

An Indian-Australian research partnership

Project Title:

Development of model to predict rheology/properties of high internal phase emulsions

Project Number

IMURA0225



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Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1. **Advanced computational engineering, simulation and manufacture**
2. Infrastructure Engineering
3. Clean Energy
4. Water
5. Nanotechnology
6. Biotechnology and Stem Cell Research

The research problem

The aim of this project is to generate a better understanding how interactions between oils and surfactants, used for the manufacture of high internal phase emulsions, affect the rheology of that emulsion.

Previous experience has shown that the nature of the oil phase has a significant effect on emulsion stability and rheology. Using solution viscometry to determine surfactant-solvent (oil) interactions and correlating these to the properties of the emulsions prepared using the corresponding ingredients will allow tailoring the oil phase to a specific practical needs.

The desired outcome would be models that allows identification/prediction of an ideal oil mixture for a given surfactant system. The system could also be used as a quality control measure to accommodate oil specification changes and in the long term enable a reduction of surfactant levels without affecting performance.

Project aims

To develop a model that will allow the prediction of rheology/properties of high internal phase emulsions based on the type of oil and surfactant components.

Expected outcomes

Highlight the expected outcomes of the project

Fundamental models of rheology of high internal phase water-in-oil emulsions. The models will address the effect of variation in property and ratio of the continuous (oil) phase; surfactant type and ratio; and the behaviour of those emulsions over time in response to shear rate.

Capabilities and Degrees Required

Desirable: Strong math-sciences or engineering (Chemical, Mechanical) background,
Desirable: Modelling, Rheology, molecular & coarse-grained modelling of surface interactions,
Desirable: meso/macro-scale modelling, transport of emulsions