PO89 - 24981 - BIGELS AS A VEHICLE FOR BIOACTIVES COMPOUNDS: ASSESSMENT OF IN VITRO DIGESTION BEHAVIOR

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Abstract

Bigels are novel complex biphasic systems composed by organic and aqueous gelled phases that can act as texture modifiers, and vehicle for topical and gastrointestinal delivery of hydrophilic/lipophilic bioactives. However, its behavior through digestion has still not been assessed. Moreover, process conditions can change their structure and consequently the bioactive stability and release. Thus, the aim of this work was to evaluate the influence of the process on bigel's structure and behavior through gastrointestinal tract. Bigels were produced with gellan gum hydrogel (1.25% w/w) and high oleic sunflower oil+glycerol monostearate (10% w/w) organogel loaded with 0.1% curcumin. Gelling agents were solubilized separately (80 °C, 30 min) and then mixed by cold or hot-emulsification method. Cold-set was carried out mixing gelled systems by mechanical stirring (50 °C, 1,000 min^{-1}, 10 min). Hot-emulsification was performed with addition of 2% (w/w) Tween 80 by mechanical stirring (same conditions) or rotor-stator device (50 °C, 14,000 min^{-1}, 2 min). Bigels were submitted to an *in vitro* gastrointestinal digestion using the harmonized digestion method, and changes were assessed through fluorescent microscopy. At the end of digestion, free fatty acids (FFA) released and bioaccessibility and stability of curcumin were determined. Cold-set bigels showed W/O structure while hot-emulsification led to W/O bigels with smaller droplets when rotor-stator was used. The results from the *in vitro* digestion indicated that all bigels were stable after stomach conditions, however, they destabilized during intestinal conditions. Besides, O/W bigels showed higher stability with less droplet's coalescence, due to the surfactant presence. FFA and curcumin stability followed the same tendency, with higher values for O/W bigels. However, despite the higher stability, the effective bioavailability was similar for all bigels produced. Thus, independent of the structure and physical properties, bigels could be used for protection and oral delivery of hydrophobic bioactives and are promising systems for concomitant hydrophilic/hydrophobic loading.

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