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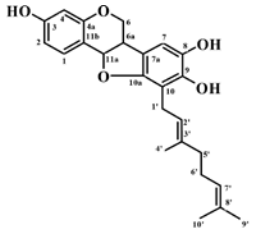
Prenylated polyphenolic compounds from *Lespedeza bicolor*

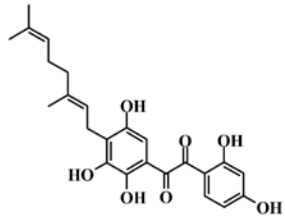
Key words: polyphenolic compounds, antioxidant activity

Lespedeza bicolor is a legume shrub (Fabaceae) that is native to Japan and the South of the Russian Far East. *L. bicolor* has been used for the treatment of acute and chronic inflammation of urinary tract. Its extract is an active component of the medicine Lespephlan developed in the Russian Federation. This species is known to produce prenylated polyphenolic metabolites possessing antimicrobial, anti-inflammatory and antioxidant properties [1, 3]. We have studied the chemical composition and antioxidant activity of *L. bicolor* stem bark metabolites.

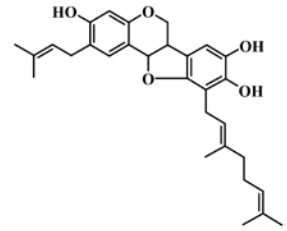
Five prenylated polyphenolic compounds have been found in the extract of *L. bicolor* stems. Compounds **1**-**4** have been isolated for the first time and their structures have been determined on the basis of NMR and CD spectral data as 6a,11a-dihydrolespedezol A_2 (**1**), 1-(2,4-dihydroxyphenyl)-2-(4-geranyl-2,3,5-trihydroxyphenyl)-etane-1,2-dione (bicoloketone) (**2**), 2-isoprenyllespedezol A_2 (**3**), 6a,11a-dihydrolespedezol A_3 (**4**) respectively. The molecular formulae of these compounds have been confirmed using HR-HPLC-MS technique. Lespedezol A_2 (**5**) had earlier been isolated from another Lespedeza species (*L. homoloba*) [2].



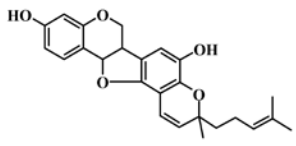
6a,11a-Dihydrolespedezol A_2 (**1**)



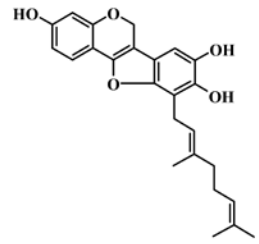
Bicoloketone (**2**)



2-Isoprenyllespedezol A_2 (**3**)



6a,11a-Dihydrolespedezol A_3 (**4**)



Lespedezol A_2 (**5**)

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Several prenylated polyphenolic compounds with a methyl group attached to an aromatic ring had been isolated previously from *L. bicolor* root bark [3]. It should be noted that we have not found such compounds in *L. bicolor* stems. 6a,11a-Dihydrolespedezol A3 (**4**) is a derivative of lespedezol A3 isolated previously from *L. homoloba*.

We studied the DPPH scavenging effect of the isolated compounds as well as their "ferric reducing antioxidant power" (FRAP) directly determining the reducing capacity of a compound. The date on antioxidant activity of compounds **1**-**5** are shown in Table 1. We have found that lespedezol A2 (**5**) previously isolated from *L. homoloba* possessed the most significant antiradical and antioxidant activity in both DPPH and FRAP tests. Compounds **1**-**4** possessed moderate antiradical activity and reducing capacity compared to reference antioxidant quercetin.

Table 1

Antioxidant activity of polyphenolic compounds from *L. bicolor* stems

Compound	DPPH scavenging effect, IC_{50} (30 min), μM	FRAP assay, AAE*
Quercetin	9.17	1.52
Ascorbic acid	31.2	1.00
1	24.0	0.47
2	26.1	0.25
3	21.3	0.46
4	26.7	0.43
5	19.1	0.81

*The data of FRAP assay are given as ascorbic acid equivalents

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