SHORT COMMUNICATION

ESTIMATION OF THYMOQUINONE IN COMBINATORIAL DUAL DRUG LOADED NANOPARTICLES

ABSTRACT

In this work, we present a UV spectroscopy-based method for estimating metformin hydrochloride (MFN) and thymoquinone (TQ) in combinatorial dual drug-loaded nanoparticles designed for brain cancer treatment. The nanoparticles co-deliver thymoquinone and metformin hydrochloride, leveraging their synergistic anticancer properties. The designed analytical technique was validated by ICH Q2 R1 demonstrating high precision, accuracy and robustness. Linearity was confirmed for thymoquinone and metformin hydrochloride in ethanol and phosphate buffer (PB), pH 7.4 with correlation coefficients (R^2) above 0.998. The method provides a reliable and efficient means of quantifying thymoquinone and metformin hydrochloride in nanoparticle formulations, facilitating advanced brain cancer therapeutic strategies.