

AMINO-ACID AND MINERAL COMPOSITION OF SUBSTANCES FROM THE AERIAL PART AND ROOTS OF *Limonium gmelinii*

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Among medicinal plants of the Republic of Kazakhstan, the genus *Limonium* numbers 18 species and is certainly of interest [1].

Roots of *L. gmelinii* occur in industrial quantities in the republic and have been incorporated into medicine [2].

For example, a substance isolated from the aerial part of *L. gmelinii* showed high antioxidant activity. We initiated a comparative study of biologically active compounds by determining the amino-acid and mineral composition of substances obtained from roots and the aerial part of *L. gmelinii*. Raw material was collected in Enbekshikazakh district of Almaty region during flowering. The total amino-acid composition of the studied samples was established as before [3] and is listed in Table 1.

TABLE 1. Amino-Acid Composition of Aerial Part and Roots of *L. gmelinii*

Amino acid	Amount of amino acid per 100 g substance, mg	
	aerial part	roots
Alanine (Ala)	1205	869
Glycine (Gly)	375	302
Valine* (Val)	389	309
Leucine* (Leu)	611	495
Isoleucine* (Ile)	228	175
Threonine* (Thr)	324	288
Serine (Ser)	555	486
Proline (Pro)	842	709
Methionine* (Met)	150	102
Aspartic acid (Asp)	1120	990
Glutamic acid (Glu)	2201	2126
Ornithine (Orn)	20	12
Tyrosine (Tyr)	411	309
Histidine (His)	250	130
Arginine (Arg)	520	460
Lysine* (Lys)	242	212
Tryptophan* (Trp)	212	171
Hydroxyproline (o-Pro)	17	15
Phenylalanine* (Phe)	463	304
Cysteine (Cys)	121	83
Total amino acids	8275	8547
Total essential amino acids	2619	2056
Essential amino acids per total amino acids, %	31.65	24.06

*Essential amino acids.

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TABLE 2. Mineral Composition of Substances from Aerial Part and Roots of *L. gmelinii*

Content, µg/g	Substance	
	aerial part	roots
Cu	81.1	24.9
Ni	159.22	33.15
Co	24.51	11.97
Mn	77.67	19.26
Fe	2427.18	27.88
Pb	39.56	4.52
Cd	5.34	4.10
Zn	135.92	75.35
Ca	77.9	45.7
Mg	35.2	23.4
Na	205.24	360.72
K	182.52	148.53

Table 1 shows that the content of essential amino acids (of the total amino acids) in the substance from the aerial part (31.65%) was significantly greater than their content in the substance from roots (24.06%). This is indicative of their biological value [4].

Table 2 gives the mineral composition of substances from the aerial part and roots of *L. gmelinii* as found from atomic absorption [5].

The studied substances contained sufficient quantities of microelements (Cu, Zn, Mn, Co, Fe, Ni, Mg) for which humans are rather sensitive to a change of concentration [6]. It was also found that Pb and Cd were present, the concentrations of which were less than the allowed values in plant preparations [7]. Furthermore, the mineral composition of the substance from the aerial part was significantly greater than that in the substance from the roots.

REFERENCES

1. *Flora of Kazakhstan*, Vol. 7 [in Russian], Nauka, Alma-Ata (1963), p. 72.
2. G. Zhusupova, K. Rachimov, T. Shalachmetova, and Zh. Abilov, "Phytopreparations from the species of *Limonium Mill* Genus," in: *Biodiversity: Biomolecular Aspects of Biodiversity and Innovative Utilization*, Bilge Sener, ed., New York (2002); G. E. Zhusupova, Zh. A. Abilov, and K. D. Rakhimov, VFS RK 42-1243-04, RK-LS-3-No. 008963 "Limonidine."
3. P. Adams, *J. Chromatogr.*, **95**, No. 2, 188 (1974).
4. V. M. Simakova, I. V. Isaeva, V. A. Ryabchuk, and G. I. El'kina, *Farmatsiya (Moscow)*, No. 1, 28 (1992).
5. I. Khavezov and D. Tsalev, *Atomic-Absorption Analysis* [in Russian], Khimiya, Leningrad (1983).
6. M. S. Panin, *Chemical Ecology* [in Russian], Min. Educ. Sci., Rep. Kaz., Semipalatinsk (2002), pp. 207-213.
7. *USSR State Pharmacopeia*, Vol. XI, No. 2 [in Russian], Meditsina, Moscow (1990).