Encapsulation of nutraceuticals in biocompatible oligo(ethylene glycol) (OEG)-based microgels

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Stimuli-responsive microgels based on oligo(ethylene glycol) (OEG) represent an emerging class of smart materials with strong potential for biomedical applications, particularly in the encapsulation and controlled delivery of nutraceuticals. These microgels undergo reversible swelling or collapse in response to external stimuli, such as including temperature and pH [1].

Combination of colloidal techniques (hydrodynamic diameter and electrokinetic) was used to probe the physicochemical properties of the system. Nutraceutical encapsulation performance was evaluated through UV-Vis spectroscopy, quantifying both encapsulation efficiency and loading capacity to advance the understanding of OEG-based microgels as nutraceutical delivery platforms.

The swelling behavior and electrokinetic response of the microgels were systematically investigated as a function of pH and temperature, enabling determination of the volumetric phase transition temperature (VPTT) across a range of pH conditions and following nutraceutical occlusion. Various ratios of nutraceuticals to OEG microgels were analysed. Surprisingly, increasing nutraceutical concentration did not yield improvements in encapsulation efficiency or loading capacity. Continued research into these promising systems is needed to fully elucidate the underlying mechanisms governing their encapsulation behavior.

Keywords:
Oligo(ethylene glycol), Nutracetical, Microgels

References:

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Acknowledgements:
This activity was funded by grants PID2023-149387OB-I00 and PID2023-149650NB-I00 awarded by MICIU/AEI/10.13039/501100011033 and FSE+ and grant C-EXP-187-UGR23 awarded by Consejería de Universidad, Investigación e Innovación and by ERDF Andalusia Program.