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A COMPARATIVE STUDY OF THE ALKALOIDS OF *Corydalis* SPECIES

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UDC 547.943

A chemical study has been made of five species of *Corydalis*: *Corydalis rosea* Leych., introduced into the Botanical Gardens of VILR [All-Union Scientific-Research Institute of Medicinal Plants]; *C. gigantea* Trautv. et Mey, growing in the Far East; *C. vaginans* Royle, introduced into the Botanical Garden of VILR; *C. marschalliana* Pers, growing in the Crimea; and *C. remota* Fisch., growing in the Far East. The results of the investigation are given in Table 1 and below [1-3].

<u>Alkaloid</u>	<u>Source of Isolation</u>
1. Sanguinarine	<i>C. rosea</i> , <i>C. gigantea</i> , <i>C. marschalliana</i> , <i>C. remota</i> , <i>C. vaginans</i>
2. Dihydrosanguinarine	<i>C. gigantea</i> , <i>C. vaginans</i> , <i>C. remota</i>
3. Cheilanthifoline	<i>C. vaginans</i> , <i>C. gigantea</i>
4. Scoulerine	<i>C. gigantea</i> , <i>C. vaginans</i> , <i>C. marschalliana</i>
5. Ophiocarpine	<i>C. gigantea</i>
6. Isocorypalmine	<i>C. vaginans</i>
7. Corydaline	<i>C. marschalliana</i>
8. Isocorybulbine	"
9. Tetrahydropalmatine	"
10. Adlumine	<i>C. gigantea</i> , <i>C. rosea</i> , <i>C. vaginans</i>
11. d \bar{l} -Adlumine	<i>C. rosea</i>
12. Adlumidine	<i>C. rosea</i> , <i>C. gigantea</i> , <i>C. remota</i>
13. d \bar{l} -Adlumidine	<i>C. rosea</i>
14. Bicuculline	<i>C. vaginans</i> , <i>C. gigantea</i> , <i>C. remota</i>
15. Ochotensine	<i>C. vaginans</i>
16. Corydaine	"
17. Ochrobirine	"
18. \bar{l} -O-Methylcorpaine	"
19. Bulbocapnine	<i>C. vaginans</i> , <i>C. marschalliana</i>
20. Protopine	<i>C. vaginans</i> , <i>C. rosea</i> , <i>C. gigantea</i> , <i>C. remota</i> , <i>C. marschalliana</i>
21. Corycavine	<i>C. marschalliana</i>
22. α -Allocryptopine	<i>C. remota</i>

Analysis of the results obtained shows that the species studied differ fairly greatly in their chemical composition. The alkaloids of the benzophenanthridine and protopine groups

All-Union Scientific-Research Institute of Medicinal Plants, Moscow. Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 592-594, September-October, 1978. Original article submitted March 2, 1978.

TABLE 1. Amount of Alkaloids in Some Species of *Corydalis*, %

Alka- loids	<i>C. rosea</i>	<i>C. gigantea</i>	<i>C. vaginans</i>	<i>C. marsc- halliana</i>	<i>C. remota</i>	Type of alkaloids
1	0,02	0,001	0,007	0,0016	0,003	} Benzophenanthridine
2		0,005	0,002		0,002	
3		0,006	0,02	0,002		}
4		0,005	0,02			
5		0,0005				} Protoberberine
6			0,00013	0,09		
7				0,002		}
8				0,008		
9						}
10	0,02	0,003	0,008			
11	0,002				0,07	} Isoquinoline
12	0,02	0,0007	0,11			
13	0,002				0,024	}
14		0,006	0,026			
15			0,002			} Spirobenzylisoquinoline
16			0,01			
17			0,014			}
18			0,0002			
19			0,03	0,22%		Aporphine
20	0,81	0,05	1,14	0,37%	0,00	} Protopine
21				0,004%		
22					0,02	

are characteristic for all five species, while the spirobenzylisoquinoline alkaloids are found only in *C. vaginans*. Protoberberine alkaloids are found in *C. gigantea*, *C. marschalliana*, and *C. vaginans*, and the phthalide-isoquinoline alkaloids are absent only from *C. marschalliana*. According to the literature, the phthalide-isoquinoline alkaloids *l*-adlumidine and *d*-bicuculline have been isolated from *C. marschalliana* growing in Bulgaria [4].

On the other hand, the species considered differ in the composition of the alkaloids within each group. For example, the 13-methyl-substituted alkaloids corydaline, isocorybulbine, and corycavine were isolated only from *C. marschalliana*.

Although *C. rosea* and *C. remota* are close in chemical composition, the racemic forms of adlumine and adlumidine are found in the former but not in the latter. *Corydalis vaginans*, *C. gigantea*, and *C. marschalliana* are rich in phenolic compounds with a predominance of the tetrahydroprotoberberine alkaloids (scoulerine, cheilanthifoline, ophiocarpine, and isocorypalmine). The phenolic aporphine alkaloid bulbocapnine has been found in *C. vaginans* and *C. marschalliana* and the phenolic spirobenzylisoquinoline alkaloid ochotensine has been isolated only from *C. vaginans*, while, as can be seen from the table, the latter species contains the largest amount of alkaloids.

SUMMARY

A comparative chemical study of five species of corydalis (*Corydalis rosea* Leych., *C. gigantea* Trautv. et Mey, *C. vaginans* Royle, *C. remota* Fisch., and *C. marschalliana* Pers.) has shown that important characteristics of the individual species are not only the type but also the particular composition of the alkaloids within each group and, in particular, the presence of certain characteristic signs connected with the biosynthesis of the alkaloids such as 13-methyl derivatives, phenolic compounds, racemic forms, etc.

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