

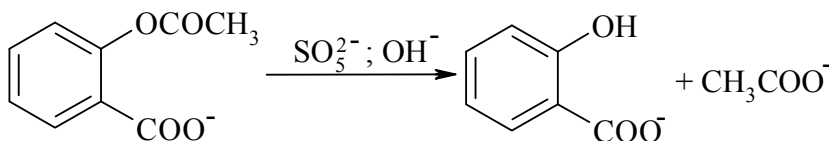
ASPIRIN KINETIC-SPECTROPHOTOMETRIC ASSAY WITH PEROXYMONOSULFATE

Blazheyevskiy M.Ye., Kryskiw L.S.

National University of Pharmacy, Kharkiv, Ukraine

soul_fly@meta.ua

Aspirin, also known as acetylsalicylic acid (ASA), is a salicylate drug, often used as an analgesic, antipyretic and an anti-inflammatory medication. It also has an antiplatelet effect. Today, aspirin is one of the most widely used medications in the world, with an estimated 40.000 tonnes of it being consumed each year. The SPHU and PhEur recommend to quantitate aspirin titrimetrically. The scientific literature describes kinetic, spectrophotometric, fluorescent, potentiometric, chromatographic and other methods for aspirin assay. We propose a new catalytic indicator reaction of ASA hydrolysis (perhydrolysis) with potassium hydrogen peroxymonosulfate (HPMS) for aspirin quantitation. Tangent method of differential kinetic method analysis was used. The optimum reaction conditions has been evaluated: $c(\text{HPMS})3.8 \times 10^{-3} \text{ mol L}^{-1}$, 10.5-11.0 pH range. In this case the maximum difference between the rate of catalytic (perhydrolysis) and non-catalytic (alkaline hydrolysis) decomposition of ASA was observed and therefore to measure the indicator reaction rate with sufficient accuracy under the first-order reaction kinetics. The hydrolysis product of ASA (salicylate) is monitored at 295 nm during 15 min.



Calibration graph for aspirin was obtained: $\text{tg}\alpha = (96.9 \pm 8.3) \times c - (0.003 \pm 0.001)$, ($r=0.999$). It has linear dependence up to $200 \mu\text{mol L}^{-1}$. The limit of quantitation (LOQ) is $20 \mu\text{mol dm}^{-3}$. For five determinations of aspirin 8, 12 and $16 \mu\text{mol L}^{-1}$ concentrations RSD was 2.4%, 1.6% and 1.0% ($n=5; P=0.95$) respectively. Method has satisfactory reproducibility and accuracy ($\text{RSD} \leq 2.4$, $\delta \leq -0.1\%$). Aspirin substance contains $99.97 \pm 0.01\%$ of ASA.

Thus a highly selective and sensitive spectrophotometric method has been developed for the determination of aspirin based on hydrogen peroxide catalytic effect on the alkali hydrolysis of ASA. The proposed method is simpler and expresses in comparance with well-known one. Statistical comparison of the results with those of an official method shows excellent agreement and indicates no significant difference in precision. The proposed method does not require the use of toxic solvents or reagents and sophisticated equipment.