Call for application for research scholarships

for post-graduate international candidates

RESEARCH PROJECT N. 14

Title

Host-guest inclusion complexation as a strategy to protect photo-sensible substances during UV-induced polymerization

Scientific responsible (name, surname, role)

Roberto Pisano, Associate Professor (roberto.pisano@polito.it)

Short description of the research activity (max 250 words)

Vitamins used as food supplements or cosmetic ingredients often suffer from photo-degradation. Despite limiting their shelf-life, photo-degradation also prevents some vitamins to be processed in UV-induced encapsulation processes.

A strategy to protect vitamins from photo-degradation consists in forming host-guest complexes with cyclodextrins, a category of oligosaccharides exhibiting the ability to form inclusion complexes by hydrophobic interactions.

On the other side, the use of liquid formulations is often considered as a strategy to improve the release kinetics of active principles. For this purpose, microcapsules containing a liquid core can be produced by incorporating micrometric liquid droplets in a UV-curable polymeric shell.

Cyclodextrin-encapsulation combined with UV-induced polymerization could expand the selection of bioactive molecules that can be micro-encapsulated through a UV-activated process.

The candidate will exploit the opportunity to use cyclodextrins as stability and solubility enhancers of vitamins or photodegradable moities in UV-induced polymerization processes. The candidate will investigate the optimal process conditions for the production of vitamin-containing liquid microcapsules at the lab scale and will investigate the release kinetics from the produced batches. The role of cyclodextrin or cyclodextrins derivatives in preserving the metabolic activity of selected vitamins will be investigated.

Specific requirements (experiences, skills)

Practice of the most common chemical laboratory equipment, critical thinking (preferable)

Website of the research group (if any)

http://www.disat.polito.it/it/la_ricerca/gruppi_di_ricerca/musychen/molecular_engineering_lab_mole

Keywords (min 3, max 6)

cyclodextrins, UV photodegradation, microcapsules, vitamins

Research Area (max 1)

Chemistry and Material Science