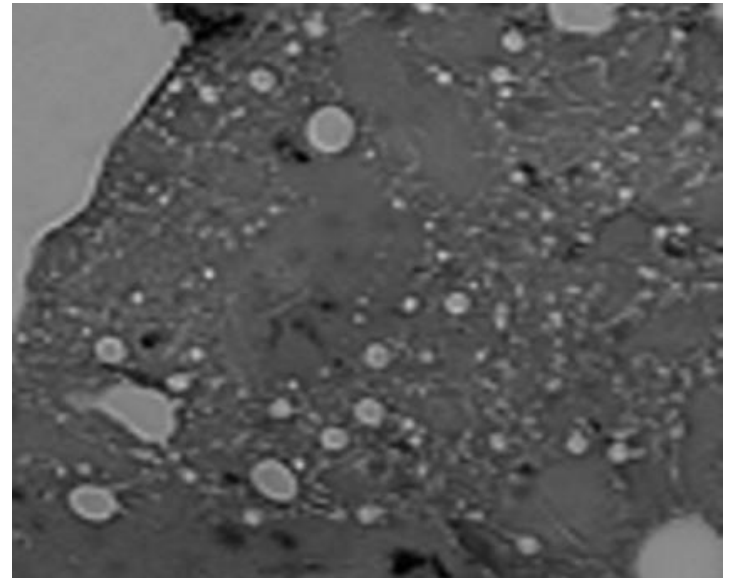
# Effect of protein levels and fat/oil on emulsion stability of meat emulsions



*Effect of protein levels and fat/oil type on meat emulsion microstructure*



Beef Fat



Canola Oil

# Some Conclusions

- The mechanism of meat emulsion stabilization is complex and multi factorial
  - depends on the physicochemical properties of the fat phase, the interfacial protein film around fat globules, and the protein matrix.
- Use of non-meat proteins which have low gelling ability and high emulsifying capacity can produce more stable meat emulsions when prepared with canola oil