Dr Marijana Dragosavac Biography & Abstract

Biography

Dr Marijana Dragosavac graduated with an MEng degree in Chemical Engineering from the University of Novi Sad (Serbia). She worked for a Danish company Aker Kvaerner (Vapour Recovery Systems) and Serbian engineering company Worldtech both in oil and gas industry. This was followed by her work as a Teaching and Research Assistant at the Chemical Engineering Department, University of Novi Sad (Serbia) where she finished an MSc in 2009. Same year Marijana moved to UK to start a PhD on “Particle formulation and filtration using Membrane Emulsification” at Loughborough University under the supervision of Prof Richard Holdich.

In 2012 Marijana was appointed to a lectureship in Chemical Engineering at Loughborough University. Her main interest is **particle formulation** and she has successfully developed number of formulations based on classic and Pickering emulsions using membrane emulsification in combination with appropriate downstream processing. Some examples of uniform particles up to date: silica particles with tunable internal structure (fragrance release, low soluble drug delivery, chromatography packing), biodegradable microparticles (controlled release), microparticles containing viable living cells etc.

Marijana is a Senior Lecturer within Loughborough's Chemical Engineering department and holds the position of Chief Scientific Officer for Micropore Technology Ltd. (Loughborough University spin out).

Abstract

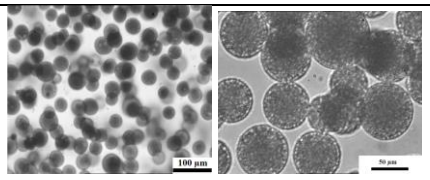
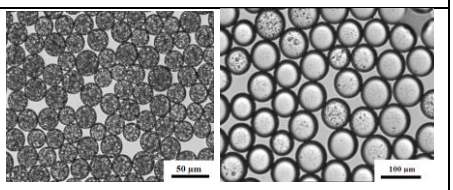
Industrially meaningful production of uniform spherical particles for controlled and targeted delivery using membrane emulsification

Production of larger droplets of controlled diameter is becoming increasingly popular. Those droplets after additional treatment can be turned into particles and applied in industries as food and flavour encapsulates, controlled release depots under the skin, medical diagnostic particles, high value fillers, electronic ink capsules, ion exchange resins. Conventional devices for preparing emulsions apply more energy than needed to produce droplets, leading to droplets with a wide size distribution and such devices are not suitable if temperature/sheer sensitive compounds should be encapsulated.

Membrane emulsification (ME) is a dispersion process to produce monosized droplets of one liquid phase (e.g. oil) in a second immiscible liquid phase (e.g. water) using low energy per unit volume where the shear stress applied on the membrane surface influences the droplet size. A new ME techniques (dispersion cell, torsional, and “cross-flow” ME) developed at Micropore Technologies Ltd. UK in collaboration with Loughborough University were introduced for generating the shear on the membrane surface providing the possibility to generate larger droplets without risk of breakage with possibility for scaling up. Using these techniques, it is possible to generate highly uniform drops/particles between 15 and 1000 μm with the production volume capacity of up to 1500kg/hr using the “cross-flow” system.

The talk will tackle production of particles reported in the Table 1 with the special focus on the use in controlled/targeted delivery.

Table 1 *Some of the particles successfully produced up to date at Loughborough University using ME methods.*

Formulation	Application	Highly uniform particles
Encapsulation of a water-soluble compounds by complex coacervation	Micronutrient for plants	
Encapsulation of cancer treatment drug using biodegradable polymer	Inhibiting cancer growth	
Porous uniform silica particles	Drug Delivery, flavour/fragrance encapsulation