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In vitro digestion and storage stability of riboflavin-loaded WPI nanostructures towards foods fortification

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The consumption of fortified foods incorporating bioactive compounds as a way to promote a healthier lifestyle has gain particular interest in research community and food industry. However, due to their chemical instabilities, bioactive compounds' bioavailability can be compromised during post-processing, storage, and digestion. Their encapsulation/association in nanostructures offers a good strategy to enhance bioactive compounds' bioavailability.
Whey protein isolate (WPI) nanostructures were developed to associate riboflavin (Rb), aiming at its incorporation in foods, and their storage stability and digestion behavior were evaluated. Rb bioaccessibility was determined through spectrofluorimetry by quantifying Rb concentration in the soluble fraction after digestion, that was performed using INFOGEST static *in vitro* gastrointestinal model. Also, storage stability was evaluated by assessing nanostructures size and polydispersity (PdI) through dynamic light scattering, over 45 days at 4 °C and 25 °C.
Rb-loaded WPI nanostructures showed no statistically significant differences in terms of size (ca. 120 nm) and PdI (0.2) during storage period, at both temperatures tested. Rb showed a bioaccessibility of 56 % when associated in WPI nanostructures, enhancing Rb bioaccessibility. These results contribute to improve the knowledge on the use of WPI nanostructures as effective encapsulating systems to augment hydrophilic bioactive compounds' bioaccessibility, towards food fortification.