

TYPE COMPOSITION OF TRIGLYCERIDE SEED OILS.
III. TRIGLYCERIDES FROM CERTAIN PLANTS
OF THE RANUNCULACEAE FAMILY

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UDC 543.54:665.35

Quantitative determination of triglycerides from plant oils using reversed-phase HPLC [1] is an alternative to the usual method of converting the oil components to the methyl esters with subsequent GC analysis. We used the same conditions in our research that were used previously [2].

Table 1 presents results for seed oils from plants collected in Belgorod region in 2003 (*Aquilegia hybrida* hort., *Delphinium consolida* L., *Delphinium* sp., *Ranunculus acris* L., *Clematis integrifolia* L., *Nigella sativa* L.) and acquired in commerce (*Adonis aestivalis* L., *Trollius chinensis* L., *Pulsatilla vulgaris* Mill., *Helleborus* sp.). Triglycerides from the majority of plants are formed mainly from α -linolenic, linoleic, and oleic acids (from unsaturated acids). However, trienoic acids of seed oil from *Clematis* contain only γ -linolenic (11.0 ± 2.0 mol %); in oil from *Aquilegia*, ranunculenol (57.9 \pm 2.0 mol %). The ratio of acid increments in *Aquilegia* oil is so favorable that "problem" triglycerides are practically not seen in the chromatogram. Oils from *Delphinium* seeds are clearly distinguished by the presence of triglycerides formed from *cis*-11-eicosenoic acid (**1**) (10-20 mol %), which are well separated from other triglycerides. The chromatogram of seed oil from *N. sativa* shows triglycerides formed from *cis*-11,*cis*-14-eicosadienoic acid (**2**) (3.5 ± 0.5 mol %). Our data agree with those in the literature [3, 4]. However, owing to the approximately equal increments corresponding to transitions from linoleic acid to **2** and oleic acid to **1**, it is practically impossible to determine separately triglycerides formed from **2** and **1** (except pure triglyceride L₂**2**). The fatty-acid composition should be established by traditional methods for reliability.

TABLE 1. Triglycerides from Seed Oils of Certain Ranunculaceae Plants

Acid radical	<i>Adonis aestivalis</i> L.	<i>Trollius chinensis</i> L.	<i>Pulsatilla vulgaris</i> Mill.	<i>Clematis integrifolia</i> L.**	<i>Helleborus</i> sp.	<i>Ranunculus acris</i> L.	<i>Delphinium</i> sp.	<i>Delphinium consolida</i> L.	<i>Nigella sativa</i> L.	<i>Aquilegia hybrida</i> hort***
Ot ₃	0	0	0	0	11.7	15.6	0	0	0	2.9
Ot ₂ L	0	2	1.2	1.8	13	23.8	0	0.3	0	35.6
OtL ₂ +Ot ₂ O	0.8	8.6	1.2	12.3	13.9	20.9	1.8	1.0	0.4	10.6
		7:1*	1:1*	40:1*	2:1*	2:3*	9:1*	9:1*	20:1*	7.0
Ot ₂ P	0	0.4	0.6	0.3	7.8	3.8	0.1	0.1	0	21.0
Ot ₃ +OtLO	45.3	47.1	46.5	30.5	15.3	12.1	11.4	16.2	8.6	0
	150:1	15:1	90:1	5:1	1:9	1:2:5	30:1	30:1	80:1	5.1
OtLP+Ot ₂ S	0.3	1.6	0.9	6.2	9.8	7.6	0.4	0.2	0.1	5.5
										5.2
Ot ₂ 2							0	0	2.8	0
Ot ₂ O	12	21.7	20	14	8.7	3.6	19	7.2	13	0

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TABLE 1. (Continued)

Acid radical	<i>Adonis vernalis</i> L.	<i>Trollius chinensis</i> L.	<i>Pulsatilla vulgaris</i> Mill.	<i>Clematis integrifolia</i> L.**	<i>Helleborus</i> sp.	<i>Ranunculus acris</i> L.	<i>Delphinium</i> sp.	<i>Delphinium consolida</i> L.	<i>Nigella sativa</i> L.	<i>Aquilegia hybrida</i> hort***
										1.8
OtO ₂ +Ot ₂ P+										0
OtLS+OtOP	15.6	8.90	15	15.9	9.0	8.1	2.5	1.1	11.0	1.6
										1.0
Ot ₂ ₂							0	0	1	0
OtO ₂ +Ot ₂ ₁					2.5		6.4	1.9	?	0
OtO ₂	4.6	5.4	6.3	5.3	0.2	2.1	22	15	13	0.6
Ot ₂ S+OtOP+										0
OtOS	10.7	4.4	6.4	9.8	4.1	2.1	3.7	3.9	11.2	0.6
										0.7
OtP ₂	0.9		0	0	1		0	0	0	0
O ₂ ₂							0	0	2.1	0
OtO ₁					1.2		10	8.7		0
O ₃	0		0.8	0.8	0		10	14	7.1	0
OtOS+O ₂ P	0	0	1.4	3.1	1.6	0	2.7	4.1	7.0	0
										0
O ₂ ₁							5.1	7.5		0
Ot ₁ ₂							0.6	9		0
O ₁ ₂							1.4	6.7		0
₁ ₂							0	1.5		0
Res.	0	0	0	0	0	0	1.8	1.5	1.2	0.8

*Ratios of amounts of pure triglycerides in problem pairs were obtained in eluent containing 25 vol % CH₃CN in (CH₃)₂CO. Acid radicals: Ot, octadecatrienoic (*cis*-9,*cis*-12,*cis*-15, ***cis*-6,*cis*-9,*cis*-12, ****trans*-5,*cis*-9,*cis*-12); L, linoleic; O, oleic; P, palmitic; S, stearic; **1**, *cis*-11-eicosenoic; **2**, *cis*-11,*cis*-14-eicosadienoic.

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