

## LIPOSOLUBLE PIGMENTS FROM THE HERB

*Hypericum perforatum*

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*The liposoluble pigments — carotenoids, chlorophylls, and hypericin — have been determined in a chloroform extract of the herb common St. John's wort. It has been found that, among the carotenoids, the biologically active  $\beta$ -carotene and its oxygen-containing derivatives predominate.*

Common St. John's wort *Hypericum perforatum* L., fam. Guttiferae, is widely used in folk medicine and scientific medicine. Consequently, there has been no weakening of interest in the chemical study of representatives of the genus *Hypericum*. The greatest number of investigations have been devoted to the study of phenolic compounds, and the lipophilic components have hardly been considered [1].

We have now studied the composition of the liposoluble pigments of a chloroform extract of the herb common St. John's wort growing in the environs of Almaty. The extraction of the air-dry comminuted raw material was performed by exhaustive steeping with chloroform at room temperature. After the solvent had been distilled off in vacuum we obtained with a yield of 6.8% a pasty green-brown mass having the following physicochemical constants: acid No., mg KOH/g — 6.4; saponification No., mg KOH/g — 195.4; iodine No. — g I<sub>2</sub>/100 g — 109.2; unsaponifiable substances, % — 4.2.

Chlorophylls were determined together with carotenoids and hypericin (on one sample) by dissolving a weighed amount of extract in 90% acetone and then determining the optical densities of the solution at wavelengths of 662, 644, 600, and 440 nm [2, 3].

TABLE 1. Composition of the Liposoluble Pigments of a Chloroform Extract of the Herb St. John's Wort

Name	Content, mg-%
Carotenoids	294.7
Carotenes	151.9
$\alpha$	59.1
$\beta$	77.6
X	15.2
Xanthophylls	142.8
Neoxanthin	32.2
Violaxanthin	31.3
Zeaxanthin	27.9
Luteolin	26.9
X	24.5
Chlorophyll	515.5
a	489.8
b	25.7
Hypericin	20.0

\*X) unidentified compounds.

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The carotenoids were freed from chlorophylls by saponification. Their preliminary separation into carotenes and xanthophylls was achieved on columns of sodium sulfate [4, 5]. Individual substances were obtained by TLC on Silufol plates in a layer of  $Al_2O_3$  (activity grade II, in the following systems: 1) *n*-hexane–diethyl ether (7:3) and 2) *n*-hexane–acetone (96:4) for carotenes, and 3) heptane–methyl ethyl ketone (5:3) and 4) *n*-hexane–acetone (8:3) for xanthophylls. The zones containing carotenes were eluted with *n*-hexane, and the zones of the xanthophylls with ethanol, after which the absorption maxima in the visible region of the spectrum (360–500 nm) were measured. Carotenoids were determined quantitatively by the use of specific extinction coefficients [6]. The results of the investigation are given in Table 1.

The liposoluble pigments of a chloroform extract of the herb St. John's wort are represented by terpenoids (carotenoids and chlorophylls) and anthracene derivatives (hypericin).

We identified 86.5% of the carotenoids, in which the biologically active  $\beta$ -carotene and its oxygen-containing derivatives — violaxanthin, zeaxanthin, and neoxanthin — predominated. Among the chlorophylls, the blue-green chlorophyll *a* predominated. The amount of hypericin in the chloroform extracts was low.

## REFERENCES

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