

SEED AND OIL LIPIDS OF COTTON GROWN ON SALINE SOIL*

N. K. Yuldasheva, N. T. Ul'chenko, A. I. Glushenkova,
and I. G. Akhmedzhanov

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Saline soils occupy more than 60% of the total irrigated area of Uzbekistan [1]. Of these, about 35% are used for cotton cultivation.

The cotton harvest and the quality of fiber and oil are known to depend on not only the climatic conditions but also, to a significant extent, the soil salinity.

We studied the effect of soil salinity on the properties of seeds and oil of cotton variety AN-Bayaut-2 grown in Dzhizak region.

Experimental plants were grown in weakly (sample 1) and moderately (sample 2) saline soils; controls, in non-saline soil. Free lipids were extracted with hydrocarbons (bp 72-85°C) in a Soxhlet apparatus; bound lipids, by the literature method [2]. The acid number was found as before [3]. The content of free gossypol was determined using *p*-anisidine [4]. Lipids were hydrolyzed by methanolic KOH (10%) [5]. Methyl esters were prepared as described previously [6].

Table 1 lists the properties of seeds and oil and indicates that the oil content of seeds, the content of free gossypol, and the mass of 1000 seeds decrease with increasing soil salinity whereas the content of free lipids increases. This is especially noticeable in seeds grown in the more saline soil (1.8%) versus the control (1.04%).

We also determined the fatty-acid composition of free and bound lipids (Table 2). The fatty-acid compositions of the studied samples were qualitatively identical but quantitatively different. This can be seen for 18:2 acid, the content of which in fatty acids of bound lipids decreases as the amount of soil salinity increases. It should also be noted that sample 2 has a higher level of octadecenoic acid in both the free and bound lipids.

TABLE 1. Properties of Seeds and Oil of Cotton Variety AN-Bayaut-2 Grown on Saline Soils

Property	Sample		
	Control	1	2
Mass of 1000 seeds, g	109.45	109.21	105.0
Moisture of seeds, % of seed mass	7.7	8.0	8.3
Oil content for actual moisture, % of seed mass	24.8	23.4	20.4
Free lipids, % of dry mass	26.8	25.4	22.2
Free gossypol content in seeds, % of oil mass	1.41	1.30	1.13
Oil acid number, mg KOH	6.6	2.7	7.1
Bound lipids, % of seed mass	1.04	1.15	1.80

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S. Yu. Yunusov Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (99871) 120 64 75. Translated from *Khimiya Prirodnikh Soedinений*, No. 2, p. 158, March-April, 2004. Original article submitted March 29, 2004.

TABLE 2. Fatty-Acid Composition of Free (F) and Bound (B) Lipids of Cotton Seeds, GC, mass %

Acid	Control		Sample			
			1		2	
	FL	BL	FL	BL	FL	BL
14:0	1.2	1.0	0.9	1.1	1.2	0.8
16:0	26.2	25.6	23.9	30.0	26.1	25.2
16:1	1.4	0.9	1.3	0.9	0.7	1.8
18:0	1.8	3.6	3.9	3.8	2.3	7.5
18:1	16.3	19.5	17.0	18.8	18.4	21.2
18:2	53.1	49.4	53.0	45.4	51.3	43.5
$\Sigma_{\text{sat.}}$	29.2	30.2	28.7	34.9	29.6	33.5
$\Sigma_{\text{unsat.}}$	70.8	69.8	71.3	65.1	70.4	66.5

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