

The study of flavonoids and glycosides in the *Digitalis lanata*

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ABSTRACT The population of *Digitalis lanata* was studied in hillocks of Pécs-Nagyárpád, the southern part of Transdanubia in Hungary. The qualitative analysis of digitalis-glycosides and flavonoids in the leaves of naturally growing *Digitalis lanata* was carried out. The qualitative analysis was carried out by TLC. The digitalis-glycoside content was smaller in the leaves of naturally growing *Digitalis lanata* than in the leaves of cultivated variations.

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KEY WORDS

Digitalis lanata
digitalis-glycosides
flavonoids
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The glycosides can be found in different parts of the plant (root, stem, leaf, fruit, seed, etc.) in small concentration. The glycosides are composed of the hydroxyls of sugars and alcohols. The digitalis-glycosides do not dissolve in water, because the big carbohydrate frame is too hydrofob. The digitalis-glycosides are active optically, because they include asymmetry centres. The sterane-frame of the digitalis-glycosides compose brightly fluorescing products with concentrated acids. Flavonoids are more characteristic in flowers, fruits and roots. Flavonoids are the biggest group of the phenol compounds in the plant. The flavonoid-aglycons dissolve in organic solvents. The flavonoids compose a colored complex with metalions. The chromatograms were studied at 365 nm UV light.

Materials and Methods

Samples from the population of naturally growing *Digitalis lanata* were collected in Nagyárpád, from the populations of cultivated *Digitalis lanata* in Budakalász and Bácsalmás and from the population of naturally growing *Digitalis ferruginea* in Italy. The basis for comparisons were digoxin, gitoxin and rutin standards.

Analysis of digitalis-glycosides

The dehydrated leaves were soaked in distilled water for a night. The ballast was removed with lead-acetate. After filtration and spin-drying, the samples were shaken out in chloroform-ether-ethyl alcohol (50:10:10). 20 microlitre from each sample was applied to the plate. The samples were developed in ethyl-acetate - methanol - water (75:10:7,5). The proving was done with trichloric-acetic acid in the chloroform. After the treatment at 120°C for 10 minutes, the plate was at 366 nm UV light. The samples were compared with the standards. From the standards serial dilutions were made (10, 40, 70, 100 ng). The samples were developed in n-hexan - ethyl-methyl-ke-ton - water (4:16:0,4). The chromatograms were treated at 110°C for 5 minutes, then in hydrochloric acid vapour, for 30 minutes, after it at 110°C for 5 minutes. It was evaluated at 366 nm UV light too.

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Analysis of flavonoids

An extract was made from the milling product in the Soxhlet apparatus. In order to free the solution from chlorofill, it was shaken CCl₄, then it was centrifugated. Concentrated acetic acid, piridin, AlCl₃ with methyl alcohol were added to the upper phase with methyl alcohol. The controll consisted of rutin and methyl alcohol. The serial dilutions contained 4, 8, 12, 16, 20, 28 and 40 microgram rutin.

The samples were developed in ethyl-acetic acid - formic acid - acetic acid - water (100:11:11:27). The chromatogram was treated at 105°C for 5 minutes. Then it was evaluated at 365 nm UV light.

Results and Discussion

Digitalis lanata comprises three genin-glycosides: lanatozide A, B and C. After the splitting of glucose and acethyl groups lanatozide A is transformed into digitoxin, lanatozide B into gitoxin and lanatozide C into digoxin. The lanatozides were in disintegrated condition. At 366 nm UV light, digitoxin fluoresced yellow, gitoxin light blue and digoxin purple. On the chromatogram developed in trichlor- acetic acid, the spots from the samples of *Digitalis lanata* and *Digitalis ferruginea* differed in intensity. The samples of *Digitalis lanata* were stronger.

Thin-layer chromatography is suitable for separation of small amounts of substances in a mixture. The concentrations of the samples can be estimated in comparison with the spots of serial dilutions. The samples of naturally growing *Digitalis lanata* from Nagyárpád fluoresce weaker than the samples of cultivated *Digitalis lanata* and naturally growing *Digitalis ferruginea*. Therefore the quantity of effective substance in the population from Nagyárpád was smaller than that in the cultivated populations. Consequently it is more probable that the sample of *Digitalis lanata* in Nagyárpád does not originated from cultivated population, but it is truly naturally growing.

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