RESEARCH THAT RESONATES
AUGUST 17-21, 2014 | MONTREAL, CANADA

IUFoST 17th WORLD CONGRESS OF FOOD SCIENCE AND TECHNOLOGY & EXPO

BOOK OF ABSTRACTS*

* Please note if you do not find a set of abstracts for a Concurrent Session, this is because we did not receive a set of abstracts for that session.

Evaluation of Beta-Carotene Bioacessibility Encapsulated in Lipid Nanoparticles Produced with Murumuru (*Astrocaryum murumuru*) Butter by an *In Vitro* Dynamic Gastrointestinal Model **MP32.5**

Graziela Gomes[1]; Antonio Vicente[2]; Samantha Pinho[1]
[1]University of São Paulo (USP), Pirassununga, Brazil; [2]University of Minho, Braga, Europe, Portugal

Colloidal delivery systems have the ability to increase bioavailability of lipophilic substances encapsulated within them. Solid lipid nanoparticles (SLN) are one of the most used colloidal dispersions in nanoencapsulation of hydrophobic substances, and can be produced using low energy approaches, such as the phase inversion temperature (PIT), which is based in the change of solubility nonionic polyethoxylated surfactants with temperature. In order to incorporate these systems in foods, it is important studying their behavior under gastrointestinal tract conditions. *In vitro* models aim to achieve an acceptable level of validation of digestive properties compared to *in vivo* behavior, and can

be static or dynamic. The dynamic model have been developed to simulate more effectively the *in vivo* behavior, and one of the most known is the TIM system (TNO intestinal model), that mimics the major events occurring in the gut lumen. Such model consists of serial compartments simulating the stomach, duodenum, jejunum, and ileum. The jejunum and ileum compartments are connected to filtration units to simulate the absorption in the gut.
This work aimed to investigate the digestibility of beta-carotene loaded SLN produced with murumuru(*Astrocaryum murumuru*) butter (an Amazon oil rich in lauric fatty acids), prepared by PIT method, in a TIM-like system. The samples of nanoparticles (average diameter ~40 nm) were submitted to digestion cycles of 5 h, using flow rates, secretions and enzymatic solutions according to Reis et al (2008). After filtration and the ileal valve, the efflux was collected hourly, for particle size, zeta potential, bioaccessibility and free fatty acids (FFA) analyses. Particle size and zeta potential were also evaluated for the stomach (after 90 min) and duodenum (after 120 min).
Nanoparticles became stable in the stomach, and started to destabilize in duodenum. The amount of FFA released was determined by titration and the results revealed that almost 50% were absorbed. The content of beta-carotene was measured spectrophotometrically and the total bioacessibility was approximately 40%. The process waste was around 10%, which indicate that the TIM-like system used had a good yield.
The results show the good potential of nanoparticles to serve as encapsulation system for lipid-soluble bioactive compounds and the eficience of the TIM-like system in estimating parameters as digestibility and bioacessibility of beta-carotene-loaded SLN produced.