

31-2016-4313 | Novel Methods for Preparing Polymeric or Hybrid Microcapsules Using Oil-in-Oil Emulsions
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Background

- Microencapsulation is defined as a process of confining micron-sized particles or droplets in a polymeric shell called microsphere/microcapsule, having an average diameter ranging from 100 nm to several hundred micrometers.
- Interfacial polymerization (IFP) has been intensively used in the microencapsulation process due to its high yield, moderate and fast synthesis.
- IFP reactions take place at the boundary of two phases while each phase contains different monomer to form the shells of microcapsules. Up to date, these microcapsules are prepared using either oil-in-water or water-in-oil emulsions.

Our Innovation

A new method for preparing polymeric or hybrid microcapsules using oil-in-oil emulsions, enabling the encapsulation of various hydrophilic and hydrophobic materials.

- Enables to encapsulate water-sensitive materials.
- Enables to encapsulate air-sensitive materials.
- Enables to develop new formulations.

Technology

The developed method is based on oil-in-oil emulsification and IFP.

The method enables for the first-time encapsulation purely of hydrophilic materials such as polyethylene glycol (PEG), glycerol, ethylene glycol within polymeric microspheres such as polyurea.

Polymeric microcapsules dispersed in polar oils such as PEG were demonstrated. These capsules contained in their core non-polar materials such as toluene, xylene, heptane.

This method enables the formation of microcapsule as opposed to regular monomers, used widely in the preparation of polyurea capsules, that lead to the formation of bulk polymers.

Furthermore, a method for preparing microcapsules with hybrid shells was developed. These shells are composed of polymer and inorganic materials like silica.

Opportunity

- Pharmaceutical industry
- Agricultural industry
- Cosmetic industry
- Biotechnology industry

Patent Status

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