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Process innovation in the production of smart lipid-polymeric release systems

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Abstract

Liposomes are the most versatile carriers for the delivery of a large variety of both lipophilic and hydrophilic drug molecules, being biocompatible and biodegradable. Despite their great advantages, their tendency to degrade and aggregate in biological fluids as well as in storage conditions drove the research towards new preparative approaches for liposomes stabilization, essentially based on superficial coatings or inclusion in polymeric materials. However the most used techniques, such as spraying, layering, sometimes by exploiting supercritical fluids, require complex and expensive apparatuses. Therefore, this work was developed with the idea to overcome typical liposomes stabilization limits, by choosing the consolidated wet granulation process as a method to obtain granules containing liposomes in a single step, by spraying on powder the liposomal suspension, previously produced by a novel continuous and rapid simil- microfluidic method. Literature highlights, although with only few works, the use of wet granulation as method to stabilize polymeric nanoparticles suspensions, by adding them in the binder phase. Instead, there are not experimental evidences about the use of liposomes suspensions as binder phase in wet granulation for both their stabilization and incorporation in pharmaceutical solid forms. Thus, this novel combination between wet granulation and the use of liposomes suspension spray as binder phase, allowed to reach both easy and cheap liposomes stabilization and the production of smart solid multiparticulate dosage forms, which could be ideal candidates for a combined fast/slow release of active ingredients, enhancers, fortifiers.

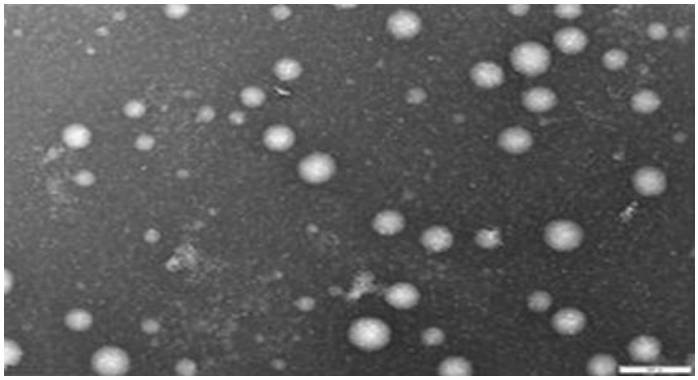

Figure 1. Image by transmission electron microscopy TEM of a granule internal section where nanoliposomes are visible, with unchanged both size (about 100 nm) and spherical shape with respect to the liquid form.

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Biography:

Annalisa Dalmoro graduated in Chemical Engineering, summa cum laude, in March 2009 at the University of Salerno (Italy), then she gained the Ph.D. degree in Science and Technologies for chemical, pharmaceutical and food industry in 2013. Starting from April 2013 she works as post-Doc researcher in TPP group (http://gruppotpp.unisa.it/en/) at the University of Salerno (Italy). Moreover, she is co-founder of the company Eng4Life srl, spin-off for technology transfer approved by the University of Salerno (http://www.eng4life.it/), established in January 2018. She has published about 40 research articles in international journals indexed on Scopus, WoS. She is also author of 2 patents.

Speaker Publications:

1. Barba A.A.; Lamberti G.; d'Amore M.; Bochicchio S.; Dalmoro A. Process for preparing nanoliposomes comprising micronutrients and food products comprising said nanoliposomes. WO 2019/049186 A1.
2. De Simone V.; Dalmoro A.; Lamberti G.; d'Amore M.; Barba A.A.; Central composite design in HPMC granulation and correlations between product properties and process parameters, New J. Chem., 41 (14) 6504 - 6513 (2017).
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