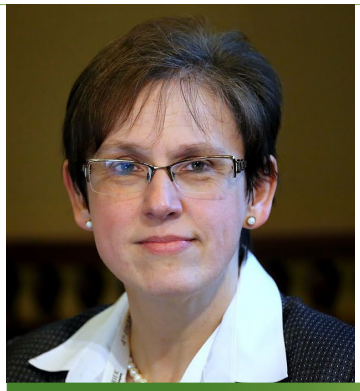
Romana Zelko, Polym Sci 2017, 3:4
DOI: 10.4172/2471-9935-C1-004



Romana Zelko

Semmelweis University, Hungary

BIOPOLYMERS MEETING 2017

Solid-state characterization and stability tracking of drug-loaded micro- and nanofibrous delivery systems

The formulation of novel nanofiber-based drug delivery systems focusing on specific delivery purposes has been investigated worldwide. The favorable physicochemical properties (high specific-area-to-volume ratio, high porosity and the possibility of controlling the crystalline-amorphous phase transitions of the loaded drugs), make them a desirable formulation and pathway to satisfy the needs of modern pharmaceutical development. In regenerative medicine, a peculiar importance has been attributed to the structure of nanofibers because microarchitecture very similar to that of the extracellular matrix can be achieved. Fibrous delivery systems can facilitate drug release and increase solubility of small molecules. Moreover, they are capable for controlled drug delivery over time for local or systemic drug administration. The solubility of the polymer, the fiber diameter and the fiber structure are the primary parameters affecting drug release. In the case of small molecules, developments focus mostly on overcoming the unfavorable physicochemical feature of the active agents. However, the physical and chemical stability of these systems has not yet been thoroughly investigated and thus poses a challenge in their development. The presentation intends to provide a comprehensive overview of non-invasive spectroscopic methods applied for the characterization of fibrous delivery systems, including a sensitive nuclear technique (Positron Annihilation Lifetime Spectroscopy), which enabled effective means for the detection and the prediction of possible supramolecular interactions based on the free volume changes initiated by stress conditions during storage. Since most of these interactions involve secondary bonds thus their rearrangements modify the size and distribution of free volume holes as a function of storage time. The applied experimental setup represents a useful approach to track the effect of ageing of the polymeric carrier on the solid-state changes of the active and the functionality-related characteristics of the delivery system.

Biography

Romana Zelko has her expertise in formulation and stability tracking of polymer-based drug delivery systems including various micro- and nanofibrous systems. Her research work focuses on different synthetic and natural polymeric delivery systems, physical ageing of polymers, microstructural characterization of dosage forms associated with their functionality-related characteristics. She has published 190 journal papers and 5 patents. Presently, she is working as the Dean in the Faculty of Pharmacy, Semmelweis University. She advanced her studies in the pharmaceutical technology at the Ghent University, Belgium.

zelko.romana@pharma.semmelweis-univ.hu

Notes: