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High-speed electro-spinning of aqueous polymer solutions for the solid formulation of biopharmaceuticals**Edit Hirsch**

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The application of biopharmaceuticals for oral administration is a topic of great interest in the pharmaceutical industry due to the inherent advantages of oral delivery. Electro-spinning is a promising drying technology providing a rapid and gentle drying at ambient temperature due to the large surface area. Considering the sensitivity of biopharmaceuticals, the use of aqueous solutions during electro-spinning is preferred. The commonly used single needle electro-spinning equipment does not have adequate productivity, thus in order to satisfy the industrial requirements the scale-up of electro-spinning is necessary. High-speed electro-spinning (HSES) is a suitable technology for mass production of fibers in the sub-micron range. The scaled-up electro-spinning of water-soluble polymers such as polyvinyl pyrrolidone (PVP) K17, PVP K90, polyvinyl alcohol (PVA), Hydroxypropyl β -cyclodextrin (HP β CD) and hydroxypropyl methylcellulose (HPMC) were achieved using HSES. Simultaneously the optimization of these systems was accomplished considering the feasibility of downstream processing (e.g. grinding) of the nano-fibrous mat. High molecular weight polyethylene oxide (PEO) was added to enhance fiber formation of PVA and HPMC while sugar type "grindability-aiding" excipients were used to improve grindability of the dried product. PVA and PEO based samples containing sugar type excipients (glucose, mannitol, lactose, saccharose, trehalose) were ground and characterized. The physical state of the polymers and excipients impacts the properties of the nano-fibers such as downstream processability and in addition it could affect the biomolecule stability. The results demonstrate the successful scale-up process to HSES which is a suitable production method for formulations of water-soluble polymers for oral delivery of biopharmaceuticals.

Biography

Edit Hirsch has completed her MSc at Budapest University of Technology and Economics, Hungary and started her PhD studies in 2015 at the Department of Organic Chemistry and Technology at the same university in the field of Pharmaceutical Biotechnology. She is the Member of the Technology of Pharmaceutical, Environmental and Safety Materials Research Group and a Researcher of the Pharmatech Model Laboratory.

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