ijuf '13
6TH MEETING OF YOUNG RESEARCHERS OF UNIVERSITY OF PORTO
U.PORTO
Livro de Resumos IJUP’13
6ª Encontro de Investigação Jovem da U.Porto

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Design
Ana Fernandes & Daniel Martins
Rui Mendonça

Impressão e acabamentos
Invulgar – artes gráficas

Tiragem
1000 exemplares

Depósito Legal
340336/12

ISBN
978-989-746-006-7

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Vitamin E profile of cooked dishes for patients with Phenylketonuria

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Phenylketonuria (PKU) is a rare inherited metabolic disorder with an autosomal recessive transmission. Early diagnosed patients need a prompt dietary intervention that consists in a semi-synthetic low-phenylalanine (Phe) diet with the inclusion of free Phe aminoacid mixtures, controlled amounts of natural foods low in protein such as fruits and vegetables and also, complement with low Phe dietic products. The dietary treatment of PKU resembles a vegan-like food pattern. As a result from the dietetic restrictions, low intakes of some micronutrients have been observed in some PKU patients, namely of vitamin E [1].

Vitamin E is the common name given to a group of 8 lipophilic compounds, namely α-, β-, γ- and δ- tocopherols and α-, β-, γ- and δ- tocotrienols, that occur naturally in vegetable oils. Its distribution pattern is related to the botanical origin of the oil.

In this work, we studied the Vitamin E profile of 10 low protein recipes [2,3] specifically planned for PKU patients, as well as natural daily basic cooked foods. Lipid fraction of the samples was obtained by Soxhlet extraction with petroleum ether and tocopherols were analyzed by normal-phase HPLC/fluorescence [4].

Total vitamin E contents varied between 0.07 and 10.08 mg/100 g. The prevailing vitamin found in all samples was α-tocopherol. The 8 vitamins were found in 3 meals cooked with veal magarese as a common ingredient. This suggests that the margarese used may contain palm oil in its composition.

In conclusion, cooked dishes, using good quality fats in its preparation, can be good sources of vitamin E for these patients and contribute to improve their nutritional status, concerning this particular nutrient.

Acknowledgments: R. Alves is grateful to FCT for a pre-doctoral grant (SFRH/BDP/64883/2010) financed by POIEC-OPEN. Tipologia 4.1-Farmacêutica Avançada, subsidized by FSE and MCTES. This work has been supported by FCT through grant no. PEst-C/EQB/LA0008/2011.

References:

Long-term stability of freeze-dried insulin-loaded solid lipid nanoparticles: a nanostrategy for a great solution

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Solid lipid nanoparticles (SLN) represent highly versatile protein delivery systems with numerous advantages, ranging from the superior drug stability to the easier scaling up for industrial production [1]. However, few studies have been supporting the long-term stability and shelf-life behavior of the nanoparticles formulations [2].

At the present work, a long-term study was performed to evaluate the physical and chemical stability of freeze-dried and non-freeze-dried insulin-loaded SLN during six months of storage at different conditions as recommended by International Conference on Harmonisation guidelines of pharmaceuticals for human use. The nanoparticles were characterized by infrared spectroscopy, high performance liquid chromatography-ultraviolet detection, dynamic light scattering, transmission and scanning electron microscopy. Furthermore, spectra similarity-based algorithms were applied to evaluate the maintenance of the insulin native-like structure over the time.

The results showed that the freeze dried SLN formulations with no cryoprotectant added were able to preserve insulin secondary structure in 6-months of shelf-life even at room conditions. These outcomes prove the drug-loaded protection and stability uniquely offered by the lipid nanoparticulate matrix. However, proteins structure and, morphological and release properties of the nanoparticles varied significantly when a cryoprotectant is used, and thus cryoprotectant effect is discussed. Considering that the formulations were freeze-dried by a non-optimized process, the next step must be focused in an experimental design in order to find the process parameters settings that best fit with the desired product quality attributes.

Acknowledgments: The authors acknowledge Fundação para a Ciência e Tecnologia by the project NanoFerrencia (2009-2012).

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