



STUDY OF THE CRYSTALLOGRAPHIC PARAMETERS OF THE ESCIN SUBSTANCE

Sh.B. Yusupova¹

E.S. Karieva²

Tashkent Pharmaceutical Institute, Tashkent city, Republic of Uzbekistan

e-mail: shahloyusupova@gmail.com

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Relevance: Escin is a natural mixture of triterpene saponins consisting of α - and β -isoforms. These isoforms differ in melting point, angle of rotation of the polarization plane, solubility, hemolytic index, and other physical properties. According to scientific studies, it is specifically the β -isoform of escin that possesses broad therapeutic activity, including angioprotective, anti-inflammatory, antitumor, anti-exudative, and venotonic effects.

Research objective. The aim of the study was to investigate certain crystallographic parameters of escin substance (particle shape, length, width, their ratios, etc.).

Materials and methods. The escin substance used in the research was manufactured by *KH Health Industry Co., Ltd.* and contained 97.5–102.0% escin. Of this, 38.4% corresponded to α -escin and 29.5% to β -escin. The substance had a specific characteristic odor and appeared as a fine white powder with a weight loss on drying of 2.3%.

To determine the crystallographic parameters of escin, a *Motic B1-220A-3* microscope intended for analytical work was used in combination with a *Canon A123* microscope camera. To properly assess the size and shape of the active substance particles, photomicrographs were taken at magnifications ranging from 26 $\times$ to 900 $\times$. Measurements were carried out with an ocular micrometer and later converted into microns. Statistical analysis of the obtained results was performed using generally accepted criteria (Zaytsev, 1991) with a personal computer (MS Excel software). Experiments were repeated three times.

Results. The photomicrographs obtained in the study confirmed that the escin substance is mainly composed of crystallites. The morphology of the particles is diverse, including rod-like, prismatic, amorphous, and granular forms, which indicates their poorly distinguishable crystalline structure. The size of the fragments varied: both small rounded particles and larger agglomerates with indistinct contours were observed.

When determining the particle size of the active substance, it was found that the maximum length ranged from 22.63–32.51 μm , the minimum length from 7.25–13.82 μm , with an average length of 14.94–23.17 μm . The maximum width of the particles was 4.72–8.54 μm , the minimum width 1.51–5.18 μm , and the average width 3.12–6.86 μm . For spherical particles, the maximum and minimum diameters were 14.60–33.35 μm and 1.65–7.26 μm , respectively, with an average diameter of 10.93–19.22 μm .

Since the ratio of average length to average width of the particles exceeded 3:1 (1:4.79; 1:3.10; 1:4.03), most of the particles had an elongated shape and were classified as anisodiametric. According to data from the literature, substances with such particle morphology are characterized by fine dispersity, positive compressibility, and poor flowability.

Conclusions. Based on the results of studying the crystallographic parameters of escin substance, it was established that the ratio of average particle length to average width exceeded 3:1. Therefore, the majority of the particles possess an elongated morphology and belong to the group of anisodiametric-shaped materials.