



## PO64 - 24702 - TUNING PHYTOSTEROLS-BASED OLEOGELS PROPERTIES BY SOYBEAN LECITHIN ADDITION IN DIFFERENT ORGANIC PHASES

***Paula K. Okuro<sup>1</sup>; Antonio A. Malfatti-Gasperini<sup>2</sup>; António A. Vicente<sup>3</sup>; Rosiane L. Cunha<sup>1</sup>***

1 - Department of Food Engineering, School of Food Engineering, University of Campinas, 13083-862 Campinas, São Paulo, Brazil; 2 - Brazilian Synchrotron Light Laboratory, Brazilian Center for Research in Energy and Materials, 13.083-970 Campinas, São Paulo, Brazil; 3 - Centre of Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

E-mail: paulaokuro@gmail.com

**Keywords:** Oil structuring, Fat replacer, Solvent quality, Organogel

### **Abstract**

In this study the effect of soybean lecithin (L) addition and solvent quality in a hybrid oleogel system – formed by  $\beta$ -sitosterol and  $\gamma$ -oryzanol (BG) – was investigated. Medium chain triglycerides (MCT) and sunflower oil (SFO) were used as triglycerides with different chain length and degree of unsaturation, and hexadecane (HEX) as a model of linear hydrocarbon. The motivations in using lecithin are related to its natural/versatile properties, showing different functionalities such as emulsifier and co-oleogelator, and to the self-assemble ability of its molecules via non-covalent interactions. Hierarchical organization of structured oil was investigated applying techniques for bulk, meso and nanoscale. Self-sustained systems could no longer be observed after 40 wt% of BG replacement by lecithin. Small-angle X-ray scattering showed that building blocks were dependent on solvent type and BG:L ratio in the mixture of oleogelators. Differential scanning calorimetry showed that stability against temperature was improved decreasing the polarity of the solvent. In addition, thermal and rheological measurements showed a time-dependent self-assembly of molecules in hybrid systems. Microscopy images depicted changes on typical fibril aggregation of BG as lecithin was added, which promoted to a certain extent the suppression of phytosterols ribbons formation. Oscillatory shear and uniaxial compression measurements were influenced by BG:L ratio and solvent type mainly at higher lecithin amount. The combination of BG and MCT appeared to be the most affected by lecithin incorporation whereas SFO rendered harder oleogels. These results could contribute to understand the role of both lecithin addition and solvent type influencing the host oleogelator structure. It was hypothesized that intermolecular BG complex formation is hindered by lecithin, besides this phospholipid also might coexist as a different phase, causing structural changes in the gel network. Addressing the role of co-oleogelator can provide the opportunity to tune soft materials with desired properties.



### **Acknowledgements**

São Paulo Research Foundation (FAPESP) grant # 2018/20308-3. Brazilian National Council for Scientific and Technological Development (CNPq 307168/2016-6). Brazilian Synchrotron Light Laboratory (LNLS) for the opportunity to use SAXS1 (proposal number 20160277 and 20170297) beamline and Tsuno Rice Fine Chemicals Co., Ltd. for the donation of gamma oryzanol samples.