

**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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Optimization of the production process and product quality of titanate nanotube-drug composites

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Conventional drugs often have poor pharmacokinetics and biopharmaceutical properties[1]. Whereas, nanosized drug delivery systems may prolong shelf-life and enhance bioavailability and acceptability by increasing either uptake efficacy or patient compliance [2].

TNTs were synthesized with hydrothermal method, and then composites were formed with atenolol (ATN) and hydrochlorothiazide (HCT) using various solvents. Ethanol, methanol and 0.01M HCl solution or ethanol and 1M NaOH solution were used to produce TiATN and TiHCT composites respectively. The physicochemical properties of the samples were investigated by using TEM (FEI, OR, USA) and SEM (Hitachi, Japan) imaging to analyze the texture, optical contact angle tester (DataPhysics, Germany) to determine the surface free energy, FT-IR spectrometer (Thermo Fisher Scientific Ltd., MA, USA) and DSC/TG apparatus (Mettler-Toledo Ltd, Hungary) to detect the interaction between drugs and TNTs.

The results revealed that the strength of interactions is highly connected to the solubility of the drug in , and to the volatility of the applied solvent. Moreover, the strength of interactions exhibited considerable influence on the surface characteristics of the products, which determines their processability and their behaviour in biological environment.

References

1. Buzea C. et al. *Biointerphases*, 2, 17-71 (2007)
2. Raliya R. et al. *Current Pharmaceutical Design*, 22, 2481-2490 (2016)