INVESTIGATION OF THE INFLUENCE OF FUNGICIDES ON THE OIL CONTENT OF COTTON SEEDS AND THE QUALITY OF THE OIL

S. F. Radzhabov and A. U. Umarov

UDC 647.665.3+632.959

We have investigated the oil of seeds of cotton plants of varieties 108-F and Tashkent-3 treated with fungicides: uzgen, benlat, and topsin, in a dose of 200 kg/ha (the samples were obtained from the experimental fields of SoyuzNIKhI [All-Union Scientific-Research Institute of Cotton Growing]. The characteristics of the seeds, the physicochemical indices of the oils and the fatty acids, and also the fatty-acid and triglyceride compositions of the oils determined by generally adopted methods [1] are given in Tables 1 and 2.

It follows from Table 1 that the oil content of the seeds increases (by from 0.4 to 0.8%), particularly with the use of uzgen and benlat.

All the samples have similar physicochemical indices of the oils and fatty acids. The fatty-acid compositions of the oils were determined by the GLC method, and the triglyceride compositions by enzymatic hydrolysis [2]. The treatment of the fields with fungicides does not affect the fatty-acid and triglyceride compositions of cottonseed oil (Table 2).

TABLE 1

Index	108-F				Tashkent-3			
	control	uzgen	benlat	topsin	control	uzgen	benlat	topsin
Weight of 1000 seeds, g	116,21	116,63	116,22	115,52	118,12	118,82	118,60	118,04
Oil content of the seeds calculated on the absolutely dry weight, %	22,18	22,54	22,42	22,04	22,35	23,15	23,10	22,84
Oil								
color of the black oil in a 1-cm layer at 35 yellow units on the VNIIZh-12 colorimeter	3,5	3,5	3,5	3,5	6,0	6,0	6,0	6,0
density, g/cm^3	0,9273	0,9268	0,9265	0,9281	0,9164	0,9182	0,9176	0,9171
refractive index, n_D^{20}	1,4750	1,4752	1,4752	1,4760	1,4724	1,4722	1,4722	1,4730
viscosity, °E	9,1032	9,1013	9,1012	9,1010	7,1224	7,1219	7,1209	7,1186
iodine No., % I_2	105,02	104,85	104,90	104,26	107,40	106,90	107,24	107,32
saponification No., mg KOH/g	194,08	194,25	194,28	194,12	194,83	194,86	194,72	194,65
acid No., mg KOH/g	2,34	2,45	2,42	2,63	2,82	2,74	2,70	2,88
Amount, expressed as % I_2 of								
unsaponifiables	1,03	1,07	1,05	1,02	1,29	1,16	1,18	1,23
native gossypol (by the aniline–pyridine method)	0,78	0,72	0,76	0,84	0,49	0,46	0,47	0,51
Fatty acids								
neutralization No., mg KOH/g	204,83	204,71	204,76	204,43	204,61	204,60	204,68	204,52
mean molecular weight	273,93	274,09	274,02	274,47	274,22	274,24	274,13	274,34

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 242-244, March-April, 1975. Original article submitted October 11, 1974.

TABLE 2

Fatty acids and triglycerides	103 F				Tashkent-3			
	control	uzgen	benlat	topsin	control	uzgen	benlat	topsin
	Fatty-acid composition, %							
Lauric	0,34	0,32	0,29	0,24	0,23	0,19	0,21	0,17
Myristic	1,23	1,27	1,25	1,36	0,90	1,02	0,98	1,08
Palmitic	23,02	23,20	23,11	22,33	22,11	22,22	21,94	21,86
Palmitoleic	1,64	1,45	1,68	1,57	2,65	2,54	2,60	2,35
Stearic	2,34	2,31	2,40	1,93	0,93	1,16	1,11	0,98
Oleic	18,16	18,13	18,01	17,81	17,84	17,75	17,93	17,12
Linoleic	53,27	53,32	53,26	54,82	55,34	55,14	55,22	56,44
	Triglyceride composition, %							
GlSSS	1,27	1,23	1,18	0,65	0,71	0,69	0,57	0,44
GlSSU	6,94	7,28	6,37	6,23	1,94	2,14	2,08	2,53
GlSUS	9,08	9,20	8,14	8,34	13,83	14,12	14,08	14,76
GlSUU	38,11	38,00	40,08	41,92	45,02	44,92	44,86	46,92
GlUSU	6,04	6,10	6,06	5,26	1,74	1,83	1,75	1,12
GlUUU	38,56	38,19	38,17	37,57	36,76	36,30	36,66	34,23

Note. Gl) glycerol, S) radical of a saturated acid, U) radical of an unsaturated acid.

LITERATURE CITED

1. Handbook on Methods of Investigation, Technological Control, and Accounting of Production in the Oils and Fats Industry [in Russian], Leningrad (1967), pp. 1, 2.
2. A. L. Markman, T. V. Chernenko, and A. U. Umarov, Prikl. Biokhim. Mikrobiol., 5, No. 5, 616 (1969).