

Development of the method HPTLC for the quantitative and qualitative determination of phenothiazine derivatives

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Goal of the research.

To improve the existing TLC techniques for the HPTLS method.

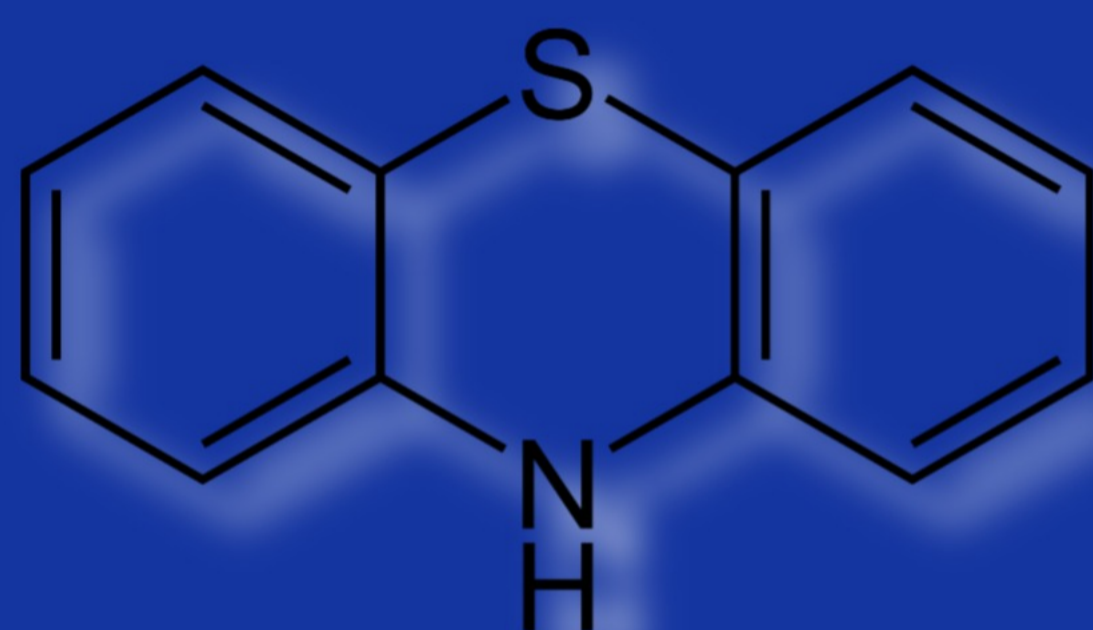
Objectives of the experiment.

- 1) To analyze the existing TLC and HPTLC methods.
- 2) The choice of the methodology on the basis of which the quantitative and qualitative analysis of phenothiazine derivatives will be developed.

Materials and methods of research.

Analysis of TLC and HPTLC methods in Pharmacopoeias, available articles and journals, studies on phenothiazion derivatives,

Main results



The chemical structure of drugs of this group is based on the heterocyclic system of phenothiazine, which includes nitrogen and sulfur heteroatoms.

Phenothiazine	pKa
Chlorpromazine	9,3
Levomepromazine	9,2
Diprazine	9,1
Thioridazine	9,5
Promazin	9,4
Trifluoperazine	8,1

The efficiency of the separation of substances largely depends on the choice of the mobile phase

Based on the basic properties of drugs, the following variants of organic solvent systems can be distinguished as mobile phases for the analysis of phenothiazine derivatives:

- methanol-25% ammonia solution (100:1.5)
- cyclohexane-toluene-diethylamine (75:15:10)
- ethyl acetate-methanol-25% ammonia solution (85:10:5)
- chloroform-ethanol(90:10)
- acetone-methanol-25% ammonia solution(90:10:2)
- methanol-n-butanol (60:40)
- chloroform-methanol(90:10)
- benzene-dioxane-ammonia(75:20:5)

The Pharmacopoeia of the Eurasian Economic Union - petroleum ether P - diethylamine P (50:1, vol/vol) saturated with phenoxyethanol P
 Japanese Pharmacopoeia Acetone-hexane-ammonia solution(16:6:1)
 Pharmacopoeia of the Russian Federation - acetone-diethylamine-cyclohexane (10:10:80)

Characteristics of the plates	TLC	HPTLC
Average particle size, mkm	11-20	5-7
Layer thickness, mkm	250	100
The length of the solvent front run, cm	10-15	3-5
Amount of solvent, ml	50	5-10
Detection limit, mcg	1	0,1
Spot diameter, mm	2-4	1

- one-component system - ethyl acetate
- single-component eluent - methanol
- toluene-ethyl ether-chloroform (30:50:20, vol/vol)
- benzene-dioxane-25% ammonia solution (60:35:5)
- ethyl acetate-acetone-25% ammonia solution in ethanol 1:1 (50:45:4)
- toluene-acetone-ethanol-25% ammonia

Due to the narrower distribution of silica gel, the spots of the separated substances become more compact and are better separated by a shorter distance in less elution time.

The accuracy of the applied volume and the compactness of the zone subsequently affect the final result of quantitative determination. The quantitative assessment of the spot in the device takes place according to its two characteristics: by the area of the spot and its "volume" in space, the intensity of the stain color (brightness) is used as the third coordinate.

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In TLC of phenothiazine derivatives, the following detectors are used: an FPN reagent (a mixture of 5% FeCl₃ solution, 20% HClO₄ solution and 50% HNO₃ solution in a ratio of 5:45:50), a solution of perchloric acid, iodoplatinate, a solution of concentrated sulfuric acid.



Brief description of the danger of perchloric acid: a strong oxidizer; may cause fire or explosion, may cause corrosion of metals, chemical burns if it gets on the skin.

The use of detectors is not necessary in the HPTLC methodology we are developing. Thus, we will be able to reduce the use of reagents that are dangerous both for the environment and for workers.

Conclusions.

Thus, when conducting a literature review on this topic, it is planned to develop a methodology for the qualitative and quantitative determination of compounds derived from phenothiazines by the VETSC method in combination with densitometry for three phenothiazine derivatives in the acetone-methanol-25% ammonia solution system