

Materials and methods: working solution of glibenclamide (100  $\mu\text{g/ml}$ ) was scanned in UV-spectrophotometer Evolution 60 S in the region of 200 nm to 350 nm, using methanol as a blank.

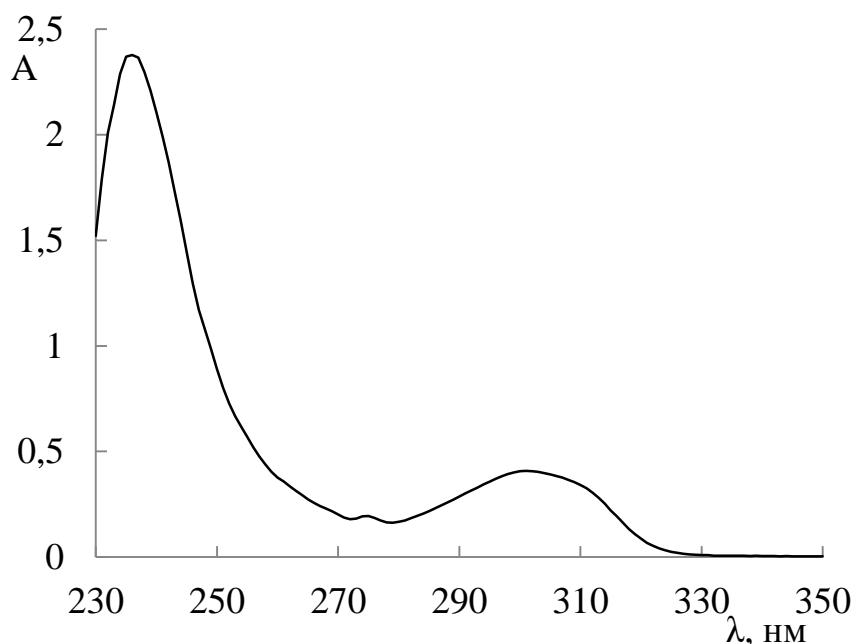


Fig. UV spectrum of glibenclamide

Results: glibenclamide methanolic solution shows UV absorption maxima in 235, 275 and 300 nm. To avoid the absorbance of other substance, which might be added to the absorbance of glibenclamide under investigation, absorption band at 300 nm was considered as the more selective.

Conclusions: a simple and rapid spectrophotometric method for the identification of glibenclamide has been developed. Absorbance at specified (300 nm) wavelength was chosen for the further UV-spectrophotometric researches. The obtained results can be used for the identification of this toxicant in the forensic toxicology investigations.

## **ELECTROCHEMICAL BEHAVIOR OF PERACETIC ACID AT CARBOSITALL ELECTRODE**

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Peracetic acid (PAA, CAS Number 79-21-0) was introduced as an antibacterial agent in 1955. It has a broad spectrum of activity, including bacteria, spores, molds, yeasts, algae and viruses<sup>1, 2</sup>).

PAA, a possibly safe oxidizing agent, is being increasingly used recently, especially as a high-level disinfectant in hospital settings.

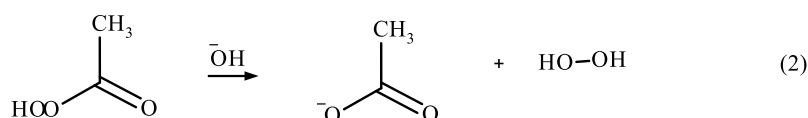
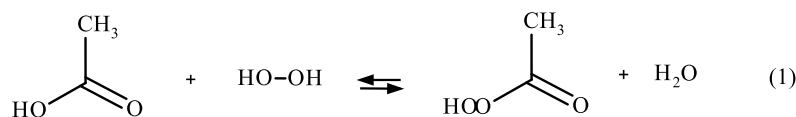
The use of PAA for sterilization has received increasing attention as concerns about environmental spread of infectious agents have deepened and needs for so-called cold sterilization have increased. PAA displays a wide spectrum of attack against microbes. In addition, PAA offers the advantages of being sporicidal at low temperature, even lower than room temperature, and of leaving only nontoxic residues. For the sake of these advantages of PAA disinfectant it has been widely used in the food industry and the health care industry as effective sterilization.

Various methods have been reported for the determination of PAA. The most widely used methods for analyzing solutions containing PAA and  $H_2O_2$  are a method by D'Ans and Frey and its modification by Greenspan and Mckellar. In their methods,  $H_2O_2$  in a solution containing PAA and  $H_2O_2$  is first titrated with permanganate or ceric sulfate, and the residual PAA is then determined by adding potassium iodide to the solution and titrating liberated iodine with thiosulfate. Needless to say, the twostep titration method is not suitable for the continuous monitoring of PAA because it is very time-consuming. As the alternative techniques of the titration methods for the determination of PAA, electrochemical measurements, chromatographic methods, and spectroscopic methods have been reported. Conductivity measurements are rapid and convenient, but their common disadvantage is their low selectivity. Spectroscopic methods have often been employed for the direct determination of a few species in aqueous solutions. Near-infrared (NIR) spectroscopy has recently been a matter of keen interest as a practical technique for a variety of water and aqueous solution analyses. So far, a UV spectroscopic method for the direct determination of PAA has not been reported probably because its UV absorption maximum is located at a very short wavelength (below 180 nm) and the extinction coefficients obtained with an ordinary UV-visible spectrometer are very low. But all these methods are not sufficiently sensitive and furthermore require handling of many chemicals, complicated cleaning and extraction procedures, and the use of cumbersome equipment which may interfere with job performance.

The aim of the research was to investigate the electrochemical behavior of PAA by cathodic voltammetry using carbosital electrode, as indicating electrode. Electrochemical measurements were carried out in the analyzer AVS-1.1 (Volta, St. Petersburg) with a three-electrode scheme by alternating current mode with square wave modulation in potential range +1.0...-1.2V,  $W=1000$  rpm, amplitude 40mV,  $\nu=65$ Hz. CE was used as a working and an auxiliary electrode, and Ag,AgCl/KCl(sat) electrode type EVL-1M4 as a reference electrode.

The electrochemical behaviour of PAA is obscured by the presence of unavoidable hydrogen peroxide. The coexistence of these two species is mainly due to the preparation of PAA from  $H_2O_2$  through

a reaction, which is of an equilibrium nature (1), and due to the continuous decomposition of PAA to H<sub>2</sub>O<sub>2</sub> (2). Thus it has been reported that PAA may coexist with a large excess of H<sub>2</sub>O<sub>2</sub> of about 100 times larger than that of PAA. Peroxides analysis based mainly on their oxidizing properties; some of peroxides act as a strong oxidizing agent, and some of them may act as reducing agents in the presence of strong oxidizing agents comparatively. Thus all reported methods for the analysis of peroxides depends on their reactions with reducing agents.



The two peaks for the reduction of PAA and H<sub>2</sub>O<sub>2</sub> are utilized for their selective analysis using square wave voltammetry which offers excellent discrimination against double-layer charging current and accordingly has a high sensitivity. The reduction peaks of H<sub>2</sub>O<sub>2</sub> and PAA are clearly observed at about +0.1 and -0.75 V, respectively, with a little shift to the more negative direction with the increase in concentration of the two species.

It was experimentally proved that height of reduction peaks decrease and potential of reduction peaks is shifted toward more electronegative values with increasing of background electrolyte pH from 2.15 to 4.78. The maximum peaks (*I<sub>p</sub>*) occurred at a pH approximately 2.5-3 and at a pH around 4.78 analytical signal almost disappears. The effect of pH on peaks potential (*E<sub>p</sub>*) shows the following: when pH value increases in the interval from 3 to 3.7, *E<sub>p</sub>* remains almost constant, but *E<sub>p</sub>* decreases sharply to negative value with pH increasing over 4. So, the optimal peaks for the analysis was obtained at pH≈3.5 on the background of acetate buffer solution and 0.1 mol L<sup>-1</sup> Na<sub>2</sub>SO<sub>4</sub>.

Thus, the electrochemical behavior of PAA at carbosital electrode was investigated and optimal conditions for its quantitative analysis coexist with H<sub>2</sub>O<sub>2</sub> were established.