

AMINO- AND FATTY ACID COMPOSITION OF THREE KAZAKHSTAN SPECIES OF *Rumex*. II.

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The genus *Rumex* (dock) of the family Polygonaceae (Smartweed) includes 23 species [1, 2], 5 of which are pharmacopeic and 7 of which are used in folk medicine [3-7], and is definitely interesting among the large variety of plants of Kazakhstan flora.

Components from roots of three Kazakh *Rumex* species, *R. rossicus* Murb., *R. marschallianus* R. chb., and *R. thyrsiflorus* F., were compared and analyzed for the first time and the quantitative contents of amino- and fatty acids were determined.

The qualitative composition of the acids was established by chromatography (paper and thin-layer) using standards and specific developers [8]; qualitative and quantitative compositions, by GC using the literature method [9, 10] (Tables 1 and 2).

TABLE 1. Composition and Content of Amino Acids in *Rumex* Roots, %

Amino acid	<i>R. rossicus</i>	<i>R. marschallianus</i>	<i>R. thyrsiflorus</i>
Alanine	0.90	0.88	0.86
Glycine	0.30	0.29	0.28
Valine	0.29	0.25	0.27
Leucine	0.49	0.47	0.45
Isoleucine	0.17	0.16	0.15
Threonine	0.28	0.27	0.10
Serine	0.48	0.46	0.44
Proline	0.71	0.69	0.68
Methionine	0.11	0.10	0.08
Aspartic acid	0.91	0.89	0.86
Cysteine	0.09	0.08	0.06
Hydroxyproline	0.02	0.02	0.01
Phenylalanine	0.31	0.30	0.29
Glutamic acid	1.82	1.78	1.74
Ornithine	0.02	0.01	0.02
Tyrosine	0.31	0.30	0.28
Histidine	0.13	0.11	0.10
Arginine	0.39	0.37	0.35
Lysine	0.20	0.19	0.17
Tryptophan	0.18	0.17	0.15

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TABLE 2. Composition and Content of Fatty Acids in *Rumex* Roots, %

Acid	<i>R. rossicus</i>	<i>R. marschallianus</i>	<i>R. thyrsiflorus</i>
C _{14:0}	1.8	3.0	2.1
C _{15:0}	0.5	0.6	0.6
C_{16:0}	3.5	8.9	6.2
C _{16:1}	1.3	2.1	1.2
C _{18:0}	3.3	2.5	4.0
C_{18:1}	38	32	35
C_{18:2}	44	44	42
C _{20:0}	0.9	0.6	0.6
C _{20:1}	1.9	1.1	2.4
C _{20:2}	1.9	2.0	2.8
*Unident.	1.6	2.0	2.3
**Unident.	1.3	1.2	1.3

Retention times correspond to *Unident., 20:3; **Unident., 20:4.

The studied *Rumex* species contained 20 amino- and 12 fatty acids but differed among themselves in quantitative content. The amino acids were highest in roots of *R. rossicus*. Alanine, proline, and aspartic and glutamic acids dominated in all species.

Fatty unsaturated (oleic and linoleic) and saturated (palmitic) acids dominated in all studied species. A comparison of the fatty-acid contents among species showed that oleic (38.0%) and eicosanoic (0.9%) acids dominated in *R. rossicus*; myristic (3.0%) and palmitic (8.9%), in *R. marschallianus*; steric (4.0%), eicosenedienoic (2.8%), eicosenic (2.4%), and eicosotrienoic (2.3%), in *R. thyrsiflorus*.

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