

DIFFUSE REFLECTANCE INFRARED FOURIER TRANSFORM SPECTROSCOPIC METHOD FOR ESTIMATION OF NERATINIB IN PHARMACEUTICALS: APPLICATION TO ANALYTICAL QUALITY BY DESIGN AND GREENNESS ASSESSMENT

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(Received 25 January 2023) (Accepted 27 February 2024)

ABSTRACT

In this research paper, we report an eco-friendly diffuse reflectance infrared fourier transform spectroscopic (DRIFTS) method for quantifying neratinib. The systematic method development was performed as per the recent analytical quality by design concept. The critical method variables such as resolution (cm^{-1}) and the total number of scans were investigated using a central composite design to determine their influence on the measurements at 2204.64 cm^{-1} . The method was valid over a linear ($R^2 > 0.99$) range of $5\text{-}30 \mu\text{g mg}^{-1}$ of neratinib, with adequate accuracy (recovery $> 100\%$) and precision ($\text{RSD} < 1\%$). Afterwards, the method greenness assessment was performed using the Analytical Greenness Metric and White Analytical Chemistry approach to establish the overall green sustainability of the current method. In a nutshell, the different functional groups of the drug were identified, and neratinib was quantified from the pharmaceutical tablets with optimum method robustness.