

AMINO-ACID AND MINERAL COMPOSITION OF *Stellaria media*

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Stellaria media (L.) Vill. (Caryophyllaceae) is well known as an invasive weed in gardens, fields, and disturbed grounds in the world [1, 2], but this plant is also a Chinese traditional medicinal plant used for hundreds of years by the Chinese community, which shows very effective anti-inflammatory and antiviral activities [3]. In both Europe and North America, it also has a very long history of herbal use, which is particularly beneficial in the external treatment of kinds of itching skin conditions [4]. But not all of these uses are supported by scientific evidence.

The goal of our work was to study the amino acid and mineral composition of the aerial part of *S. media*. Samples of raw material were collected during flowering in Nanjing Botanical Garden, Mem. Sun Yat-sen (China).

We investigated the amino acid composition by using a Hitachi 835-50 mould automatic amino-acid analyzer. For this, the sample was extracted exhaustively with hot water, filtered, and evaporated to dryness *in vacuo*. The dry solid was treated with lithium citrate buffer (pH 2.2). Proteins were precipitated by sulfosalicylic acid solution (0.1 mL, 30%). The samples were centrifuged and analyzed. The qualitative amino-acid composition in the studied sample was determined from retention times using a standard mixture consisting of 24 amino acids as a standard. The quantitative amino acids content was calculated in mg/kg of sample. Table 1 gives the results.

A total of 16 free amino acids were observed in *S. media*. Of these, 9 were essential (threonine, valine, methionine, isoleucine, leucine, phenylalanine, lysine, and histidine and arginine, which are not synthesized in children). Bound amino acids were determined after modified acid hydrolysis by HCl (5.7 N) at 130°C for 6 h. A total of 16 amino acids was observed in the sample.

The total content of free essential amino acids in *S. media* was 0.85% (27.27% of the total free amino acids); that of bound essential amino acids was 7.39% (48.05% of the total bound amino acids). This indicated that proteins from the aerial part of *S. media* were complete. Glutamic acid dominated in the investigated sample.

The macro- and microelement compositions of the herb was established by inductively coupled plasma optical emission spectrometry (ICP-OES) using a Perkin–Elmer OPTIMA 4300DV spectrograph [5]. The employed method enabled the determination of 21 elements in the herb. Table 2 gives the results. The contents of toxic and potentially toxic elements decreased in the order Al > Ti > Ba > Ag > Pb, which were below the minimum acceptable concentrations [3].

The presence of essential amino acids and essential and biogenic chemical elements will determine the potential for *S. media* and preparations of it for treatment of many diseases that are due to their deficiency in the organism.

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TABLE 1. Amino-Acid Composition of *Stellaria media*

Amino acid	Content, mg/kg dry wt		Amino acid	Content, mg/kg dry wt	
	FAA	BAA		FAA	BAA
Aspartic acid	744.01	1805.65	Isoleucine*	126.08	854.59
Threonine*	71.20	769.23	Leucine*	203.03	1512.32
Serine	44.00	656.31	Tyrosine	63.40	588.88
Glutamic acid	785.60	2202.21	Phenylalanine*	10.83	1028.97
Glycine	55.05	863.86	Histidine*	26.60	432.03
Alanine	446.00	1096.80	Lysine*	52.67	783.31
Proline	128.71	779.31	Arginine*	14.70	834.55
Valine*	287.02	998.78	Total amino acids	3116.80	15387.41
Methionine*	57.90	180.61			

*Essential amino acids; FAA: free amino acid; BAA: bound amino acid.

TABLE 2. Macro- and Microelement Compositions of *Stellaria media*

Element	Content, mg/kg	Element	Content, mg/kg
Cu	1.049	Cr	0.047
Zn	2.890	Fe	13.72
Pb	0.017	B	0.918
Ag	0.731	P	46.76
Mo	0.021	K	86.47
Ba	1.011	Na	63.28
Mn	0.913	Ca	279.9
Co	0.003	Mg	9.813
Ni	0.019	Al	66.31
Ti	2.671	Si	71.14
V	0.011		

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