

Industry Case Study

Microcapture

Characterisation of Novel Microcapsule Formulations

Challenge

Microcapture use a novel micro-encapsulation technology to create a storage and delivery mechanism for a range of potential applications such as fragrance release and anti-microbial delivery on demand. One of Microcapture's products uses a water in oil in water (WOW) emulsion to encapsulate complex payloads (see Figure 1).

Microcapture have worked with the Bridge to visualise and characterise various contents of the microcapsules.

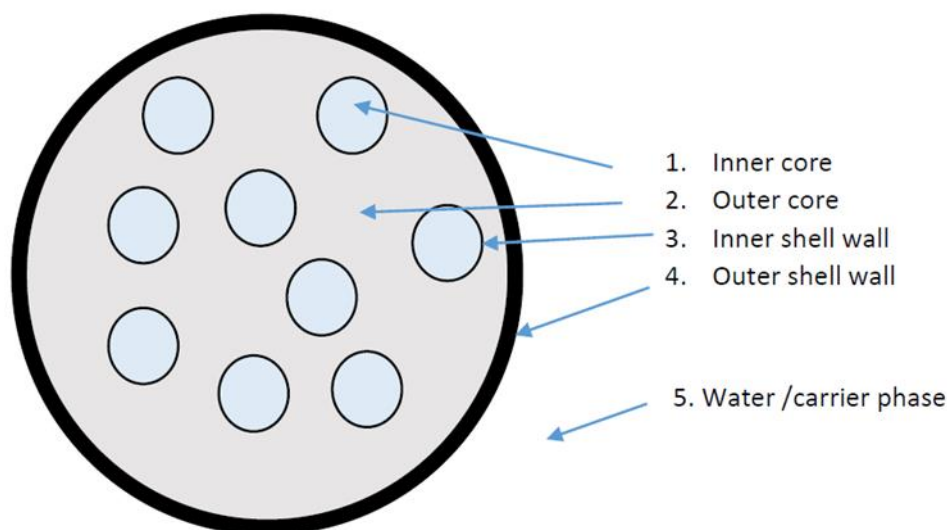


Figure 1. Schematic diagram of water – oil – water particle produced by Microcapture.

Approach

The Bridge's Instrument Scientist team were deployed, utilising their microscopic and spectroscopic expertise to interrogate microcapsule samples. Advanced light microscopy was used to perform imaging of the capsules at varying magnification using transmitted light whilst Raman microscopy was employed, using a Bruker Senterra instrument (Figure 2), to combine visualisation of the microcapsules with chemical interrogation of the contents.

Outcomes

Microscopy of Microcapture's formulation clearly demonstrated the successful formation of WOW microcapsules (Figure 3). Particle and sub-particles were both

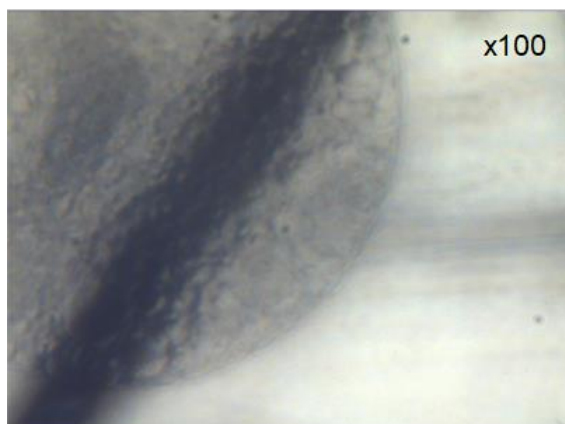
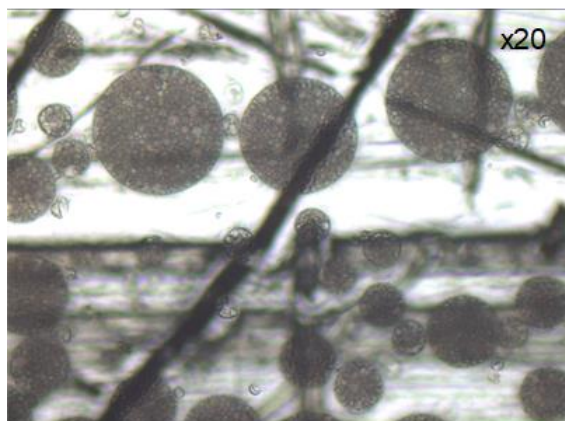


Figure 3. Microscope images of Microcapture's water in oil in water (WOW) microcapsule formulation at different magnifications.

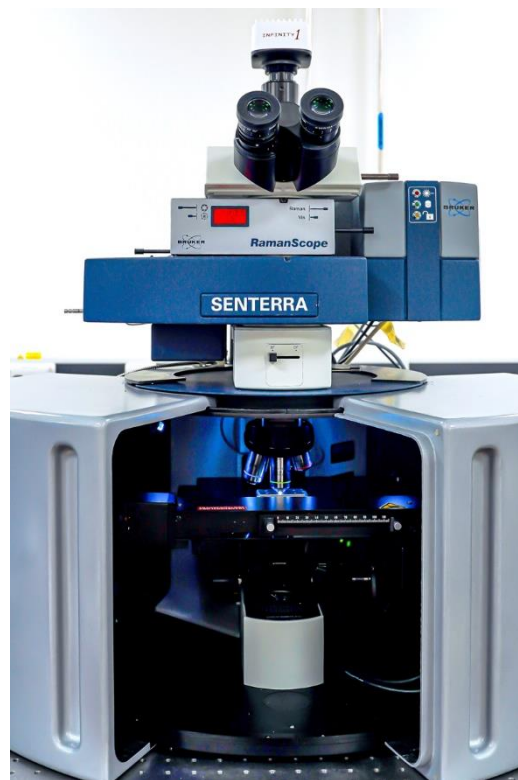


Figure 2. Bruker Senterra Raman microscope housed in the Bridge.

visualised allowing for image analysis e.g., particle circularity and particle-sub-particle sizing.

Raman spectroscopy was used to identify spectral features associated with different constituents of the microcapsule formulation (Figure 3). microscopy was used to focus on specific features within the formulation highlighting the presence and, crucially, location of different chemical components. In this way the successful encapsulation of different cargoes of interest can be demonstrated (Figure 4).

Following development of the assay, identification of the chemicals of interest could be determined at different stages of the product's intended life cycle to assess product stability and performance over time.

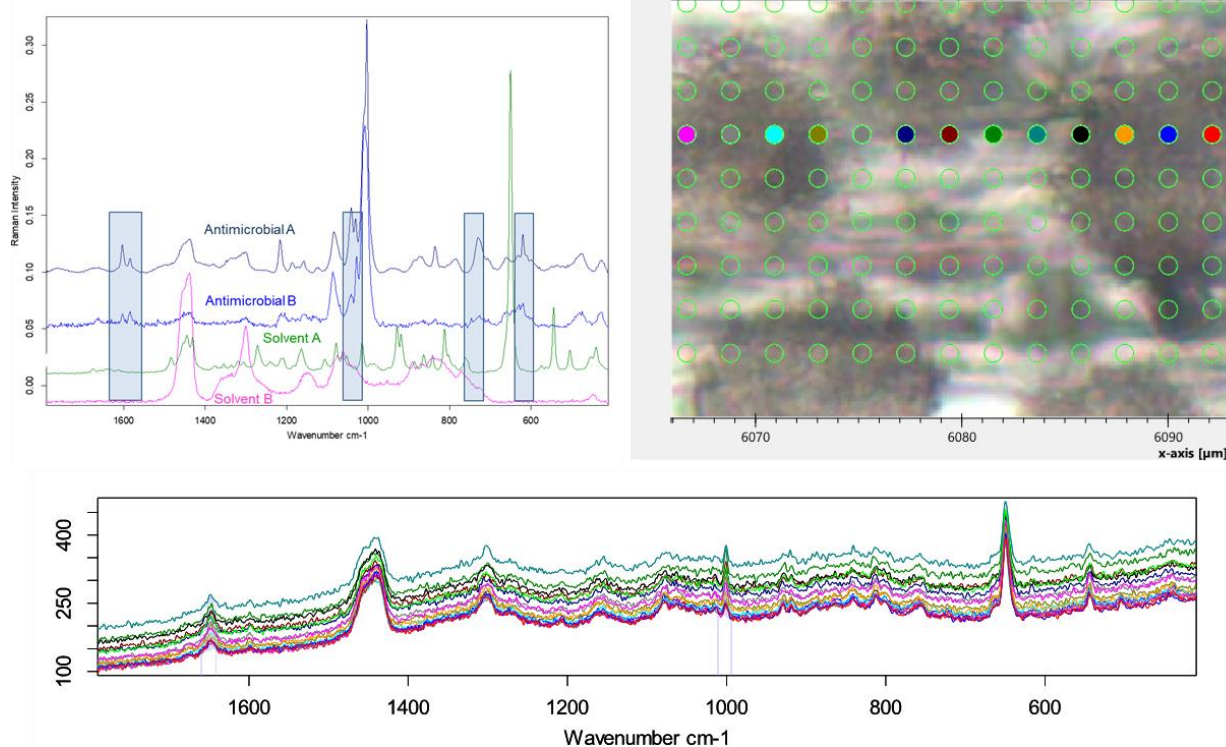


Figure 4. Spatially resolved Raman spectroscopy of encapsulated antimicrobials in Microcapture's WOW formulation.

Summary

Imaging coupled to targeted chemical analysis was used to demonstrate the successful encapsulation of chemical species of interest within Microcapture's novel formulation. The information gleaned was used to aid future product formulation and development as well as to further understand product performance characteristics.

Bridge

R&D Centre for Advanced Materials and Engineering

W: www.thebridge-lincoln.org

T: +44 (0)1522 201430

E: enquiry@thebridge-lincoln.org

Joseph Ruston Building, Edgewest Road, Lincoln, LN6 7EL, UK



FUNDED BY:

