# PHOTOLUMINESCENCE SPECTRA AND PHOTOCHEMISTRY OF ERBISOL

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The own photoluminescence spectra of Erbisol preparation and its modifications (Extra Erbisol and Super Erbisol) have been measured at room temperature for the first time. It has been shown that they are all characterized by specific spectra of light emission. The preparations have been found to possess different photochemical stabilities to UV irradiation. The results obtained have been discussed, taking into account the technological features in the fabrication of preparations and their biological (medical) action on human organisms.

Preparations of the Erbisol class belong to a new generation of preparations developed for the first time at the "Erbis" Scientific and Production Center (Kyiv, Ukraine) [1,2]. An essential feature of these preparations is the original mechanism of their action: the preparation treats not only the disease itself, but also affects the organism as a whole, by activating its protective systems which are responsible for the search for and the extermination of pathological alterations.

Erbisol is one of the first home-made preparations which were included into the register of vital medical agents of Ukraine. It has manifested itself well while treating oncological diseases [3], hepatites of various etiologies (including medically induced ones caused by abusing antibiotics or chemotherapy, as well as viral hepatitis) [1, 4], cirrhosis, erosions and peptic ulcers in gastroenteric tract, paradontosis, bronchial asthma, diabetes mellitus [5, 6], and a number of other diseases [7, 8].

The preparations of the Erbisol class contain a non-albuminous complex of natural organic compounds of a non-hormonal nature isolated from embryonic cells of animal tissue. In such cells, there occur the processes which are not inherent in a normal standard state of the cells of an adult human being. The basis of Erbisol comprises low-molecular specific "pilot" molecules derived from the "markers of the cell's physiological state", which activate the natural mechanisms developed in the course of evolution for the search for and the extermination of pathological alterations in organs and tissues and favor a more complete realization of the genetic potential of an organism. The preparations stimulate the synthesis of interferon and promote the necrosis of tumors.

Nowadays, the SPC "ERBIS" produces a few types of Erbisol preparation (Erbisol, Extra Erbisol, and Super Erbisol) which substantially extended the opportunities of its practical application – from the treatment of complex diseases to the endoecological detoxication, prophylaxis, and restoration of the protective functions of organisms. In this connection, various methods to apply Erbisol — from injections to the homeopathic use, as a small additive to potable water — have been developed.

Most of the preparations, which were produced from natural raw materials, possess a natural bioenergetic potential which defines the efficiency of a preparation as a medicine that should make the bioenergetics of a human organism harmonized. The bioenergetic potential of the preparation is governed by that of an embryo and is preserved to the maximal extent in fabricated preparations, provided that a special technology was used. In particular, this circumstance explains the existence of various modifications of Erbisol and different orientations of their use.

At present, the quality of medical preparations and their medical efficiency are estimated, in practice, only by their chemical content, i.e. according to separate components of the preparation. Nevertheless, the properties of the preparation considered as an integrated self-organized system are an indicator of its efficiency, which is not less important. The structural ordering of the preparation (the ordering of both the aqueous solution of biological molecules and of water) is determined by the natural raw material, while, making use of the corresponding techniques for its fabrication, one can optimize its structure.

Thus, upon the study of preparations, especially of those which are fabricated from natural or holistic

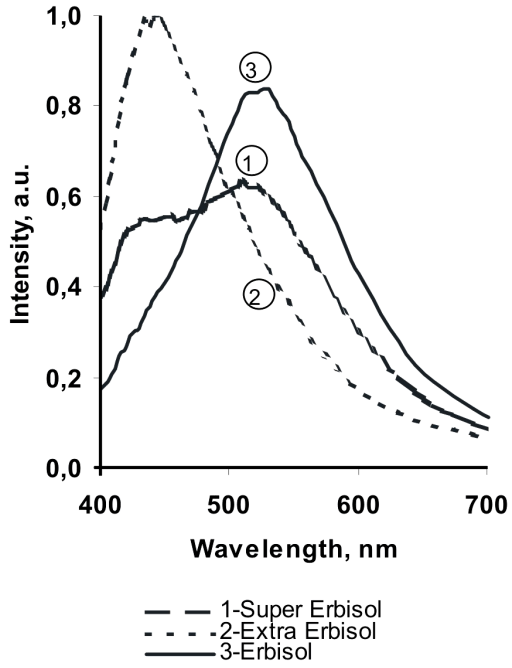


Fig.1. Luminescence spectra of various Erbisol preparations

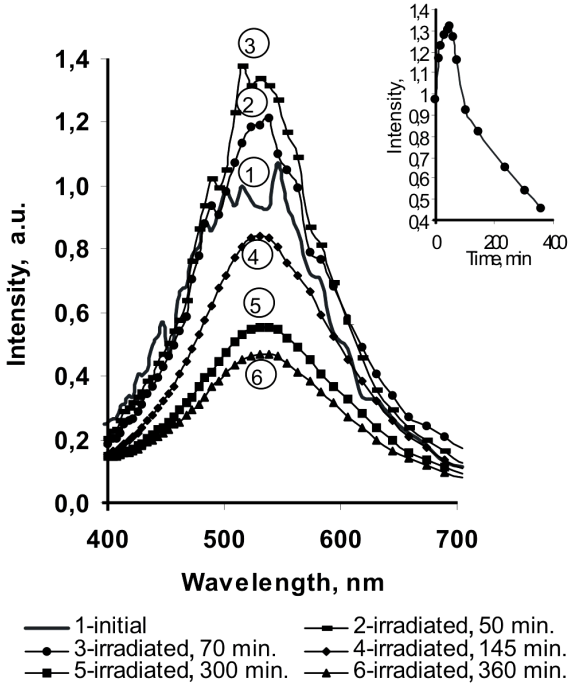


Fig.2. Change of the photoluminescence spectra of Erbisol upon UV-irradiation

natural substances, important are those investigations which allow the preparation to be investigated as an integrated self-organized system. These are the physical researches, from which one can draw a conclusion about the bioenergetical properties of a preparation, e.g., structural researches [9–11] and studies of the optical spectra of preparations, in particular, luminescence ones.

This work reports the results of measurements of the own luminescence spectra of three types of Erbisol preparations (Erbisol, Extra Erbisol, and Super Erbisol) carried out with the purpose to determine the structural features of these preparations.

The previous studies of the preparations considered as lyotropic liquid crystals [9–11] evidenced for their different structural orders and, therefore, different electronic structures. Such a difference has to manifest itself in the optical properties of preparations, in particular, in photoluminescence spectra.

The photoluminescence spectra of native preparations were measured following a conventional technique at room temperature and making use of a photo-electric registration of luminescence. The photo-electric installation for measuring the spectra was constructed on the basis of an SPM-2 monochromator (Karl Zeiß, Jena, Germany). The photoluminescence spectra were excited by a 250-W UV lamp, using UFS-6 and UFS-8 filters.

Fig. 1 exhibits the luminescence spectra emitted by Erbisol preparations of three types. One can see that each type is characterized by a specific type of the photoluminescence spectrum. The spectrum of ordinary Erbisol reveals a broad structureless band with a maximum of luminescence at 540 nm. The spectrum of Extra Erbisol also contains a single luminescence band, but with the maximum at 440 nm, whereas the luminescence spectrum of Super Erbisol is composed of two bands — at 430 and 530 nm.

Such different spectra of emission testify to that each modification of Erbisol is characterized by its own composition which is determined by the specific technology of its fabrication. Special structural researches of the preparations, carried out using the microcrystallooptical method developed for lyophilized specimens, confirm that each class of Erbisol has a characteristic structural order and, therefore, a particular electronic structure which reveals itself in the photoluminescence spectra. It is the characteristic structural order that determines the specific medical action of the preparations.

It was noticed that some Erbisol preparations, being subjected to ultra-violet irradiation when measuring the photoluminescence spectra, demonstrated irreversible changes of the photoluminescence intensity in the course of experiment. The more comprehensive studies concerning the issue how the time of exposing the specimens to UV irradiation influences their photoluminescence spectra made it possible to discover the different photochemical stabilities of the preparations with respect to various radiation wavelengths. It turned out that Extra Erbisol is rather persistent against UV irradiation. At the same time, the photoluminescence of Super Erbisol fades in time under the action of UV irradiation, with the luminescence in the short-wave range of the spectrum (the 430-nm band) disappearing faster than that in the long-wave one (the 530-nm band).

An unusual photochemical instability was observed for Erbisol. The modifications of its photoluminescence spectra versus the time of specimen's exposure to UV are presented in Fig. 2. First, when the preparation was irradiated through UFC-6 and UFC-8 filters for 50 min, the intensity of photoluminescence was growing (Fig. 2), with the intensity of luminescence experiencing chaotic "splashes", which could be caused by the formation and motion of crystallites. The further increase in the exposure duration (up to 6 h) was accompanied by a reduction of the photoluminescence intensity. Moreover, the chaotic "splashes" disappeared, and only one band with the maximum at 540 nm remained in the spectrum.

Concerning the origin of the photoluminescence in the Erbisol preparations, we can make the following conclusion. The broad structureless luminescence band of biological molecules in the visible range of the spectrum is known to be a result of the luminescence of amino acids and their complexes [12]. Judging from the structure of the Erbisol preparations, one may draw a conclusion that their photoluminescence is also connected with the luminescence of amino acids, i.e. biological molecules which form the basis of these preparations.

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СПЕКТРИ ЛЮМІНЕСЦЕНЦІЇ ТА ФОТОХІМІЯ ЕРБІСОЛУ

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Р е з ю м е

Вперше виміряно спектри власної фотолюмінесценції препарату ербісол при кімнатній температурі. Показано, що різні модифікації препарату (ербісол, ербісол екстра та ербісол супер) мають характерні спектри випромінювання. Встановлено, що досліджувані препарати мають різну фотохімічну стійкість до ультрафіолетового опромінювання. Обговорюються отримані результати, виходячи із специфіки технології одержання препаратів та їх біологічної (лікувальної) дії на організм людини.