Base B was readily soluble in ethyl acetate and ethanol and more sparingly in acetone, ether, chloroform, ethanol, hexane, and petroleum ether (40-70°C). The IR spectrum (KBr) of base B contained absorption bands at 1100 cm^{-1} (ether C–O bonds), 1710 cm^{-1} (carbonyl group), and 3500 cm^{-1} (hydroxy groups). The mass spectrum had the peaks of ions with *m/z* 415 (M^+, 37%), 397 (25%), 387 (75%), 327 (44%), 309 (100%), 300 (47%), 291 (31%), 280 (44%), 264 (25%).

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CONFORMATIONAL CHANGES OF GOSSYPULIN ON CHEMICAL MODIFICATION.

I. INFLUENCE OF GOSSYPOL

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Chemical modification is widely used for regulating the functional properties of food proteins [1]. We have made use of this approach for the study of the interrelationship of the structure of the globulins of cotton seeds with their properties by subjecting the globulins to treatment with such acylating agent as succinic and acetic anhydrides. We have shown previously [2] that the quaternary structure of the 11S globulin (gossypulin) changes appreciably even with a small degree of modification (10-fold excess of agent per 1 mole of lysine). This appears particularly clearly on succinylation. It appeared of interest to investigate the laws in the change of the secondary and tertiary structures at a minimum degree of modification, which would permit a conclusion to be drawn concerning the contribution of particular changes in the structure of the protein, leading to a disturbance of the quaternary structure. It is just with this aim that the minimum excess of acylating agent (tenfold excess per mole of lysine) was taken.

As we have established previously [3], gossypol-free gossypulin can be isolated only from fresh cotton seeds, and in other cases gossypol (the toxic pigment of the cotton plant) is unavoidably present in the protein samples obtained. In view of this, the work was carried out on gossypol-free and gossypol-containing (0.6%) samples of the 11S globulin.

The circular dichroism (CD) spectra of the gossypol-containing and gossypol-free gossypulin differed substantially (Fig. 1), particularly in the region of aromatic absorption (260-280 nm), which indicates differences in their tertiary structures. This, in its turn, affects the conformational stability of the proteins on modification. As can be seen from Fig. 2, which gives the CD spectra of modified gossypol-free proteins, succinylation (degree of modification 25%) and acetylation (degree of modification 13%) caused changes both in the secondary structure (Fig. 2b) and in the tertiary structure (Fig. 2a). In the case of gossypylin containing gossypol (Fig. 3), more substantial changes were observed in 260-280 nm

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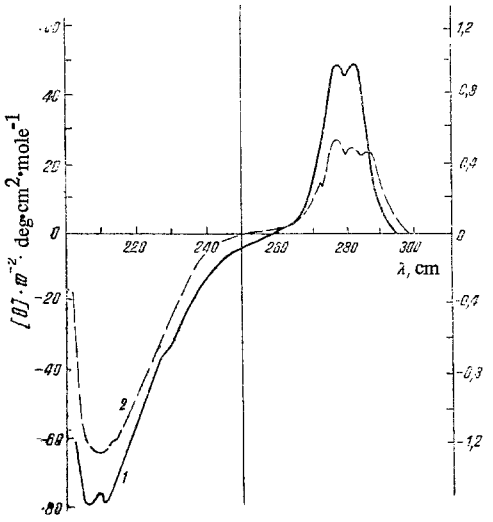

Fig. 1

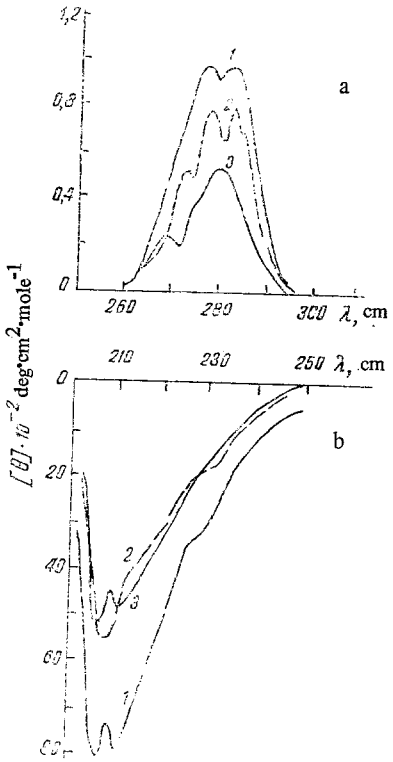

Fig. 2

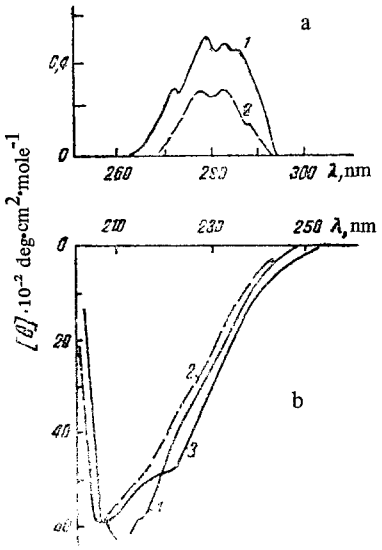

Fig. 3

region (Fig. 3a), acetylation of the protein being accompanied by the practically complete disappearance of the CD band in this region, which indicates deep changes in the tertiary structure of the protein. At the same time, the ellipticity in the 208-212 nm region (Fig. 3b) scarcely changed and only some hypsochromic shift of the maximum to 205 nm was observed, i.e., the change in the secondary structure was less pronounced than in the case of the gossypol-free protein, although the quaternary structure was destroyed in both cases.

Thus, gossypol affects the nature of the change in the conformation on the chemical modification of the protein.

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