37 ± 0,5 °C. The volume of dissolution medium was of 100 ml. Dialysate tests (5 ml) were sampled after strictly determined intervals of time (15, 30, 45, 60, 90, 120 minutes). Required amount of medium was supplied with the same solvent. In order to determine vinpocetine content spectrophotometric method in the UV-spectral range (314 ± 2 nm) was applied. Concentration of the analyzed substance was determined by the calibration plot. Producing of vinpocetine microcapsules with the shells made of gelatin, ethylcellulose and sodium alginate as well as the procedure of biopharmaceutical investigations for these drug forms can be found in [7].

Results of research and their discussion. Comparative analysis of IR-transmission spectra for nanopowders of porous silicon in the range of 400–4000 cm^{-1} after deposition of the drug with those ones of the primary powder of porous silicon and vinpocetine substance demonstrated the presence of the bands characteristic of the medicinal preparation in the samples (absorption bands at 1720, 1680 and 1607 cm^{-1}). Note that composition of the porous silicon particles according to IR-spectroscopy data did not considerably change [8].

Our investigations demonstrated that the release of vinpocetine from Si nanoparticles was of 60 % for 6 hours of the experiment that is comparable with the degree of vinpocetine release from microcapsulated forms (70 and 94 % from microcapsules with the shells of ethylcellulose and gelatin, respectively).

Conclusion

The performed study showed a possibility of using porous silicon as an agent of prolonged vinpocetine delivery and significance of the further pharmacologic investigations of this system.

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IDENTIFICATION OF PHENIBUT IN MICROCAPSULES BY SPECTROSCOPIC TECHNIQUE IN IR- AND UV-RANGES

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Vascular encephalopathy takes the second place in the structure of mortality as a result of circulatory system diseases. Annual death rate from the stroke is one of the highest in the world. It should be noted an important physiological role of gamma aminobutyric acid (GABA) in the regulation of the functional activity of central nervous system for these kinds of diseases.

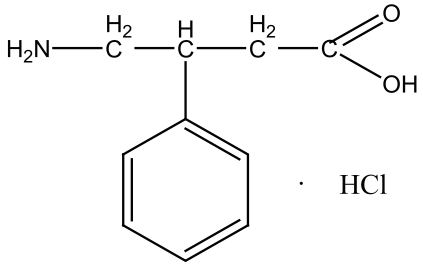
At present, the establishment of the new drug formulations for such derivative of GABA as phenibut characterized by a prolonged action is quite actual [1].

In order to obtain a prolonged action microcapsules seem to be rather perspective formulation [2, 3, 4]. Microcapsules of phenibut were obtained by extrusion technique.

Object of the research work was to perform a qualitative estimation of the components compatibility comprising a composition of the established drug formulation, namely, microcapsules.

Experimental tchnique

In the experimental investigations while preparing microcapsules a substance of phenibut was used as an active pharmaceutical substance corresponding to the requirements of ND 42-00380051-00 (Fig. 1), and additives allowed for the medicinal application and corresponding to the requirements of the normative documents.



$C_{10}H_{13}NO_2$

γ-amino-β-phenylbutyric acid hydrochloride

Fig. 1. Structural formula of phenibut

IR-spectra were surveyed with Vertex 70 spectrometer (Bruker Optik GmbH, Germany), in the middle part of IR-region in the range of 4000–400 cm^{-1} applying ATR technique (attenuated total reflectance method), using ZnSe attachment with the diamond window; as a result, IR-absorption spectra were obtained for phenibut substance, placebo-microcapsules and microcapsules with phenibut.

In addition, in order to identify phenibut in the microcapsules spectrophotometry technique was also applied in the UV-region of spectra at the wavelength of 257 ± 2 nm with spectrophotometer Hitachi U-1900. Identification technique was as follows: an accurately weighted sample of phenibut microcapsules of 0,3 g in mass was placed in volumetric flask of 50 ml capacity, then added 0,1 M of hydrochloric solution and stirred for 45 minutes in the agitator, then developed the volume of solution with the same solvent up to a specified label, and filtrated solution through a paper filter. 5 ml of the obtained filtrate were transferred to the volumetric flask with a capacity of 25 ml, and then developed the volume of 0,1 M solution of hydrochloric acid up to a specified label. 0,1 M solution of hydrochloric acid was applied as a reference one.

Results of investigations and their discussion

Results of IR-spectroscopy study for a substance of phenibut, microcapsules-placebo and microcapsules with phenibut are presented in Fig. 2.

Comparison of IR-spectra made it possible to identify phenibut substance in the microcapsues. IR-spectra of the substance and microcapsules with phenibut within the range of 4000–400 cm^{-1} show absorption bands at 3050–2800 cm^{-1}, meaning the presence of the primary aliphatic aminogroup in the samples; while the bands at 1712, 1656, 1668, 1620 indicate at the presence of carboxylic group in the same samples and thus allowing to state that chemical interaction between the chosen components of the mixture is absent.

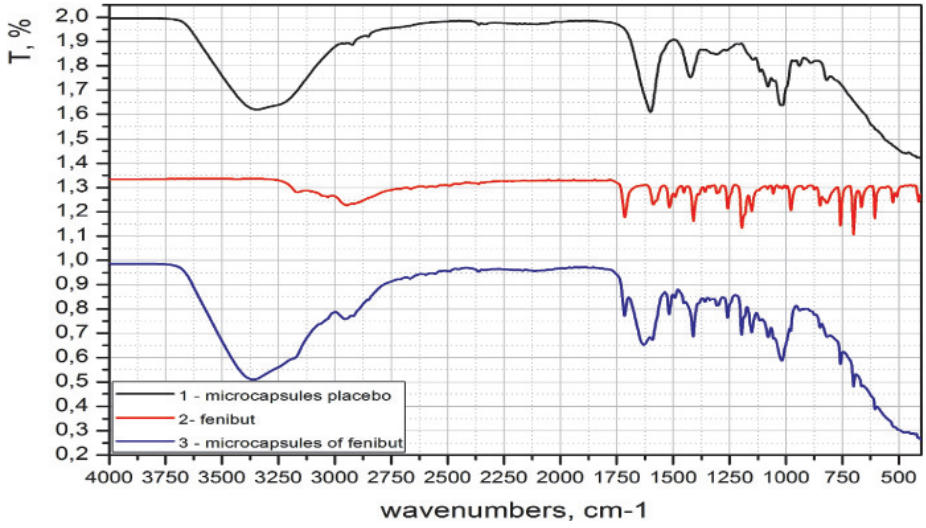


Fig. 2. IR-transmission spectra of phenibut substance, microcapsules-placebo and microcapsules with phenibut

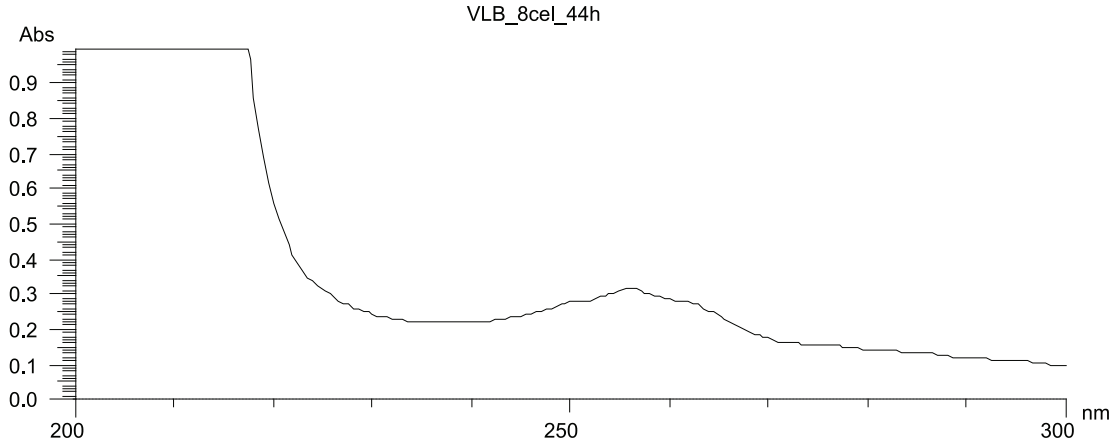


Fig. 3. Absorption spectrum of the tested solution of phenibut

UV-spectrum of phenibut within the range of 200–400 nm shows an absorption peak at 257 nm (Fig. 3).

Conclusions

It is recommended the use of spectroscopy technique in IR- and UV-ranges for the verification of identity of the phenibut substance in microcapsules.

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