

THE CHOICE OF OPTIMAL CONDITIONS FOR CHEMICAL-TOXICOLOGICAL ANALYSIS OF CETIRIZINE BY THIN-LAYER CHROMATHOGRAPHY

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Introduction. Cetirizine hydrochloride is long acting antihistamine. The drug is used to treat allergic reactions. The product is ranked third in sales among the population of Ukraine. Cetirizine hydrochloride in overdose and self-treatment affects the central nervous system and causes severe intoxication, because the choice of highly sensitive and selective methods of study of cetirizine in biological objects is an important issue. In carrying out the modern chemical-toxicological analysis of drugs are widely used thin-layer chromatography-method (TLC), which leads to its use for screening of toxic substances, cleaning substances from biogenic impurities, identification and quantitative determination.

Aim. The choice of optimal conditions of analysis of cetirizine hydrochloride by TLC-method, suitable for chemical and toxicological studies.

Materials and method. TLC analysis of cetirizine was carried out by ascending, dimensional thin layer chromatography. For selecting optimal chromatographic conditions of cetirizine as thin layers of adsorbents used chromatographic plates, which are widely used in studies of biological objects: Sorbfil PSTH-AF-A (silica STH-1A, 5-17 microns, thickness - 110 mm, a binding agent – silicasol, type bases - aluminum foil, plates size - 10x10 cm); Sorbfil PSTH-P-B-UV (silica STH-1B, 8-12 microns, 100 mm, silicasol, PETF-E (Polyethylene and Teflon), 10x10 cm); Glass plates by "Merck" (Germany) (silica gel 60 F254, 10-12 microns, glass, 10x20 cm).

Chromatographic behavior of cetirizine was investigated by TLC in 9 solvent systems, which are recognized standard by the International Committee for systematic toxicological analysis of the International Association of Forensic Toxicologists - chloroform-acetone (80:20), ethylacetate, chloroform-methanol (90:10), ethylacetate-methanol-25% ammonia solution (85:10:5), methanol, acetone, methanol-25% ammonia solution (100:1.5), methanol- n-butanol (60:40), cyclohexane-toluene-diethylamine (75:15:10).

For selecting optimal chromatographic conditions of cetirizine were studied 4 solvent systems, which are used in general organic TLC screening substances - chloroform-acetone-dioxane-25% ammonia solution (47.5:45:5:2.5), toluene-acetone-ethanol-25% ammonia solution (45:45:7.5:2.5), ethylacetate-methanol - 25% ammonia solution (85:10:2.5), chloroform-n-butanol-25% ammonia solution

(70:40:5). TLC analysis was performed according to the procedure: at the start line of the chromatographic plate by a distance of 1-2 cm from the edge at a point applied with the calibration capillary 20.0-50.0 µg of study medication using its 0.01% alcoholic solution of cetirizine. The spot diameter should be less than 0.5 cm. Chromatography was performed in a chamber volume of 500 cm³, into which 50.0 ml of an appropriate solvent system were added with subsequent saturation of the chamber solvent vapors at least 30 minutes; path length of the front of the mobile phase - 7 cm. Chromatography was terminated when the solvent reached the finish line. Chromatographic plate was dried at room temperature, after which identification was carried out by using UV light and Dragendorff's reagent for Mounier.

Cetirizine spots were identified by comparing the chromatogram obtained for the sample solution with a corresponding spot on the chromatogram obtained for a reference sample (reference solution). The comparison was made by staining, size and value retention - R_f for both spots.

Results and discussion. As a result of TLC studies were established the most optimal conditions for the identification and purification of cetirizine in the presence of biogenic impurities: solvent systems - methanol or methanol-25% ammonia solution (100:1.5); chromatographic plates – glass plates by "Merck" ($R_{f \text{ cetirizine}} = 0.57-0.59$).

The results of TLC analysis may be recommended for directional investigations of biological material on cetirizine for preliminary studies - chromatographic plates - Sorbfil PSTH-AF-A, Sorbfil PSTH-P-B-UV and system of organic solvents – acetone ($R_{f \text{ cetirizine}} = 0.50-0.51$), for confirming studies – system of organic solvents – methanol-25% ammonia solution (100:1,5) and chromatographic plates - Sorbfil PSTH-AF-A ($R_{f \text{ cetirizine}} = 0.80-0.82$), Sorbfil PSTH-P-B-UV ($R_{f \text{ cetirizine}} = 0.71-0.73$).

In screening studies combined poisonings is recommended to use the system - acetone and chromatographic plates - Sorbfil PSTH-P-B-UV, glass plates by "Merck" ($R_{f \text{ cetirizine}} = 0.31-0.34$) to confirm the presence of cetirizine in a biological object.

Conclusions. The choice of optimal conditions of analysis of cetirizine hydrochloride by Thin-Layer Chromatography – method (systems of organic solvents, stationary phase, location reagents), suitable for chemical-toxicological investigations has been conducted.

For directional chemical-toxicological analysis of cetirizine are recommended: stationary phase - chromatographic glass plates by "Merck", the systems of organic solvents - methanol or methanol-25% ammonia solution (100:1.5) ($R_{f \text{ cetirizine}} = 0.57-0.59$). The location reagents of cetirizine - UV light and Dragendorff's reagent for Mounier.