Міністерство освіти і науки України
Київський національний університет імені Тараса Шевченка
Хімічний факультет, кафедра аналітичної хімії

Тези доповідей
Київської Конференції з аналітичної хімії
Сучасні Тенденції
2016

Book of Abstracts
Kyiv Conference on analytical chemistry
Modern Trends
2016

18–22 жовтня 2016, Київ

APPLICATION OF THE KINETIC ENZYMATIC METHOD FOR BENZALKONIUM CHLORIDE DETERMINATION IN AEROSOL PREPARATION

Blazheyevskiy M.Ye , Koval'ska O.V.

National University of Pharmacy, Ukraine
61168, Valentynivs'ka, 4, Kharkiv, Ukraine

«Aqua-rinosol» is a medicine for treatment dryness inside the nose (nasal passages). It helps add moisture inside the nose to dissolve and soften thick or crusty mucus. In babies and young children with stuffy noses who cannot blow their noses, using this product helps to make the mucus easier to remove with a nasal bulb syringe. This helps relieve stuffiness and makes breathing easier. This product contains a purified gentle salt solution (also called saline or sodium chloride solution). and Benzalkonium chloride (BAC) as preservative (w=0,015 %). It is a mixture of alkylbenzyldimethylammonium chlorides of various even numbered alkyl chain lengths (R=C8, C10, C12, C14, C18). This product is a nitrogenous cationic surface-acting agent belonging to the quaternary ammonium group, especially inhibitors of acetylcholinesterase.

Considering widespread use in pharmaceutical formulation the determination of low concentration preservative constitutes a challenging problem in current pharmaceutical analysis and is a topic of global interest. The standarted method for determination BAC in pharmaceutical compositions was reversed-phase high performance liquid chromatographic.

We are proposed the most important method for BAC detection is based on an enzymatic (cholinesterase) reaction. Mechanism of analytical reaction and sensitivity of this method are the same as, or similar to, those in the human body. The conventional enzymatic method is based on the ability of cholinesterase to accelerate hydrolytic decomposition of the neurotransmitter (substrate) acetylcholine to choline and acetic acid. The reaction rate is detected at unhydrolised acetylcholine residue, which is determined by the amount of peracetic acid, producted during the impact of H2O2 on it. Indicator reaction is a reaction of peracetic acid with 4-ethoxyaniline interaction that leads to the formation of azoxyphenetole with λmax = 350 nm (lgε =4.18). The measurement velocity of changing of light absorption vs. time (ΔA/Δt, min-1) give a chance to quantitatively determination of BAC. The results confirmed that the method is linear at concentrations ranging from 1.0×10^{-6} mol/L to 5.0×10^{-6} mol/L. Depending calibration equation ΔA / Δt, min-1 from the village BAC has the form: tgα = 0,005 *c* + 0.0075 (r = 0,999). LOD was 0.4×10^{-6} mol / L. The method was satisfactorily applied to the determination of BAC in nasal pharmaceutical preparation«Aqua-rinosol». The relative standard deviation was 2.7 % (*n*=5). This method is beneficial because high sensitivity and selectivity can be achieved using relatively simple technical equipment.

1. *Hashem AlAani, Journal of Applied Pharmaceutical Science 2016, 6 (05), P.. 080-089*
2. *Kostić D, E-Journal of Chemistry 2012, 9(3) P. 1599-1604*
3. *Gubin M., Pivovarova S.; Pharmacy, 2012, 4, P.9-12:*
4. *http://www.rusvrach.ru/pharm/archive/3380-qq-4--2012--01.html*