

Functional, renewable & sustainable hybrid materials (FR&SH)

At a glance

A consortium project, part funded by the Technology Strategy Board, has been established to develop the application of green chemistry to formulated products.

The collaborative research and development work aims to demonstrate the commercial feasibility of sustainable feedstocks across multiple sectors and applications. Such renewable sources should also add value to formulated commodities.

Approach

Two Chemspeed automated formulation platforms – the FORMAX and Swing - are available at the Centre for Materials Discovery (CMD), and these were employed to explore a wide range of formulation conditions incorporating oxidised cellulose as a sustainable thickening agent.

Consortium partners Unilever, Croda, Rockwood Additives, University of Bath and the UK National Non-food Crop Centre (NNFCC) have worked alongside CMD researchers and contributed expertise in formulation components in order to inform the best use of our automated facilities.

Solution

A Design of Experiments (DoE) approach has been applied to the discovery process, encompassing both high-throughput screening of component interactions on a 15 mL scale, and larger-scale 70 mL formulation reactors individually adjusted for shear and dispensing conditions.

Benefits

The use of automated formulation methods allows greater numbers of samples to be managed than under normal laboratory bench-top conditions.

Screening experiments have been able to yield over 500 samples in a two week period, encompassing a wide compositional array. Alongside the scaled-up formulation samples, these have informed the selection of lead compositions for ongoing FR&SH research.

