AMINO ACIDS AND TRACE ELEMENTS FROM *Callisia fragrans*

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Callisia fragrans Wood. (Commelinoceae) is a cultivated plant, the fresh leaves and runners of which are used as raw material for producing juice that possesses, judging from experimental results, pronounced adaptogenic and motor-protective activity and contains harmless compounds [1].

The contents of neutral, glyco- and phospholipids and their fatty acids, ascorbic acid, organic acids, chlorophyll, and carotinoids in various plant organs have been reported [2]. The phenolic composition of the plant has been studied [3]. Our goal was to determine the amino-acid and mineral composition of *C. fragrans* juice.

Raw material was grown in industrial plots of the Russian Research Institute of Medicinal and Aromatic Plants (VILAR, Moscow). Fresh runners (100 g) were ground in a blender. The resulting pulp was filtered through cotton tissue to produce juice (86 mL) of density 1.005 g/cm^3. The resulting juice (20 mL) was placed in a Soxhlet apparatus and purified of lipophilic substances using $CHCl_3$ (100 mL) for 2 h on a water bath. The purified juice was treated with lithium-citrate buffer (pH 2.2). Proteins were precipitated by sulfosalicylic acid solution (0.1 mL, 30%). Samples were centrifuged and analyzed for amino acids on an AAA 339 analyzer (Czech Rep.). The qualitative composition of amino acids was determined by retention time using a standard mixture consisting of 24 amino acids as references. The quantitative content of amino acids was calculated in μg/mL of juice using peak areas as the parameter. Table 1 lists the results. Bound amino acids were determined after acid hydrolysis by HCl solution (6 N) at 110°C for 24 h.

We found 15 free amino acids including 6 essential ones. A total of 14 bound amino acids was observed, of which 7 were essential.

The mineral composition was determined on a DFS-8 spectrograph with a planar diffraction grating using spectral emission analysis. Runners of *C. fragrans* contained 11 elements (Table 2). The plant accumulates moderate levels of Ba, Mn, and Cu [4].

TABLE 1. Content of Free and Bound Amino Acids in *Callisia fragrans* Juice

Acid	Amino-acid content, μg/mL		Acid	Amino-acid content, μg/mL	
	AA	BAA		AA	BAA
Asp	–	42.59	Met*		1.12
Asn	96.32	–	Ile*	25.63	22.20
Thr*	14.79	19.18	Leu*	12.52	11.96
Ser	21.21	26.69	Tyr	24.60	23.17
Glu	71.51	90.66	Phe*	52.76	56.11
Gln	220.46	–	γ-Aminobutyric	19,92	
Gly	3.34	17.54	Lys*	3.27	8.97
Ala	20.73	26.83	His	11.14	
Val*	62.21	69.96	Arg		3.56

*Essential amino acids; AA, amino acid; BAA, bound amino acid.

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TABLE 2. Content of Elements in *Callisia fragrans* Runners per Abs. Dry Raw Material

Element	mg/g	Element	mg/g
Ca	15.0	Ba	14.0
Mg	4.2	Fe	8.4
Si	4.2	Na	420.0
P	4.2	Mn	112.0
		Cu	2.8
		Zn	42.0
		Al	210

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