

A Kinetic Photometric Method for Benzalkonium Chloride Determination in Eye Drops

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Received: October 25, 2018; Accepted: December 17, 2018

DOI: 10.17721/moca.2018.177-182

A novel sensitive kinetic photometric method for the Benzalkonium Chloride (BAC) determination has been developed. The method is based on the ability to inhibit the reaction of Acetylcholine hydrolysis by cholinesterase. The reaction rate is evaluated by the non-hydrolysed Acetylcholine residue, which is determined by the amount of Peracetic acid, produced during the interaction with the excess of H_2O_2 . Indicator reaction is an interaction of p-phenetidine with Peracetic acid that leads to the formation of 4,4'-azoxyphenetole with $\lambda_{max} = 358 \text{ nm}$ ($\lg \epsilon = 4.2$). The conditions affecting the reaction (reagents concentration, pH, order of addition of reagents, stability in time) have been optimized. The linear dependence has been obeyed in the range of $(1.4-8.4) \cdot 10^{-6} \text{ mol L}^{-1}$ of BAC with correlation coefficient of 0.999. The assay LOQ (20% of the inhibition degree) has been $1.9 \cdot 10^{-6} \text{ mol L}^{-1}$. The proposed method has been successfully applied to the analysis of the eye drops and has shown an accuracy and reliability of the results obtained.

Keywords: benzalkonium chloride (BAC), cholinesterase, acetylcholine
