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Quality by Design driven development of Liraglutide loaded nanocarrier system designed for oral delivery

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Since Liraglutide, a fatty acid modified glucagon like peptide -1 (GLP1) analog, is still administered parenterally, this work aims at designing and optimizing Liraglutide encapsulated in polymeric nanoparticles for oral administration implementing Quality by Design (QbD) concept from the early stage of development.

Rish assessment based study was successfully conducted followed by selecting the critical process parameters (CPPs) and critical material attributes (CMAs) with the highest risk to be further investigated applying screening design of experiment (DOE). Plackett Burman DOE was successfully implemented to understand and evaluate the effect of CPPs and CMAs on the size, encapsulation efficiency, polydispersity index and zeta potential of Liraglutide loaded polymeric NPs. The design space was established and the optimized formula was prepared and examined for physiochemical properties, compatibility, structural stability and in vitro release behaviour.

This work presents the potential of implementing the QbD methodology when designing such a complex system to ensure high quality of the final product.

References


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