

BRIEF COMMUNICATIONS

POLYISOPRENOIDS FROM LEAVES OF *Morus alba* AND *M. nigra*

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Trees or bushes of the genus *Morus* (mulberry) have been cultivated since antiquity. Mainly two species grow in Uzbekistan, *M. alba* and *M. nigra*. These species also include little studied varieties such as khasak-tut (used to feed silk worms), balkhi-tut (for fruit), ilon-tut and plakuchaya (as decorative plants), and shotut (*M. nigra*, for fruit) [1].

Three polyisoprenoid alcohols, undeca- and dodecaprenols and solanesol, were isolated from silk-worm cocoons and leaves of *M. alba* [2]. Solanesol was not observed in the leaves. Moraprenols (polyprenols) from leaves of *M. alba* growing in Fergan Oblast were studied [3]. However, the quantitative composition of the polyprenologs was not reported. Polyprenols from *M. nigra* have not been reported.

Recently a rather large number of preparations based on the use of polyprenols has appeared. In particular, the preparation gamapren (OOO GamaVetFarm, Russia) based on moraprenols is manufactured by phosphorylation of polyprenols isolated from *Morus* spp. The preparation exhibits antiviral action against Herpes viruses by suppressing the synthesis of viral proteins and stimulating the production of interferons [4].

In continuation of research on plant polyprenols [5–8] and in order to compare the quantitative contents of *M. alba* and *M. nigra* polyprenols, we present results from a study of polyisoprenols from these two mulberry varieties growing in Tashkent Oblast.

Total polyisoprenoids were isolated by the previously published method [9]. Dried and ground leaves (10 g) produced total polyisoprenoids in 2.6 and 3.2% yields. The content of total polyprenols was 1.37 and 1.97%, respectively, of the air-dried leaf mass. The qualitative and quantitative compositions of the total polyisoprenoids were determined by high-performance TLC (HPTLC, Camag), by densitometry with UV detection at 210 nm, and by other alternate methods. HPTLC analysis used Sorbfil HPTLC-AF-UV plates (10 × 10). Plates were rinsed in distilled CHCl₃ and dried in air at 20–25°C for 10 min. The eluent was toluene:EtOAc (19:1). Compounds (1.0 mg) were dissolved in solvent (1 mL) and sampled (5 μL). The distance from the origin to the solvent front was 70.0 mm. The distance between tracks was 7.7 mm. Plates were dried in air at 20–25°C for 15 min.

The standards were authentic samples of polyprenols from leaves of *Asimina triloba* (at least 96% pure) and those isolated by us from cotton leaves (at least 95% pure) of composition C₅₀–C₆₅. Standard samples of α-tocopherol and sitosterol were obtained from cotton leaves. Standard samples were prepared as described before [9]. Table 1 presents the results.

According to the results, total polyisoprenoids contained polyprenols and α-tocopherol and sitosterol. The sitosterol contents in *M. nigra* and *M. alba* were almost identical. However, the amount of α-tocopherol was almost 13 times greater in leaves of *M. nigra* than in those of *M. alba*. The homologous composition of polyprenols from both *M. nigra* and *M. alba* included deca-, undeca-, and dodecaprenols with undecaprenol dominating (34.78%) the total polyprenols. Unidentified components of the total polyisoprenoids consisted mainly of phytol according to the mobility and a qualitative reaction (50% H₂SO₄). According to TLC, the other components were hydrocarbons and triterpenoids.

Thus, the comparison of polyisoprenoids from leaves of *M. alba* and *M. nigra* showed that the contents of total polyprenols and undeca- and dodecaprenols were 1.2 times greater for *M. nigra* than for *M. alba*. The contents of decaprenol and sitosterol were identical for both plants. The amount of α-tocopherol changed sharply on going from *M. alba* to *M. nigra*. The results led to the conclusion that leaves of *M. nigra* could act as a rich source for polyprenol production.

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TABLE 1. Content of Polyprenols, Tocopherol, and Sitosterol in Total Polyprenoids from *Morus* spp., %

Variety	Polyprenols				Content		Unidentified compounds
	n = 10	n = 11	n = 12	Σ polyprenols	α-tocopherol	sitosterol	
<i>M. alba</i> , balkhi-tut	10.26	28.94	13.72	52.92	0.09	19.2	27.79
<i>M. nigra</i> , shotut	10.47	34.78	16.50	61.75	1.16	20.8	16.29

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