

Production of PCL nanoparticles by flash nanoprecipitation for controlled release of caffeine

Original

Production of PCL nanoparticles by flash nanoprecipitation for controlled release of caffeine / Massella, Daniele; Ferri, Ada; Barresi, A.. - ELETTRONICO. - (2017), pp. 80-80. (Intervento presentato al convegno Merck Young Chemists Symposium (MYCS 2017) tenutosi a Milano Marittima nel 13-15 November 2017).

Availability:

This version is available at: 11583/2692625 since: 2018-08-11T15:48:42Z

Publisher:

Società Chimica Italiana

Published

DOI:

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

OR-59

Production of PCL nanoparticles by Flash Nano Precipitation for controlled release of caffeine.

Daniele Massella,^{a,b,c,d} Ada Ferri,^a and Antonello Barresi.^a

^a *Department of Applied Science and Technology, Politecnico di Torino, Corso duca degli abruzzesi 24 10129 Italy*

^b *University Lille Nord de France, F-5900 Lille, France*

^c *ENSAIT, GMTEX, F-59100, Roubaix, France*

^d *College of Textile and Clothing Engineering, Soochow University, Suzhou, Jiangsu, 215123, China*

E-mail: daniele.massella@polito.it

Caffeine (CAF) is one of the most consumed drug worldwide due to its large application in food, pharmaceuticals, cosmetics and supplements; upon oral administration caffeine is cleared into the stomach in 15 minutes and absorbed into the blood within 1 hour. Caffeine is biodegradable polymer (poly(lactide-co-glycolide) (PLGA)) studied in drug delivery applications where long lasting releases are required. Caffeine was encapsulated in PLGA nanoparticles by exploiting the Flash nanoprecipitation technique which is well known method to encapsulate hydrophobic drug, but not hydrophilic active principles. The nanoparticles were produced in a confined impinging jet method dissolving caffeine alternately in the solvent (acetone) or in the antisolvent (water). The effect of the process parameters on the mean particle diameter and zeta potential of the nanoparticles was investigated by Dynamic Light Scattering. A novel procedure to accurately quantify drug loading Capacity (LC) and Encapsulation Efficiency (EE) was developed and implemented. The in vitro release kinetic was assessed by dynamic dialysis method. Nanoparticles with average diameter ranging from 300 to 350 nm were successfully produced, the mean size was correlated to the flow rate. LC and EE were assessed in the range of 14.536 and 34.36 respectively. The release test showed a delay in the peak of caffeine in blood mimicking solution up to 7 hours.

1. Zawrot, O. Jordan, B. Eastwood, B. Rotstein, A. J. Ugenholt, and M. Feele, *Food Addit. Contam.* 20 (11,) ; , !.

2. S. Oinha, S. Bansal, S. Aushika, S. Umria, and A. Rehman, *Int. J. Pharm.* 2 (115) ; , .

3. A. Ferri, S. Umari, S. Eila, and A.A. Barresi, *Can. J. Chem. Eng.* 95 (11) ; "7?14">17.