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# Manufacture of controlled emulsions and particulates using membrane emulsification

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## Abstract

Crossflow and rotating membrane emulsification techniques were used for making oil-in-water (O/W) emulsions. The emulsions produced from a variety of oils and monomers (viscosity 7–528 mPas) exhibited narrow size distributions over a wide droplet size range, with the average droplet size ranging from less than 1  $\mu\text{m}$  up to 500  $\mu\text{m}$ . The monomer emulsions were further encapsulated to produce microcapsules through subsequent polymerisation reactions. The monodispersity feature of the primary emulsions was retained after the encapsulation. In comparison with other homogenisation methods, our experimental results demonstrated that the membrane emulsification technique is not only superior in emulsion droplet size controls, but also advantageous in energy efficiency and industrial-scale productions.

**Keywords:** Membrane emulsification; Size control; Microcapsules; Industrialisation

## 1. Introduction

Emulsion manufacturing is an important process in food, pharmaceutical, cosmetics as well as many other chemical industries. Membrane emul-

sification is a technique which is based on a novel concept of generating droplets “drop-by-drop” to produce emulsions [1]. Using a membrane of well defined pore structure, this technique is capable of manufacturing size controlled, mono-disperse products with high efficiency, low energy con-

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