31-2016-4312 | Novel Methods for Micro-Encapsulation by Non-Aqueous Sol-Gel Routes

Abu-Reziq Raed , HUJI, Faculty of Science, The Institute of Chemistry

Background

- Today, The main method employed for the synthesis of silica microcapsules is based on an emulsion/sol-gel approach. This approach has been applied successfully in the microencapsulation of hydrophobic materials.
- The encapsulation of hydrolytically unstable ingredients cannot be achieved by the current microencapsulation methods as they rely on water-based emulsions.
- There are many candidates of pharmaceutical, agricultural or cosmetic active components that are water-sensitive or air-sensitive. To enable their encapsulation in silica shells, non-aqueous sol-gel routes must be involved.

Our Innovation

The researchers developed a novel microencapsulation technology. The technology is based on oil-in-oil emulsification and non-aqueous sol-gel chemistry that enables the encapsulation of various hydrophilic and hydrophobic active materials. The technology make it possible to encapsulate water-sensitive or air-sensitive actives that previously couldn't be encapsulated by any other microencapsulation methods.

- Encapsulate very hydrophilic materials purely without the need to dilute them in water.
- Overcome the stability limitation of water-sensitive actives.
- Applied for other types of hydrophilic or hydrophobic active materials.
- Can be used to prepare microcapsules that are composed of different types of metal oxide.

Technology

- Silica microcapsules containing pure polyethylene glycol (PEG) or glycerol in their core was successfully demonstrated for the first time.
- Different types of ionic liquids, deep eutectic solvents, highly water-soluble agricultural actives were also microencapsulated as well as Vitamin A and Cymoxanil.
- Octyl Methoxy Cinnamate (OMC) was encapsulated by a method in which the hydrophobic OMC is emulsified in PEG and then a silica shell is formed around the OMC droplets.
- Taxol, anti-cancer drug, was microencapsulated in a similar way.

Opportunity

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

Patent Status

Contact for more information:

Matt Zarek
VP, BUSINESS DEVELOPMENT
+972-2-6586686
Yissum Research Development Company of the Hebrew University of Jerusalem
Hi-Tech Park, Edmond J. Safra Campus, Givat-Ram, Jerusalem
P.O. Box 39135, Jerusalem 91390 Israel
Telephone: 972-2-658-6688, Fax: 972-2-658-6689