

A COMPARATIVE INVESTIGATION OF THE PHYSICOCHEMICAL
 PROPERTIES OF THE DNA OF THE FUNGUS
Verticillium dahliae AND OF COTTON PLANTS
 OF VARIETY 108-F

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The physicochemical properties of DNA have been studied in a population of *Verticillium dahliae* Klebahn with a proven virulence isolated from cotton plants of variety 108-F (more than 70% of diseased plants). The culture of the fungus was grown on Czapek's liquid nutrient medium in round-bottomed flasks at 24-26°C for 40 days. After the end of this period of incubation, the films of fungus, consisting mainly of microsclerotia, were collected and fixed.

The deoxyribonucleic acid was isolated from the 40-day cultures of the fungi and from cotton plant shoots using 2 M NaCl-1% SDS-0.005 M EDTA, pH 8.0 [1]. Deproteination was performed with water-saturated phenol (pH 8.0) and with chloroform-isoamyl alcohol (24 : 1). The DNA was precipitated from the solution with two volumes of 96% ethanol and purified by gel filtration on Sephadex G-200.

The hyperchromism of the DNA was 30-35% for the fungus and 40% for the cotton plant. The intrinsic viscosities of solutions of DNA determined 0.2 M NaCl on a Zimm rotary viscometer were 80 and 30 dl/g for the fungus and the cotton plant, respectively. The molecular weights calculated from the intrinsic viscosities were 20×10^6 for the fungal DNA and 3.5×10^6 for the cotton DNA. The nucleotide compositions of the DNA's were determined by the method of Spirin and Belozerskii and the content of pyrimidine isopliths as described by Mazin and Vanyushin [3] (Tables 1 and 2).

As can be seen from Table 1, the DNA of the fungus *Verticillium dahliae* belongs to the GC type while the cotton DNA belongs to the AT type. The results of Table 2 show that the relatedness factor, i.e., the ratio $\frac{(\text{pyrimidine})_n P_{n+1} \leq 3}{(\text{pyrimidine})_n P_{n+1} \geq 4}$ for the cotton plant DNA is 1.97 and for the fungal DNA 2.89. These results are in harmony with the literature [4].

The DNA of the fungus *V. dahliae* in a concentration of 2.54 µg/ml in 0.014 M NaCl solution possesses the property of causing the withering of the leaves of the cotton plant, while the solvent without DNA and the DNA isolated from the cotton plant did not have this property.

TABLE 1

DNA preparation	Content of bases, mole %				G + C	A + T G + C
	G	A	C	T		
108-F	21,0	29,3	20,6	29,1	41,6	1,40
<i>V. dahliae</i>	27,3	22,8	27,8	22,1	55,1	0,81

TABLE 2

Iso- pliths	Content of bases, mole %	
	cotton plant	<i>V. dahliae</i>
I	12,87	15,64
II	11,24	13,33
III	0,06	8,20
> III	16,81	12,83

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