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SECTION IX. PHARMACY

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THE STUDY OF CYPROHEPTADINE BY METHOD OF THIN LAYER CHROMATOGRAPHY

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Introduction. Peritol (cyproheptadine hydrochloride) - 4-(5H-dibenzo[a,d]cyclohepten-5-ylidene) -1-methylpiperidine hydrochloride is an antihistaminic drug with an antiserotonin effect, which prevents development and facilitates the course of allergic reactions. The drug is characterized by antipruritic, antiexudative, anticholinergic and sedative effects [1,2]. According to the literature sources, the drug can cause intoxication of the body and the lethal effects of overdosing, self-medication and in cases of suicide [3,4]. The elaboration of highly sensitive and selective methods for the study of cyproheptadine, suitable for analysis in biological objects is an actual task.

The most common chromatographic methods of chemical-toxicological analysis of cyproheptadine are methods thin layer chromatography (TLC), gas-liquid chromatography (GLC), high performance liquid chromatography (HPLC) [5]. The TLC-method is characterized by sensitivity, high speed chromatographic process, relative simplicity and availability of experimental technique. The development of new and modification and improvement of existing chromatographic techniques for the study of cyproheptadine, suitable for chemical-toxicological analysis, is an actual task.

Purpose of work – the selection of optimal TLC conditions for the analysis of biological objects for cyproheptadine using modern highly sensitive and selective chromatographic plates, organic solvent systems and universal developers.

Materials and methods of research. The choice of optimal conditions for TLC chromatography of cyproheptadine was carried out on several different chromatographic plates, which were widely used in modern chemical-toxicological studies: A - **Sorafil PTLC -AF-A** (type of sorbent - silica TLC -1A, graining - 5-17

microns, thickness - 110 mm, a binding agent – silicasol, type bases - aluminum foil, plates size – 10 x10 cm); **B - Sorbfil PTLC-P-B-UV** (type of sorbent - silica TLC - 1B, graining - 8-12 microns, thickness - 100 mm, a binding agent – silicasol, type bases - PTFE-E (Polyethylene and Teflon), plates size – 10 x10 cm); **C - Glass plates by "Merck" (Germany)** (type of sorbent - silica gel 60 F₂₅₄, graining - 10-12 microns, type basis - glass plates size – 10 x 20 cm).

Chromatographic behavior of cyproheptadine was investigated by TLC in 16 solvents systems: chloroform - acetone (80:20) (1); ethylacetate (2); chloroform - methanol (90:10) (3); ethylacetate – methanol – 25% solution of ammonium hydroxide (85:10:5) (4); methanol (5); methanol - n-butanol (60:40) (6); methanol - 25% solution of ammonium hydroxide (100:1,5) (7); acetone (8); chloroform – dioxane – acetone - 25% solution of ammonium hydroxide (47,5:45:5:2,5)(9); toluene – acetone – ethanol - 25% solution of ammonium hydroxide (45:45:7,5:2,5) (10); chloroform – n-butanol – 25% solution of ammonium hydroxide (70:40:5) (11); benzene – acetone (80:20) (12); chloroform - ethanol (90:10) (13); benzene – ethanol - 25% solution of ammonium hydroxide (80:20:1) (14); chloroform – ethanol - 25% solution of ammonium hydroxide (9:0,5:0,1) (15); ethanol - glacial acid acetic - water (5:3:2) (16).

It was found that the most sensitive location reagents for cyproheptadine are UV light, $\lambda = 254$ nm (the sensitivity - 0,5-1,0 μg in the sample); reagent of Dragendorff in the modification of Mounier (the sensitivity - 3,0-5,0 μg in the sample).

Results and discussion. As a result of TLC investigation were established the most optimal conditions for the preliminary and confirmatory studies of cyproheptadine and for the identification and purification of the test substance in the presence of biogenic impurities (Table).

Table
The R_f value of cyproheptadine for the various types of chromatographic plates in systems of organic solvents ($n = 5$)

Systems	Types of chromatographic plates			Systems	Types of chromatographic plates		
	A	B	C		A	B	C
1	0,12±0,03	0,03±0,02	0,02±0,02	9	0,78±0,03	0,65±0,03	0,69±0,03
2	0,07±0,03	0,05±0,02	0,02±0,02	10	0,67±0,03	0,55±0,03	0
3	0,70±0,04	0,42±0,03	0,33±0,03	11	0,77±0,03	0,81±0,04	0,92±0,04
4	0,64±0,03	0,55±0,03	0,50±0,03	12	0,07±0,02	0,03±0,02	0,03±0,02
5	0,58±0,03	0,47±0,03	0,35±0,03	13	0,44±0,03	0,31±0,03	0,21±0,02
6	0,55±0,03	0	0,26±0,02	14	0,70±0,03	0,65±0,03	0,60±0,03
7	0,71±0,03	0,59±0,03	0,45±0,03	15	0,91±0,04	0,73±0,04	0,80±0,04
8	0,30±0,02	0,11±0,02	0,11±0,02	16	0,80±0,04	0,72±0,04	0,70±0,04

Conclusions

1. For analysis of cyproheptadine in biological objects are recommended the most effective conditions (system of mobile solvents - chromatographic plates): ethyl acetate - methanol -25% solution of ammonium hydroxide (85:10:5) - B ($R_f = 0,55\pm0,03$); C ($R_f = 0,50\pm0,02$); methanol - A ($R_f = 0,58\pm0,03$); B ($R_f = 0,47\pm0,03$); methanol - n-butanol (60:40) - A ($R_f = 0,55\pm0,03$); methanol -25% solution of ammonium hydroxide (100:1,5) - B ($R_f = 0,59\pm0,03$); toluene – acetone – ethanol - 25% solution of ammonium hydroxide (45:45:7,5:2,5) - B ($R_f = 0,55\pm0,03$).

2. The results of TLC investigation of cyproheptadine are intended for employees of the Bureau of Forensic Medical Examination, toxicological and narcological centers, clinical laboratories for the study of medicinal substances in biological objects.

References:

- [1] Merhar, S.L., Pentiuk, S.P., Mukkada, V.A., Meinzen-Derr, J., Kaul, A. & Butler, D.R. (2016). A retrospective review of cyproheptadine for feeding intolerance in children less than three years of age: effects and side effects. *Acta Paediatrica*, 105 (8), 967-970. <https://doi.org/10.1111/apa.13477>.
- [2] Prakash, S. & Rathore, C. (2016) Cyproheptadine-dependent chronic serotonin syndrome. *Neurology India*, 64 (6), 1319-1321. <https://doi.org/10.4103/0028-3886.193796>.
- [3] Thomas, S. H. L. (2012). Antihistamine poisoning. *Medicine*, 40 (3), 109–110.
- [4] Chu, F.K. (2011) Review of the epidemiology and characteristics of intentional cyproheptadine overdose in Hong Kong. *Clinical Toxicology (Philadelphia)*, 49 (7), 681-683. <https://doi.org/10.3109/15563650.2011.602085>.
- [5] Clarke, E. J. C. (2011). *Isolation and Identification of Drugs in Pharmaceuticals, Body Fluids and Postmortem Materia*. London: The Pharm. Press.
- [6] Maham, M., Kiarostami, V., Waqif-Husain, S., Abroomand-Azar, P., Tehrani, M.S., Khoeini Sharifabadi, M., Afrouzi, H., Shapouri, M. & Karami-Osboo, R. (2013). Extraction and Determination of Cyproheptadine in Human Urine by DLLME-HPLC Method. *Iranian Journal of Pharmaceutical Research*, 12 (2), 311-318.