DEVELOPMENT OF DETERMINATION METHOD FOR CONCENTRATION OF α-LIPOIC ACID SOLUTIONS IN RESEARCH OF BIOVAILABILITY PROCESS FOR SOLIDS DISPERSION

Hafes Nency, Hrudko V. O., Kovalevskaya I. V.
National University of Pharmacy, Kharkiv, Ukraine
431230@ukr.net

Introduction. α-lipoic acid is a coenzyme that participates in the oxidative decarboxylation of pyruvic (consisting of pyruvate dehydrogenase complex) and α-keto acid (composed of α-ketoglutarate dehydrogenase). It is involved in the regulation of lipid and carbohydrate metabolism, affects on cholesterol metabolism, improves liver function and has a detoxifying effect in cases of poisoning by heavy metals salts. It is used as prophylactic and therapeutic purposes in the treatment of atherosclerosis of the coronary vessels, liver diseases, diabetic and alcoholic polyneuropathies.

Aim. Specialists of the department of Industrial Technology of Drugs work on creation of the medicinal product with α-lipoic acid on the basis of solid dispersions. In order to establish the possibility of developing assaying methods of α-lipoic acid in solution in the bioavailability studies of solid dispersions of α-lipoic acid, we studied its absorption spectra in different solvents.

Results and discussion. Absorption spectrum of alcoholic solution of α-lipoic acid is characterized by two absorption bands. The wide high-intensity band at 200-240 nm is common to many organic substances, containing functional groups with lone pairs of electrons. In this case the absorption due to electronic transitions in the carboxyl group. α-lipoic acid solutions have a pale yellow-green color. The absorption spectrum is illustrated by the presence of wide, but not intensive absorption band maximum in the range 332-335 nm (λ_{max} 334 nm), due to the presence in its structure a disulfide bond in the 1,2-dithiolan cycle.

The absorption spectrum of α-lipoic acid in 0.1 M aqueous solution of hydrochloric acid, which simulates the acid medium in the stomach, by its nature is very similar to the spectrum of an alcohol solution and differs from it only by the slight hypochromic effect.

One of the main requirements that are responsible the use of spectral methods for the quantitative determination of substances, is its submission of the light absorption of the solution to the Bouguer-Lambert-Beer law. Such verification is reduced to the plotting the absorbance of the solution concentration. Absorbance of α-lipoic acid in 0.1 M hydrochloric acid solution at a maximum at 334 nm obey the law of Lambert-Bouguer-Beer law over the entire concentration range from 1.25 to 12.50 $\cdot 10^{-2}$%. Specific absorption rate in this case consist 6.148±0.106.

Conclusions. The method for determining the concentration of α-lipoic acid solutions will be used in selecting the optimal compositions of solid dispersions with its contents.