

**The study of hydroxycinnamic acids in the raw material  
of *Silybum marianum* (L.) Gaertn.**

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Milk thistle (*Silybum marianum* (L.) Gaertn.) is a well-known medicinal plant belonging to the *Asteraceae* family. It originates from the Mediterranean, and is found in the Caucasus, Central Asia, North America, Africa, Southern Australia, and Ukraine.

As a unique medicinal plant, milk thistle has been used since ancient times all over the world to treat liver diseases and normalize digestion, stimulate lactation, and treat inflammation of the upper respiratory tract and lungs. The powerful hepatoprotective activity of milk thistle fruits is especially known. Also, the plant's fruits are widely used as antioxidant and choleretic drugs.

In addition to hepatoprotective activity, milk thistle fruits have anti-inflammatory, anti-fibrotic, antisclerotic, antitumor, immunomodulatory effects. They inhibit lipid peroxidation, stimulate biological activity of lipids and protein biosynthesis, and accelerate liver cell regeneration.

A whole series of effective medicines has been developed on the basis of milk thistle fruits: Karsil, Legalon, Silibor, Silimar, Hepabene, Heliskan, Silimarol; the fruits are included in the anti-diabetic officinal mixture and Hepatophyte, and a large number of different biologically active supplements are produced on the basis of the plant. In dermatology, milk thistle preparations are used for vitiligo, psoriasis, baldness, and acne.

The oil of the plant is used as an independent wound healing, regenerating medicine, as well as a substance or solvent (extractant) for the production of anti-inflammatory, wound healing, and anti-ulcer drugs.

A wide range of pharmacological effects of the plant is due to the presence of various groups of biologically active compounds, such as flavonoids, flavolignans, hydroxycinnamic acids, saponins, essential oil, sterols, organic acids, bitternesses, resins, mucilage, sugars, amino acids, biogenic amines, vitamins, macro- and microelements, and fatty oil.

The dominant components of the plant are flavolignans: silybin, silydianin, silychristin, the sum of which is commonly known as silymarin.

The aim of our study was to determine the qualitative composition of hydroxycinnamic acids in the leaves and flowers of milk thistle.

The qualitative composition of hydroxycinnamic acids in the flowers and leaves of the plant was carried out using paper chromatography (PC) and thin-layer chromatography (TLC). To do this, the analytical sample of the raw material was crushed to a particle size of 1-2 mm. Then, 10.0 g of the raw material were placed in a flask, 1000.0 ml of 70 % ethanol were added and extracted. The resulting extracts were evaporated under vacuum to a thick extract and applied to a chromatogram. Chromatographic analysis was carried out by the method of ascending HPLC in the mobile phase: acetic acid - water (15 : 85) and TLC in the mobile phases: 1 direction – 15 % acetic acid and 2 direction – 2 % acetic acid. Standard samples of hydroxycinnamic acids (caffeic, chlorogenic, neochlorogenic, and *p*-coumaric acids) were used for comparison.

The substances were determined by fluorescence in UV light at 254 nm and 365 nm before and after treatment with ammonia vapor and by comparing  $R_f$  with the valid samples of hydroxycinnamic acids.

As a result of chromatographic analysis, chlorogenic, neochlorogenic and caffeic acids were identified in the leaves and flowers of milk thistle.

The obtained data indicate the prospects for further study of milk thistle flowers and leaves. They will be used in the development of the relevant sections of quality control methods for the studied raw materials.