Print this Page

Presentation Abstract

Presentation Number:	210-01
Presentation Title:	Production of β-carotene nanoemulsions prepared by a high-speed blender: Characterization and stability evaluation
Division:	Food Chemistry
Presentation Time:	Tuesday, Jul 20, 2010, 8:35 AM - 8:55 AM
Location:	Room S504cd
Author Information:	Hélder D. Silva, Miguel A. Cerqueira, Bartolomeu W. Souza, Clara M. Ribeiro, Maria C. Avides, Univ do Minho, Inst for Biotechnology and Bioengineering, Braga, Portugal; Jane S. Coimbra, Federal Univ of Viçosa, Viçosa, Brazil; Maria G. Carneiro-da-Cunha, Univ Federal de Pernambuco, Recife, Brazil; **António A. Vicente**, Univ do Minho, Inst for Biotechnology and Bioengineering, Braga, Portugal
Presentation Description/Abstract:	An efficient implementation of nanotechnology at the industrial level depends on the development of new tools for the application of strategies aimed at improving food quality and human health. Such strategies should offer the potential to significantly improve the solubility and bioavailability of many functional ingredients. The aim of the present work was to prepare β-carotene stable nanoemulsions as potential active ingredients for food formulations. β-carotene nanoemulsions were prepared using an emulsification-evaporation technique trough a high-speed blender. Promoting homogenization between β-carotene dissolved in n-hexane with Tween 20 dispersed in mili-Q water, removing the n-hexane trough evaporation. The emulsions were prepared based on a 2^3 level factorial design, being the time (2, 5 and 8 min) and shear rate of the homogenization (3500, 5500 and 6500 rpm) and the cycles between the each homogenization (1, 2 and 3) the independent variables. Particle size distribution of β-carotene nanoemulsions was determined by Dynamic Light Scattering. The stability of the nanoemulsions was determined at a storage temperature of 4 ºC, in the absence of light, through monitoring the concentration of β-carotene during storage by spectrophotometry. The color of the nano-emulsions was evaluated with a colorimeter using the parameters CIE $L^* a^* b^*$. The particle size ranged from 9.24 and 219.72 nm and between 9.78 and 259.68 nm for the weight-mean diameter ($D_{3,2}$) and volume-surface diameter ($D_{4,3}$), respectively. These diameters were measured immediately after the production of the particles. The concentration of β-carotene decreased during 21 days of storage time. Particle size parameters suffered a statistically significant influence ($p < 0.05$) from the blending time and from the interaction of blending time and shear rate.

These results show that it is possible to prepare oil-in-water nanoemulsions of β-carotene using the emulsification-evaporation technique, without the use of high-pressure homogenization.