

An Indian-Australian research partnership

Project Title:

Solid additives for the stabilisation of
high internal phase emulsions

Project Number

IMURA0226



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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

Stabilisation of high internal phase emulsions is based on surface active ingredients being present in the oil phase. The surfactant is located at the oil/aqueous interface as well being present as dissolved molecules or as reverse micelles in the system. Reverse surfactant micelles play an important role for the stabilisation of the emulsions towards coalescence.

Introduction of solid, surface modified, particles (comparable size to the reverse micelles) could take over this role and in an ideal case improve the stability of the emulsions given that there is no desire for the particles to compete with the active surfactant at the oil/water interface. This would guarantee a stable population of "reverse micelles particles" in the system at any given time, and have the potential to reduce surfactant concentration needs in the emulsion system.

Project aims

To investigate the potential of solid additives (i.e hydrophobic silica) as a means for stabilising high internal phase emulsions towards coalescence.

Expected outcomes

Highlight the expected outcomes of the project

Expected outcomes are a fundamental understanding of the role and operation of solid particles as reverse micelles in high internal phase water-in-oil emulsions. The outcomes will include the particle's interaction with different surfactant regimes, and the influence of particle type, concentration and surface property state on behaviour.

Capabilities and Degrees Required

Essential: Masters or Bachelor degree in Organic Chemistry, Inorganic Chemistry, Chemical Engineering or Physics

Desirable: Experience in mathematical modelling,

Desirable: Experience in Organic synthesis,

Desirable: Experience in experimental surface characterization, colloid science.