Biocompatible Microemulsion Gels for the Delivery of Hydrophilic and Hydrophobic Active Ingredients

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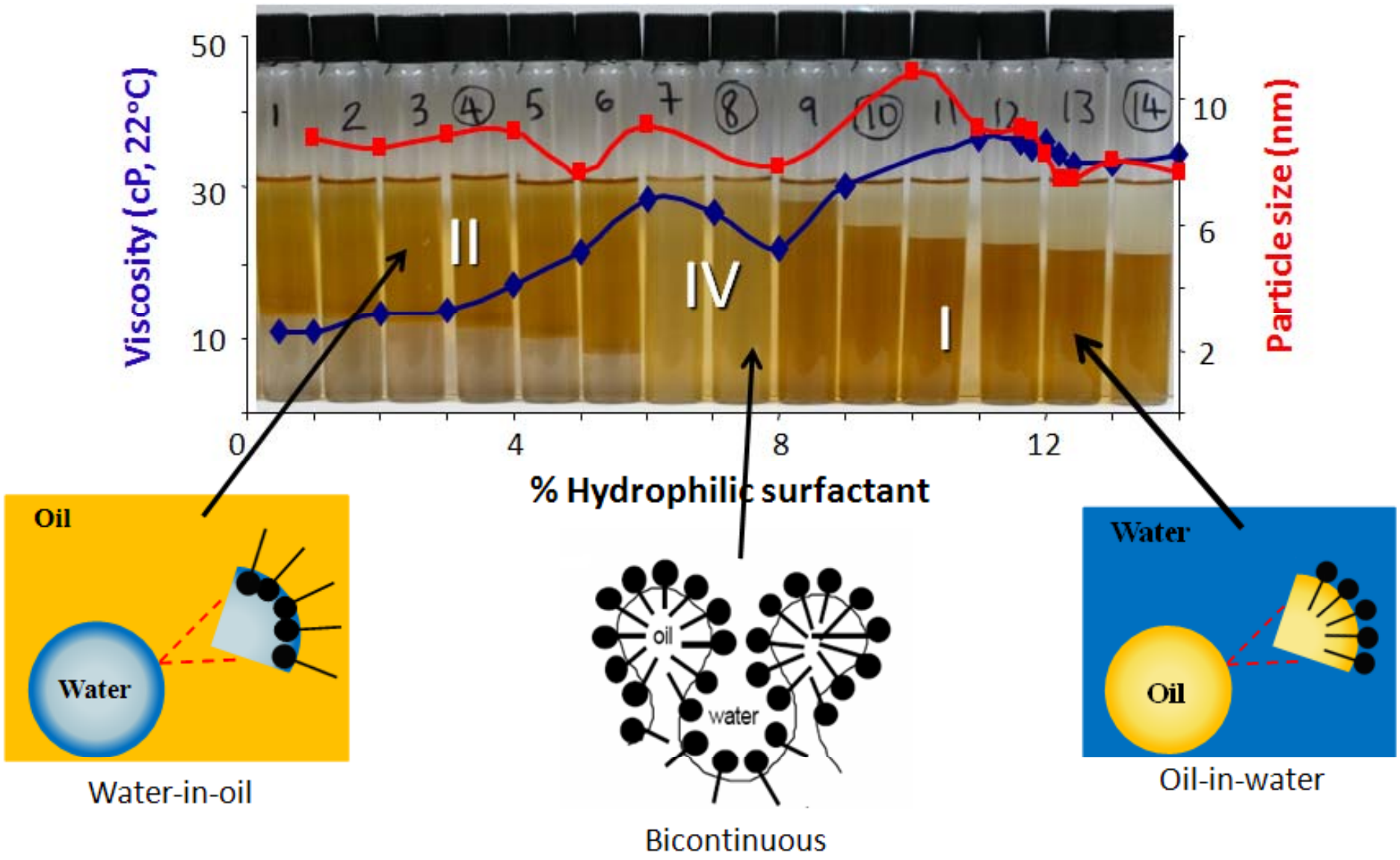
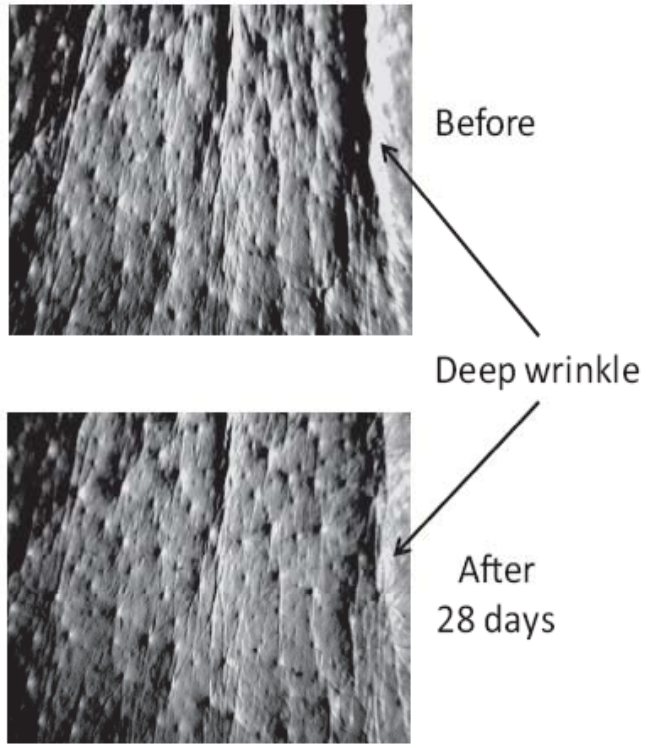
Microemulsions (µEs)



µEs for the Delivery of Actives

- Ability to co-solubilize hydrophilic and hydrophobic actives
- Enhancing skin permeation of active ingredients
- Novel low toxicity lecithin linker µEs by Yuan et al. for transdermal delivery



Pictures of the crows feet area of a volunteer at day 0 & day 28 after applying a linker lecithin µE containing 0.5% Deepaline PVB (anti-wrinkle active).

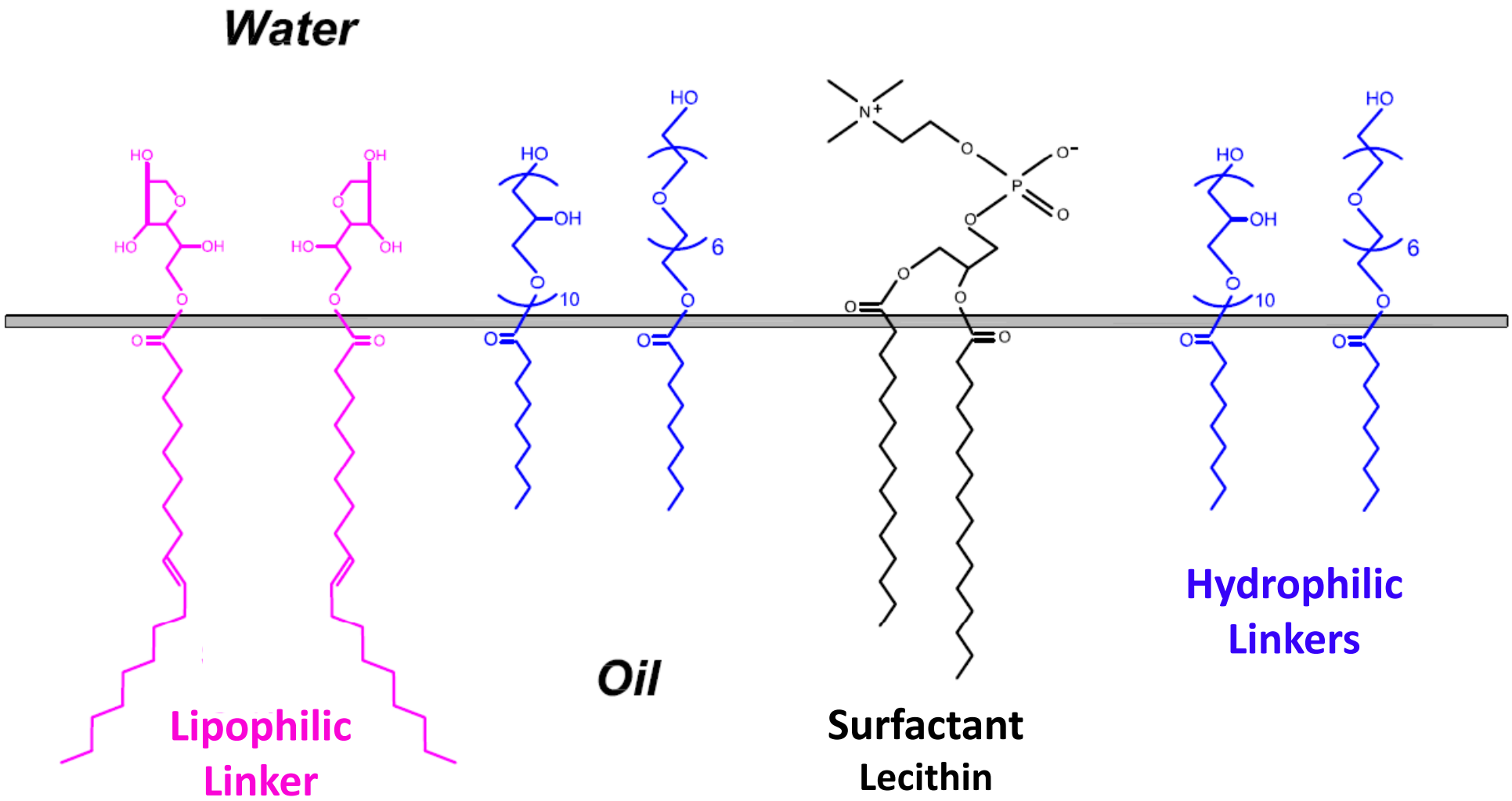
Microemulsion Gels

- Microemulsion gel = μE + gelling agent(s)
- Stimuli-responsive (temperature, pH, etc.)
- Possible gelling agents: gelatin, poloxamers, carbomer, gellan gum, etc.

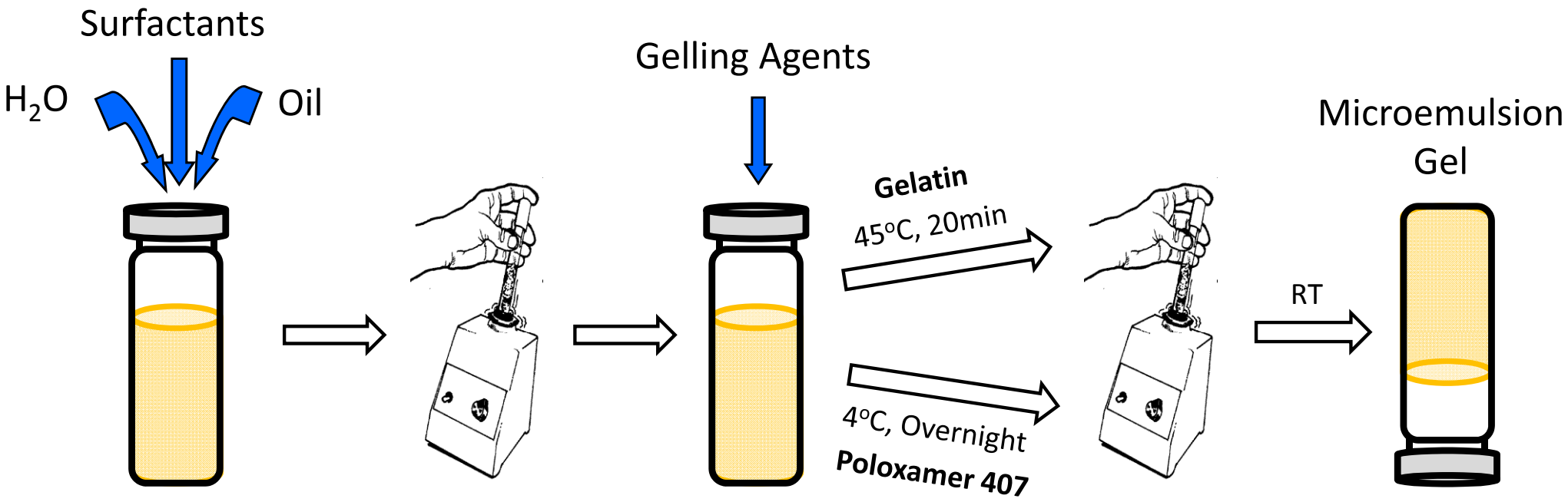
Objective

Modify the **viscosity** of low toxicity linker lecithin microemulsions using thermoresponsive viscosity modifying agents (**gelatin** & **poloxamer 407**)

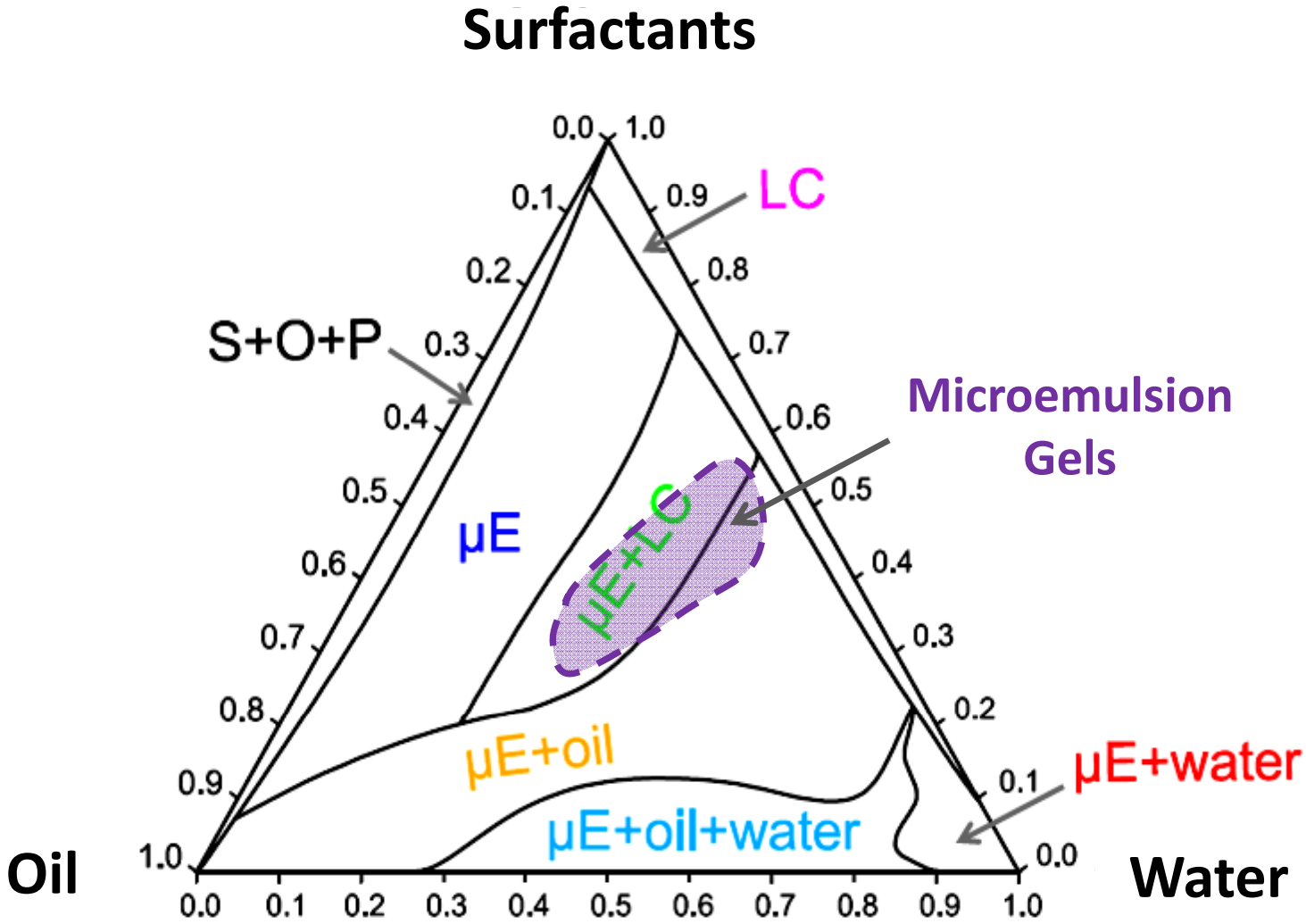
Microemulsion Components



Methodology

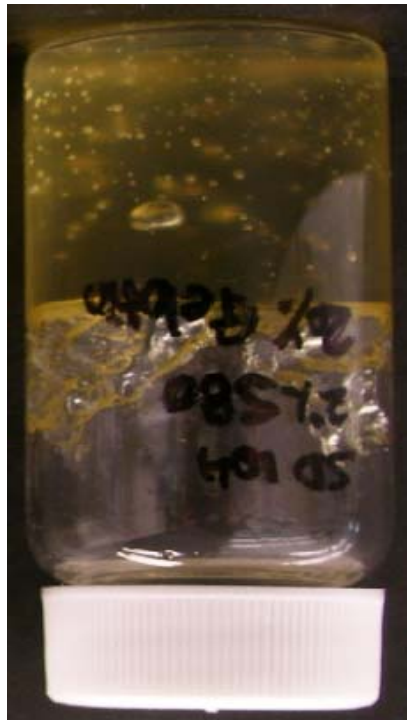


Ternary Phase Diagram (25°C)



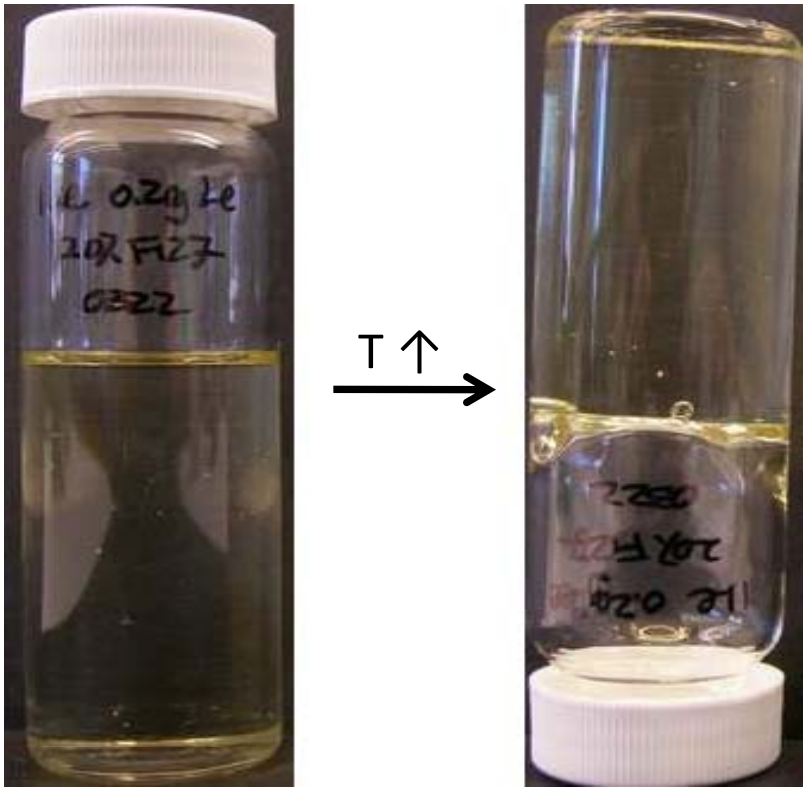
Gelatin as Viscosity Modifying Agent

- Able to modify the viscosity of linker lecithin µE
- Produce thermoresponsive microemulsion gels at ~ 20% w/w gelatin
  - Can incorporate ≤ 40% oil in the microemulsion gels
  - Can adjust gel hardness and opacity by varying oil, water or gelatin content

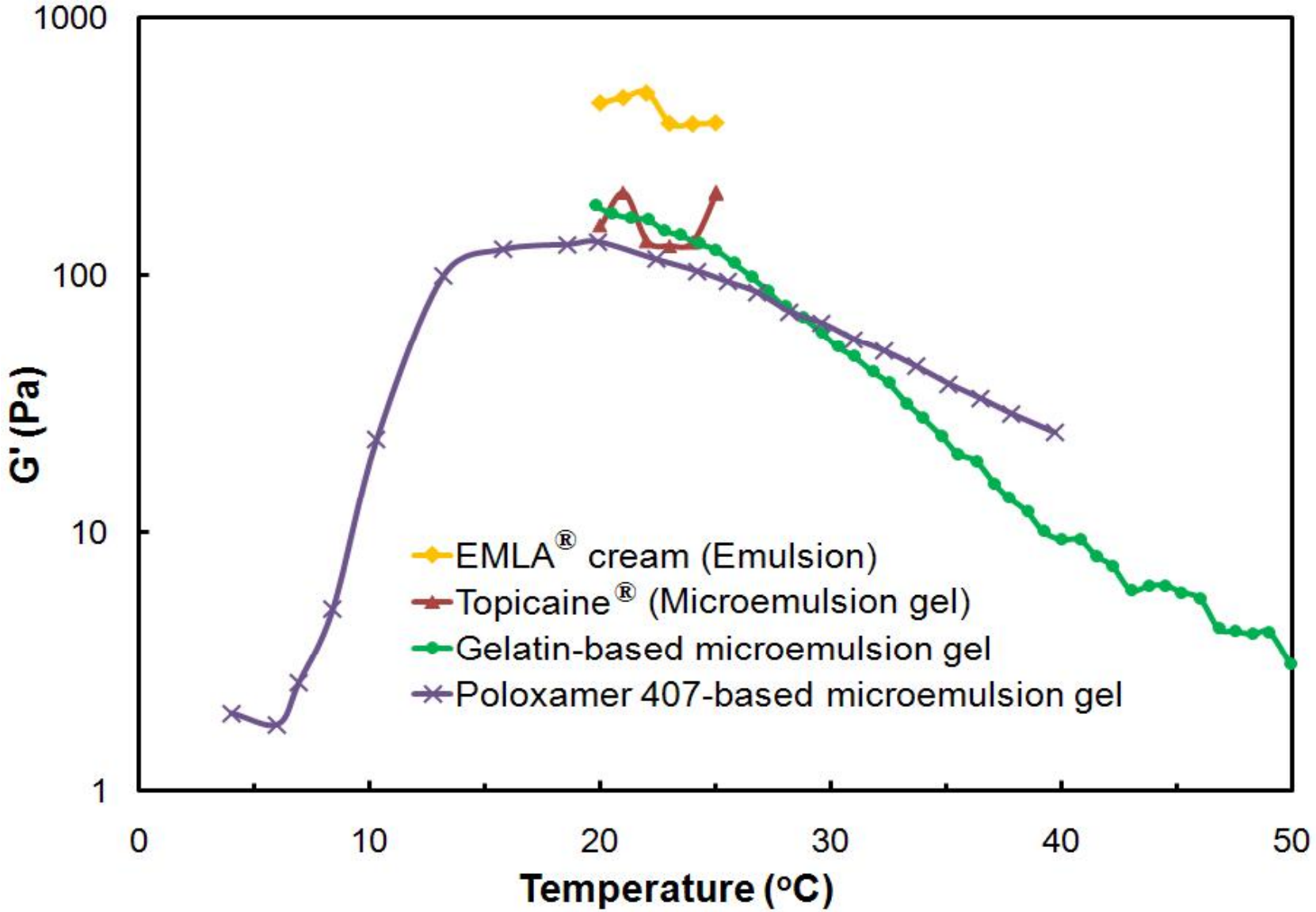


Poloxamer 407 as Viscosity Modifying Agent

- Able to modify the viscosity of linker lecithin µE
- Produces thermo-responsive, transparent microemulsion gels at ~ 20% w/w poloxamer 407
  - Can incorporate 10% oil
  - Shear thinning
  - "Shelf life" > 1 year



Rheological Comparison



Summary

- Viscosity of low toxicity lecithin-based linker microemulsions can be modified with addition of gelling agents such as gelatin and poloxamer 407
- Addition of 20 wt% gelatin or poloxamer 407 can produce thermoresponsive microemulsion gels
- Hardness and opacity of microemulsion gels can be adjusted by varying oil, water and gelling agent content

Acknowledgement

- Mengyan Li (summer student)
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References

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Thank You!

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