

Poszter előadás

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Absztrakt:

Electrospun nanofibers: promising materials in nanobiomedicines and pharmaceutical technology

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Electrostatic spinning (ES) process was applied to prepare pharmaceutically active nanofibers loaded mainly with drug molecules and also with inorganic nanoparticles and living cells. Nanofibers were fabricated from the solution of polymers and active ingredients for improving drug administration, release and stability. The morphology of fabricated webs was investigated by optical microscope (Olympus BX-40) and scanning electron microscope (SEM, JEOL 6380LVa). The thermal behaviour of the samples was analysed by differential scanning calorimeter (DSC, Setaram DSC92). Crystal morphology was studied using Raman microscope (Labram Horiba Jobin Yvon) and X-ray diffractometer (PANalytical X'pert Pro MDP XRD). The chemical stability was analysed by capillary electrophoresis (HP3D CE, Agilent). In vitro drug release was performed by Erweka DT6 dissolution tester (USP II apparatus) and the drug concentration of collected samples was determined using spectrophotometer (HP 8452 UV-VIS).

Diameter of the prepared fibers was in the range of hundreds nanometers determined by SEM. According to XRD, Raman-microscopy and DSC investigations the APIs were in amorphous state in the polymer matrix. There was no detectable degradation of the APIs in the electrospun webs. The electrospun samples were dissolved by water immediately and drug release time was no more than half minute.

This work shows that electrostatic spinning is capable to fabricate webs of nanofibers with ultra-fast drug release and increased stability. These formulations dissolve in water based media immediately therefore they might be applied as oral dissolving web (ODW). Due to that the electrostatic spinning process works at room temperature it is capable for producing sensitive biopharmaceuticals such as vaccines thus nanofibers might be also promising in the future researches of non-invasive vaccination which is a more and more important European and global issue. Last but not least this lab-scale technology is suitable for industrial scaling up owing to the recent rapid development of industrial electrospinning technology mainly in the textile and filtration industry.

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nanostructured drugs

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