Ref: 4375

Digestibility of organogels produced with medium- and large-chain triacylglycerols

Fasolin, Luiz Henrique[1]; Cerqueira, Miguel Ângelo[2]; Pinheiro, Ana Cristina[2]; Cunha, Rosiane Lopes[1]; Vicente, António Augusto[2]

[1]University of Campinas, Brazil;
[2]University of Minho, Braga, Portugal

E-mail: lh.fasolin@gmail.com

Keywords: Organogel, bioactive, triacylglycerol, release

Abstract

The structure of organogels depends on the organogelator and the type of oil used, exerting influence on the release profiles of bioactives in the gastrointestinal system. So, the aim of this work was to produce gels using medium-chain triacylglycerols (OMCT) or high oleic sunflower oil (large-chain triacylglycerols – OLCT), glycerol monostearate as organogelator and β-carotene as bioactive compound and evaluate its stability in the digestion *in vitro.* The static digestion of the organogels was performed and during the digestion, the gel structure, free-fatty acids (FFA) content and bioaccessibility of β-carotene were evaluated by fluorescent microscopy, NaOH titration and spectrophotometry methods, respectively. In the gastric step the gel structure remains almost intact without bioactive release, but some fluid incorporation was visually observed. In the duoden the bile salts in conjunction with lipase interacted with the organogel, destroying the structure and forming micelles. A great number of small micelles was observed for OLCT, while for OMCT systems fewer and bigger droplets were observed due to the coalescence of the droplets that could indicate loss of structure. This is corroborated by the higher amount of FFA and almost all bioactive bioaccessibility of OMCT systems. In the jejun step the OMCT structure was completely destroyed, while for OLCT the number of micelles decreased but no coalescence was observed. Moreover, for OLCT the FFA content remains the same and decreased for OMCT. At the end (ileum), the OLCT droplets began to coalesce increasing their diameter. Thus, stronger organogel and more resistant to the gastrointestinal system was produced with LCT. However, this resistance did not allow the complete bioaccessibility of the bioactive that was observed for MCT. Results showed that it is possible to use organogels as vehicles for bioactives and the release can be controlled by the modification of the structure.