**The study of water-insoluble drug release from the novel particulate intradermal delivery system**

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Vaterite CaCO3 micro- and submicron particles have been recently proven as a promising system for effective drug delivery to hair follicles. Investigation of the particles’ behavior in model media *in vitro* is an important step when the system is adjusted for the delivery of each specific pharmacological compound. The release study from the carriers in media, that are similar to biological fluids, is especially of high importance here. In case of water-insoluble payload, such investifation becomes especially challenging as involves the study of its liberation in aqueous solutions, thus requires the elaboration of novel approaches.

The aim of the current work was to develop a technique enabling multimodal spectroscopic and microscopic investigation of the release behaviour of a water-insoluble drug from vaterite carriers in water. The addition of a polar aprotic solvent (N,N-dimethylformamide) to aqueous suspensions of the carriers at the investigated time points right before the UV–Vis spectroscopic measurement allowed us to enhance the accuracy of the released drug determination. Monitoring of the carrier degradation process by a combination of scanning electron microscopy demonstrated a good correlation between the obtained data and the payload release kinetics.

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