

AMINO ACID AND MINERAL COMPOSITIONS OF *Alchemilla tredecimloba*

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Alchemilla tredecimloba L. (Rosaceae) is endemic to the western Caucasus. This unstudied species is of definite interest considering that the aggregate species *A. vulgaris* is included in the European Pharmacopeia [1]. The goal of the present work was to establish the amino acid and mineral compositions of the aerial part of *A. tredecimloba*. Samples of raw material were collected from the wild population in Daut gorge of Karachaevo-Cherkessy Republic.

The qualitative and quantitative amino acid compositions were determined as before [2].

The study of the amino acid composition of *A. tredecimloba* identified 15 amino acids (Table 1), 9 of which were essential: valine, threonine, methionine, isoleucine, leucine, lysine, phenylalanine, histidine, and arginine. The total content of amino acids was 7.26%, of which essential amino acids were 4.11% (or 56.61% of the total amount).

The macro- and microelement compositions of *A. tredecimloba* were determined by atomic absorption spectroscopy on a DFS-8-1 instrument using state standard minerals and ores as references [3]. Raw material from *A. tredecimloba* was ashed beforehand in porcelain crucibles at 450-500°C to constant weight.

The method was based on total evaporation of an analytical portion from the well of a carbon electrode (50 elements) in an AC electric-arc plasma (DG-2). The method could determine 21 elements. Table 2 gives their contents in various plant organs.

The content of potentially toxic and toxic metals decreased in the order Al > Ti > Ga > Ag > Pb. The average contents of toxic metals were below the minimum acceptable concentrations [4].

TABLE 1. Amino Acid Composition of *Alchemilla tredecimloba* L. Leaves

Amino acid	Amino acid content		Amino acid	Amino acid content	
	g, %	g/kg		g, %	g/kg
Aspartic acid	0.44	4.40	Isoleucine	0.38	3.80
Threonine	0.57	5.68	Leucine	0.71	7.15
Serine	0.46	4.62	Tyrosine	0.28	2.78
Glutamic acid	1.03	10.28	Phenylalanine	0.47	4.75
Glycine	0.39	3.92	Histidine	0.29	2.93
Alanine	0.53	5.33	Lysine	0.63	6.35
Valine	0.50	5.03	Arginine	0.55	5.51
Methionine	0.01	0.12			

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TABLE 2. Macro- and Microelement Compositions of *Alchemilla tredecimloba* L.

Element	Content in various plant parts, %			
	roots	stems	leaves	flowers
Cu	0.005	0.005	0.005	0.005
Zn	0.015	0.01	0.01	0.01
Pb	-	0.0006	0.0006	0.0006
Ag	0.00001	0.00001	0.000015	0.000015
Mo	0.00005	0.00005	0.0003	0.003
Ga	0.0001	-	-	-
Ba	0.05	0.06	0.05	0.05
Mn	0.06	0.06	0.08	0.1
Co	-	-	-	0.0001
Ni	0.0002	0.0003	0.0005	0.0006
Ti	0.02	0.02	0.02	0.02
V	0.0001	0.0002	0.0002	0.0002
Cr	0.0003	0.0003	0.0003	0.0005
Fe	0.5	0.2	0.3	0.5
B	0.01	0.01	0.03	0.02
K	30	30	20	20
Na	0.6	0.6	0.6	0.6
Ca	15	20	30	30
Mg	6	5	6	6
Al	0.2	0.1	0.1	0.15
Si	1	1	2	1

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