DETERMINATION OF CARBAMAZEPINE IN SUBSTANCE AND MEDICINES

Gmoussa A., Bevz O.V., Sych I.A., Fedosov A.I.
National University of Pharmacy, Kharkiv, Ukraine
bevz.helen@gmail.com

Introduction. Carbamazepine is a medicine that is mainly used to treat epilepsy and neuropathic pain. Carbamazepine works by stabilizing electrical activity in the brain, which helps prevent seizures and reduce pain. Due to the widespread use and prescribing of carbamazepine medicines - the selection of optimal methods for pharmaceutical analysis to control the quality of the medicine is relevant.

Aim. The aim of the work consisted in selecting a rapid, modern and sensitive method for the determination of carbamazepine in substance and finished pharmaceuticals.

Materials and methods. Comparison of the methods of UV-Visible absorption spectroscopy and Liquid chromatography was carried out according to validation parameters given in reports of world scientists, the cost of materials was calculated according to the Sigma Aldrich catalogue, the environmental performance of the methods was determined with the software "AGREE".

Results and discussion. Absorption spectrophotometry analysis in the ultraviolet and visible regions has been proposed using aqueous solutions of the drug. The maximum optical range under these conditions is observed at a wavelength of 284 nm. Linearity range at the selected wavelength is observed at 8-18 μg/ml with a correlation coefficient of 0.999.

Liquid chromatography analysis was performed using an HPLC instrument with a UV detector detecting at 285 nm, a C8 column (150 x 4.5 mm, 5 μm) and Empower software. Extraction of carbamazepine from the prepared drug was performed by adding 50 μl of 25% ammonia solution and 5 ml of chloroform to the drug, followed by homogenization and centrifugation. The resulting organic phase was then evaporated in a fume hood followed by reconstitution of the dried extract using the mobile phase. A mixture of methanol: water: glacial acetic acid (65:34:1) was offered as the mobile phase at a flow rate of 1 ml/min at room temperature. Samples were injected automatically in volumes up to 20 μl. Linearity range at the selected procedure is observed at 0-5 (μg/ml) with a correlation coefficient of 0.999.

The cost of UV-Visible spectrophotometric analysis is €0.23, while liquid chromatography costs €72.19 due to sample preparation and many reagents, so the liquid chromatography method is also less environmentally friendly than the spectrophotometric method.

Conclusions. All methods are pharmacopeial, validated, meet the criteria on the principle of green chemistry, meet the requirements for the methods of the leading Pharmacopoeias of the world and accordingly, whatever equipment the laboratory is equipped, the available method from the considered in the work can be applied, so after verification in the laboratory can be used for pharmaceutical analysis of carbamazepine medicines, and the results of the determination are presented to the executive authorities as confirming the quality of pharmaceutical products.