

AMINO- AND FATTY-ACID COMPOSITION OF KAZAKHSTAN *Haloxylon* SPECIES

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The genus *Haloxylon* (Chenopodiaceae) is represented by 10 species in semi-deserts and deserts of Central Asia, Iran, Afghanistan, Northwest China, Kazakhstan, and Mongolia. Three species are indigenous to the flora of Kazakhstan: *H. aphyllum* Bge., *H. persicum* Bge., and *H. ammodendron* Bge. [1].

The aerial part of *Haloxylon* is used in folk medicine externally for scorpion and snake bites. The ash is used as a wound-healing agent for internal gastrointestinal-tract ulcers [2].

The aerial part of the studied *Haloxylon* species contains 18 amino- and 8 fatty-acids with different quantitative contents in each species (Tables 1 and 2).

The composition of the bound amino acids was established using an AAA-881 (Czech Rep.) amino-acid analyzer. Samples were hydrolyzed in HCl (5.7 N) for 24 h in sealed ampuls at 110°C [3].

The aerial part of *H. aphyllum* had the highest amino-acid content. Glutamic and aspartic acids dominated in all species. The amino-acid content, including essential ones (30.06%, 29.91, 30.22 of total amino acids), was about the same in all *Haloxylon* species.

Fatty acids were analyzed as methyl esters in a Chrom-42 chromatograph (Czech Rep.) using Cellite 545 adsorbent on WAW chromosorb, He carrier gas, flame-ionization detector, carrier gas flow rate 30 mL/min, detector temperature 188°C, and furnace temperature 230°C. Acids were methylated by NaOMe at 60–70°C [4].

Unsaturated fatty acids (oleic and linoleic) and saturated palmitic acid dominated the composition of all studied species. Based on the results, the quantitative compositions of fatty acids of all studied *Haloxylon* species are similar. The content of saturated and unsaturated fatty acids (of total fatty acids) differs only by several units between the *Haloxylon* species.

Table 1. Composition and Content of Amino Acids in Aerial Part of *Haloxylon*, %

Amino acid	<i>H. persicum</i>	<i>H. aphyllum</i>	<i>H. ammodendron</i>	Amino acid	<i>H. persicum</i>	<i>H. aphyllum</i>	<i>H. ammodendron</i>
Val*	4.45	4.43	4.48	Asp	10.96	10.97	10.90
Ile*	3.96	3.94	3.98	Gly	7.30	7.32	7.25
Leu*	8.42	8.41	8.44	Glu	17.38	17.41	17.32
Lys*	2.91	2.89	2.95	Pro	5.55	5.57	5.53
Met*	1.72	1.70	1.75	Ser	6.31	6.31	6.27
Thr*	4.08	4.06	4.10	Tyr	2.70	2.72	2.70
Trp*	1.12	1.10	1.16	Cys	1.53	1.55	1.54
Phe*	3.39	3.38	3.45	Σaa	6.517	9.206	6.633
Ala	6.80	6.82	6.81	Σeaa	1.959	2.754	2.011
Arg	8.48	8.49	8.46	Total protein, %	6.79	9.70	6.83
His	2.91	2.91	2.89				

*Essential amino acids.

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Table 2. Composition and Content of Fatty Acids in Aerial Part of *Haloxylon*, %

Acid	<i>H. persicum</i>	<i>H. aphyllum</i>	<i>H. ammodendron</i>	Acid	<i>H. persicum</i>	<i>H. aphyllum</i>	<i>H. ammodendron</i>
14:0	1.01	1.11	1.13	18:2	47.07	46.90	48.46
16:0	26.21	25.83	23.99	18:3	0.38	0.31	0.40
18:0	1.91	2.05	1.79	Σfa	0.786	2.247	3.009
14:1	0.25	0.26	0.29	Σsfa	29.13	28.99	26.91
16:1	0.51	0.36	0.47	Σusfa	70.87	71.01	73.09
18:1	22.66	23.18	23.47				

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