

IDENTIFICATION OF EXPIRED MEDICINES ON BASIS ATENOLOL USING PRINCIPAL COMPONENT ANALYSIS

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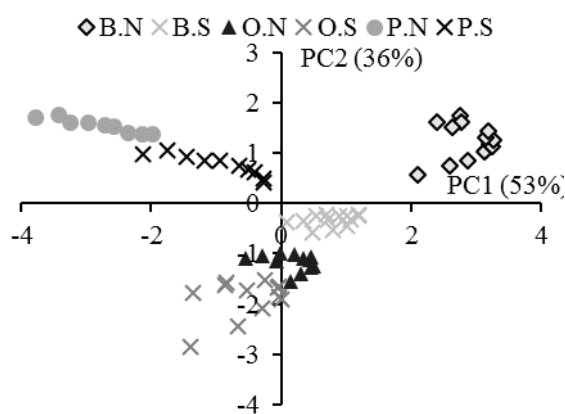
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Atenolol is a popular medical product for the treatment of hypertension and cardiovascular diseases. This medicament blocks the heart from the action of adrenaline and other hormones that accelerate the heart rate. As a result, the pulse slows down, blood pressure decreases. Since the load on the heart is reduced, the risk of a heart attack decreases for the patient. The quality of the medicaments directly depends on the expiration date. Under the expiration date of medicinal products is understood the time during which this product fully meets all the requirements of regulatory documentation. Expired pharma drugs lose their pharmacological properties, adversely affect the body as a whole.

In this study, real samples containing auxiliary substances (microcrystalline cellulose, lactose, magnesium carbonate, gelatine, silicon dioxide, talc, starch, etc.) were tested using voltammetric sensory system based on glassy carbon electrodes (GCEs) modified by films of the polyelectrolyte complex of chitosan and chitosan succinamide (CS-SCS), as well as composites with α -, β - and γ -CD. Pharmaceuticals from various manufacturers (Belupo (B), Pranapharm (P), Ozon (O)) were chosen as real samples. The obtained voltammograms were chemometrically processed by principal component analysis (PCA) and transformed into points on the principal component, constructed along the maximum dispersion of experimental data (PC1). Then, the next principal component (PC2) was constructed orthogonal to PC1 and directed along the next largest change in the measurement data, and so on. As can be seen from figure, clusters (data of parallel measurements) of ATN medicines did not intersect with each other on the score plots in the coordinates of PC1-PC2.



*S – expired medicines; N – unexpired medicines

Fig. Score plot of PCA modelling of voltammograms obtained by differential pulse voltammetry for 0.094 mM solutions of ATN medicines using sensory system with three GCEs electrodes modified by CS-SCS composites of α -, β -, and γ -CD

Thus, the sensory system with three GCEs indicator electrodes modified by CS-SCS composites of α -, β -, and γ -CD allowed recognizing not only ATN medicines by manufacturers but also identification of expired medicines.

This work was supported by the Russian Science Foundation (Grant No. 16-13-10257).