

# Mechanical Characterisation of Soft Matter and Complex Fluids



## Introduction

Soft matter, including food hydrocolloids and hydrogels, represents a fascinating class of materials characterized by their unique mechanical and rheological properties. These materials play a crucial role in food science and industry, owing to their ability to modify texture, stabilize emulsions, and retain water. Food hydrocolloids, such as xanthan gum, carrageenan, and pectin, are widely utilized as thickening and gelling agents, influencing both the functional and sensory properties of food products. Similarly, hydrogels, with their three-dimensional polymeric networks, are extensively studied for applications in food encapsulation, controlled release, and structural enhancement. The mechanical characterization of these materials provides critical insights into their behaviour under various conditions, paving the way for innovations in food formulation and processing.

## Methods



Figure 1. Rheology and mechanical testing geometries.

## Methods



Figure 2. Rheo-tribology geometries for contact and sensory measurements

## Post-processing of protein-pectin solutions

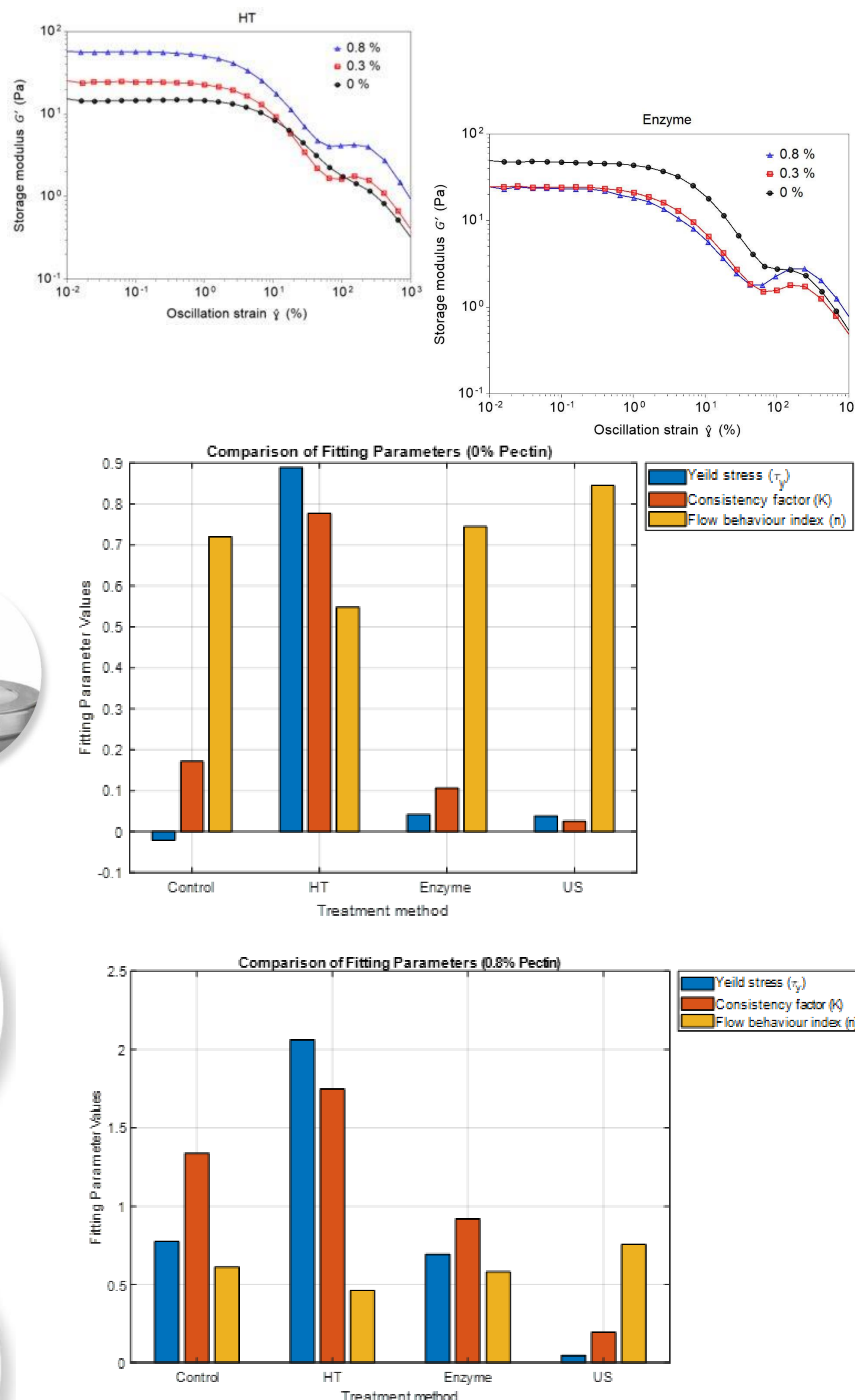


Figure 3. Herschel-Bulkley fitting parameters for the flow behaviour.

## Normal stress differences measurement

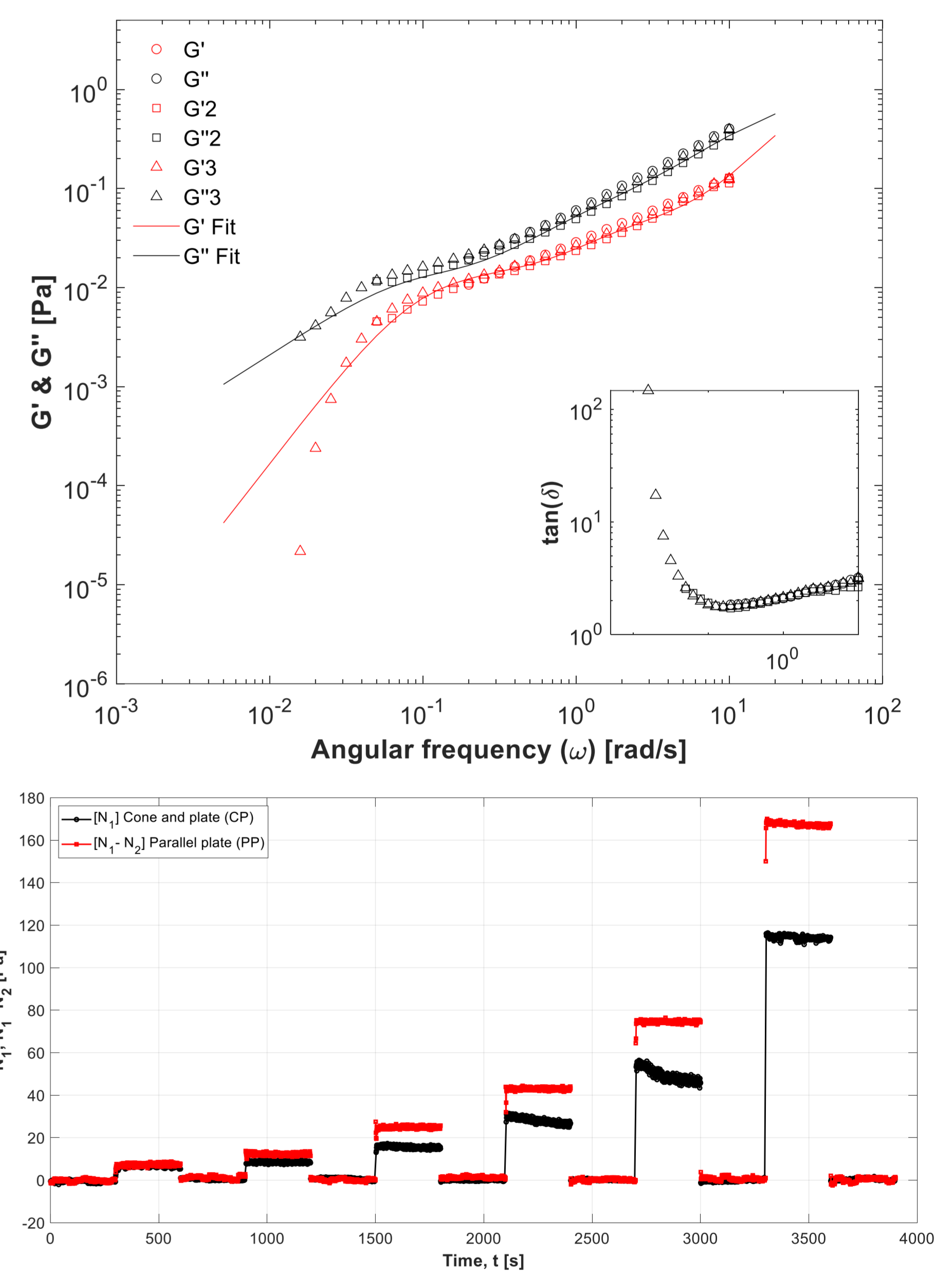
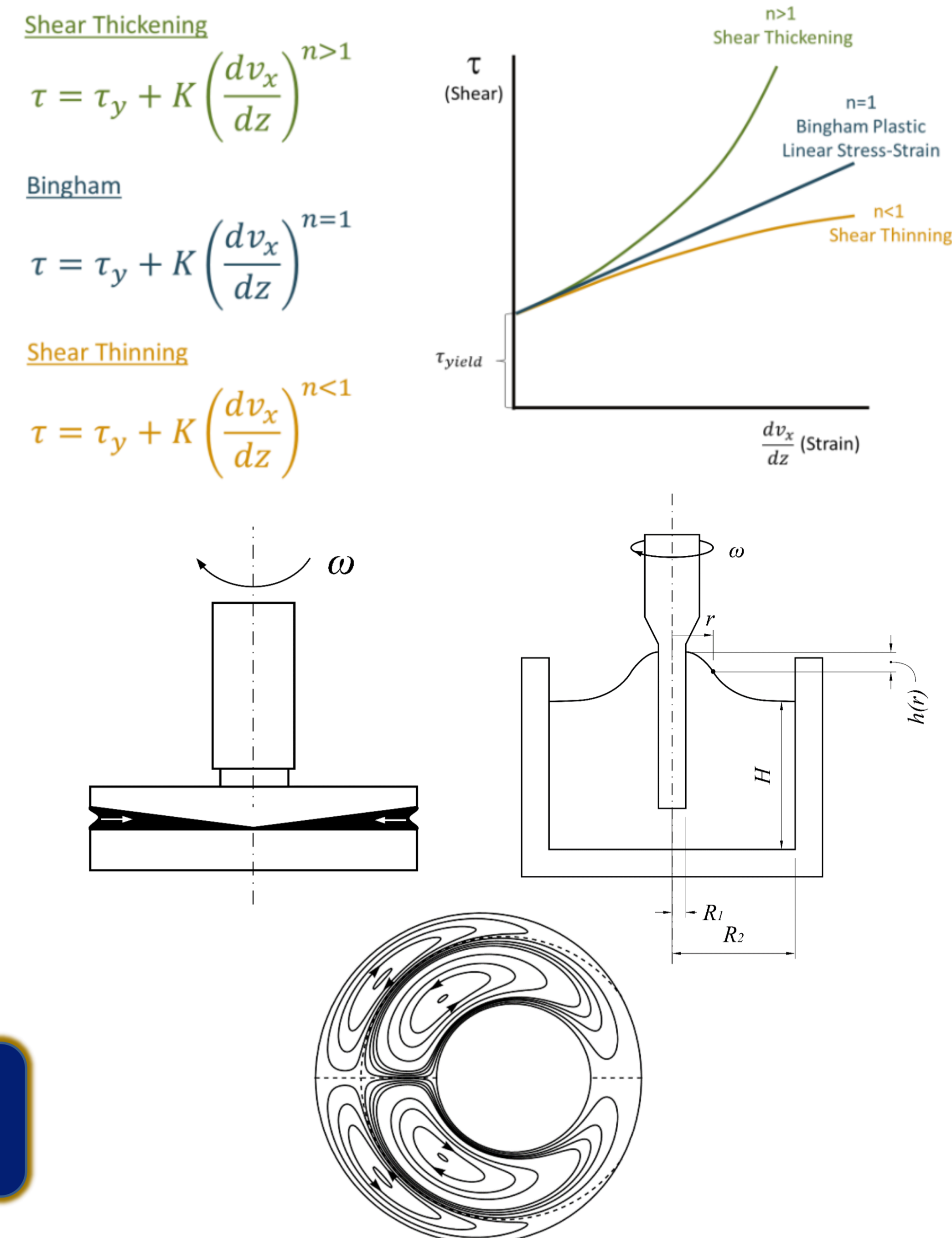


Figure 4. Testing Mochi at -12°C

## References

[1] Maklad, O., and R. J. Poole. Journal of Non-Newtonian Fluid Mechanics 292 (2021): 104522.