

## ALKALOIDS OF SOME SPECIES OF THE GENUS *Berberis* INTRODUCED INTO THE CRIMEA

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Plants of the genus *Berberis* (barberry) have long been used in folk medicine [1]. The drug berberine bisulfate isolated from these plants has found use in officinal medicine as a cholagogic agent [2].

In the dendrology division of the State Nikitinskii Botanical Garden at the present time we are engaged with questions of the introduction of *Berberis* species of different geographical origins. In particular, evergreen species of *Berberis* have been successfully introduced on the southern shore of the Crimea (Table 1).

In order to select introduced barberry species of practical use, we have carried out screening of the vegetative organs of these plants (leaves and stems) for the presence of alkaloids. The total alkaloids were isolated by two methods. The first consisted in the treatment of the carefully comminuted raw material (leaf blades or bark of the stems, 0.5 g each) with 0.5 ml of 10% aqueous KOH followed by extraction of the alkaloids with 10 ml of chloroform—methanol (10:1) and separation of the organic layer. TLC analysis of the extracts obtained was conducted on Silufol plates in the solvent system toluene—acetone—ethanol—25% ammonia (4:4:2:0.5) or chloroform—methanol—water (100:20:1). The substances were revealed with the Dragendorff reagent [3].

The second method consisted in the direct extraction of the raw material with chloroform—methanol and TLC analysis, as described above, but with visual detection of the spots of the alkaloids in UV light ( $\lambda_{\text{max}}$  365 nm, PRK mercury lamp, UFS-1 filter).

For the semiquantitative estimation of the alkaloids in the raw material, we obtained the extractive substances from 20 g of stem bark or 100 g of leaves by method 2, described above, and chromatographed them on silica gel L (40—100  $\mu\text{m}$ ) with elution by water-saturated chloroform—ethanol (10:1). The fractions containing berberine (TLC monitoring from the luminescence in UV light) were combined and evaporated to dryness, and the residue was weighed and calculated as a proportion of the initial raw material.

TABLE 1. Level of Berberine Fractions in Introduced Species of *Berberis* (as percentages of the dry plant material)

Species	Stem bark	Leaves
<i>B. jlianae</i>	0.5	0.003
<i>B. darwinii</i>	1.0	0.005
<i>B. ilicifolia</i>	1.0	0.002
<i>B. buxifolia</i>	0.5	0.001
<i>B. giraldii</i>	2.0	0.002
<i>B. lycoides</i>	0.2	0.002
<i>B. dealbata</i>	0.5	0.003
<i>B. francisci-ferdinandi</i>	2.0	0.002
<i>B. vulgaris</i>	0.4	0.001
<i>B. oblonga</i>	0.1	-
<i>B. aetnensis</i>	0.3	-
<i>B. canadensis</i>	0.5	0.003

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As a result, it was established that all the barberry species studied contained berberine as the main component, this being identified by TLC in comparison with a pharmacopeial specimen. The amount of berberine fractions in the stem bark was two to three orders of magnitude higher than the amount in the leaves (see Table 1). Moreover, with respect to the amount of alkaloids in the stem bark, the species *B. jlianae*, *B. darwinii*, *B. ilicifolia*, *B. giraldii*, *B. dealbata*, *B. francisci-ferdinandi*, and *B. canadensis* were appreciably superior to *B. vulgaris*, which is used as a raw material for the production of berberine. The species *B. lycoides*, *B. oblonga*, and *B. aetnensis* were distinguished by a low level of berberine. On the whole, because of their low content of these compounds, the leaves cannot be a source of alkaloids, and evergreen species of barberry are usually richer in alkaloids than deciduous species.

## REFERENCES

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