

DEVELOPMENT OF ANALYSIS CONDITIONS FOR THORACEMIDE DRUG SUBSTANCE IN GAS-CHROMATO-MASS SPECTROMETRY

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Relevance: Torsemide is a loop diuretic. However, when used in low doses, its pharmacodynamic profile, in terms of diuresis level and duration, is similar to that of thiazide diuretics. At higher doses, torsemide produces high diuresis with maximal effect [1]. Long-term treatment with torsemide requires regular monitoring of electrolyte balance, especially serum potassium levels. Regular monitoring of glucose, uric acid, creatinine, and lipid levels in the blood is also necessary. Torsemide exhibits maximal diuretic activity 2 hours after oral administration. Strict adherence to dosage is essential when prescribing to patients with liver or kidney failure. Particular caution is required when treating patients with liver failure, as the drug's concentration in blood plasma may increase. Considering these factors, the development of methods for the chemical-toxicological analysis of torsemide is necessary. Currently, gas chromatography-mass spectrometry (GC-MS) is widely used among modern analytical methods. This method is characterized by very high sensitivity, accuracy, and the ability to detect very small amounts of the analyte in complex mixtures. This method is also widely used to detect substances causing poisoning when the substance is unknown, or when standard samples are unavailable, and to detect metabolites formed from the toxic substance as a result of metabolic processes in the body.

Objective of the Study: The aim of this study was to develop analytical conditions for torsemide using gas chromatography-mass spectrometry (GC-MS).

Methods: Experiments were carried out using a SHIMADZU GCMS-QP2020 chromatograph-mass spectrometer [2]. Based on the research conducted, the following conditions were developed: a metal capillary column 30 m long with an inner diameter of 0.25 mm, the inner surface of which is coated with 5% phenylmethylsiloxane in dimethylsiloxane with a thickness of 0.25 µm; injector

temperature 280°C; column oven temperature increased from 100°C to 280°C at a rate of 20°C/min, with the column thermostat at 10°C/min; helium carrier gas, column flow rate 2.2 ml/min; injected sample volume 1 µl; analysis time 25 minutes. To prepare the standard sample solution, an accurately weighed amount (5 mg) of the torsemide working standard was taken and dissolved in 5 ml of 96% ethyl alcohol in a 25 ml volumetric flask, and the solvent was added to the mark. A 1 µl volume was taken from the sample and injected into the chromatograph column.

Results: Under these conditions, peaks characteristic of torsemide were observed in the chromatogram at a retention time of 19.978 minutes. Then, mass spectrometric analysis of the resulting peak was performed. It was found that the peak in the chromatogram corresponded to fragment ions with masses of 65, 207, 246, 263, and 281 m/z. The chromatogram and mass spectra of torsemide obtained in the experiment were compared with the data in the computer database, and it was determined that their structure corresponded to the torsemide structure.

Conclusions: The conditions for the analysis of torsemide by gas chromatography-mass spectrometry were developed. These conditions were applied to the determination of torsemide isolated from biological objects and biological fluids, and positive results were obtained.

REFERENCES.

1. <https://vitainfo.uz/uz/dori/torasemid-sandoz>
2. _Abdullabekova N.A., Usmanaliyeva Z.U. Development of analysis conditions of indapamide drug substance in gas-chromato-mass spectrometry/ / Abu Ali Ibn Sino and innovation in modern pharmacy VII international scientific and practical conference. Tashkent 2024, 129 p