

**Institute of Pharmaceutical Technology and
Regulatory Affairs
Faculty of Pharmacy
University of Szeged**

I. Symposium of Young Researchers on Pharmaceutical Technology, Biotechnology and Regulatory Science

Szeged, Hungary



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Preparation and investigation of levodopa-containing powders for alternative administration

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Levodopa (LEVO) is the most widely used active pharmaceutical active agent in the treatment of Parkinson's disease. During the per os administration, the significance of off-period increases, therefore it is necessary to find additional therapeutical possibilities. Nasal delivery of levodopa can be a suitable choice.

Nasal powders were prepared as a binary system with excipients by a dry co-grinding process. The co-grinding process parameters (LEVO:excipient ratio and grinding time) resulted the 5-40 μm particle size range. The co-grinding process decreased the degree of crystallinity of LEVO. The α -cyclodextrin and PVP had an intensive crystallinity degree reducing effect. HPMC, PVP and D-mannitol associate around the LEVO crystals preventing its crystalline structure. Presence of hydrogen bond was detected only for LEVO-PVP and LEVO-D-mannitol. Chemical degradation of LEVO in the binary ground systems was not detected. The dissolution rate of the products was controlled.

Besides nasal powders composed of levodopa and chitosan or sodium hyaluronate¹ were also prepared with a planetary ball mill. The rotation speed, the milling time and the drug-excipient ratio were evaluated to be the most relevant milling factors - as a result of the initial risk assessment according to a factorial design. Milling in the presence of higher amount of sodium hyaluronate resulted in smaller average particle size of powders and higher initial dissolution and permeation of LEVO compared to chitosan-containing formulations.

Reference

1. Bartos Cs., Pallagi E., Szabó-Révész P., Ambrus R., Katona G., Kiss T., Rahimi M., Csókal. Eur. J. Pharm. Sci. 123, 475-483 (2018)

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