In actual fact, the use of reagent (I) alone led to considerably better results. A solution of nitrothiosulfobenzoate [2] was diluted 10-fold and a chromatogram was sprayed with it. Cysteine and cystine gave yellow spots on a white background. When silica gel or polyamide is used as the support, 2 μg of cystine can be detected in a spot, while when paper is used the amount is ≥ 10 μg. Cysteine appears rapidly. In the case of cystine, the coloration develops in 10-15 min. Other amino acids are not revealed by this reagent.

Cystine peptides with free amino and carboxy groups appear in the same way as cystine. When the amount of S–S bonds in a spot is ≥ 15 nmole, free peptides are readily detected on a chromatogram.

Protected cystine peptides appear considerably more slowly (time of development of the coloration 30-40 min) and in higher concentrations (20-30 μg) in a spot than in free ones. Protected cysteine peptides appear similarly.

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CIRCULAR DICHROISM SPECTRA OF THE PROTEIN FRACTIONS OF MAIZE

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An investigation of the circular dichroism (CD) spectra of plant proteins will permit the laws of their structural changes to be revealed [1]. We have previously [2] studied the nature of the absorption spectra of the protein fractions of maize in the ultraviolet and infrared regions, and the results of this can be used in practice for selection evaluation. In connection with this, it appeared of interest to determine the possibility of the CD method for investigating the albumins, globulins, zeins, and glutelins of maize.

The protein fractions were isolated from maize grain in the phase of full ripeness by the procedure described previously [3, 4]. The spectra were obtained on a DKhR-02 dichrograph and, for comparison of the preparations, the CD optical densities were calculated for the absorption of a 1% solution in a 1-cm cell.

A comparison of the CD spectra of the protein fractions revealed characteristic differences (Fig. 1). The CD band of the albumins was characterized by maxima at 216 and 220 nm,

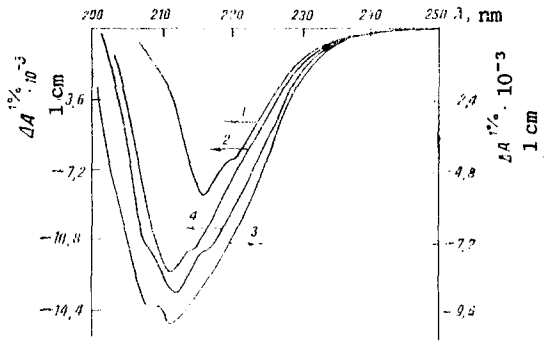

Fig. 1. CD spectra of maize albumins (1), globulins (2), zeins (3), and glutelins (4).

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and the first of them underwent a hypsochromic shift for the globulins and zeins (211 nm) and the glutelins (212 nm). A similar tendency was observed for the second CD maximum, the shift of which was greatest for the zeins (208 nm), while for the globulins and glutelins the hyposochromic shift was less pronounced (215 and 216 nm, respectively). It was established that the hyperchromic effect of the CD band increased in the sequence albumins–globulins–glutelins–zeins. The changes in the characteristics of the CD spectra are explained by differences in the secondary structures of the proteins, and also by the possible contribution of optically active nonprotein chromophores, which, according to the literature [2], are present in the protein fraction. The results obtained are in harmony with those on optical rotatory dispersion [5, 6] and CD [1] indicating a relatively high degree of α-helicalization of the zeins, which is a distinguishing feature of the structural organization of proteins of prolamine nature isolated from cereal seeds [8].

Thus, an investigation of CD spectra will permit a comparative characterization to be made and conclusions to be drawn concerning the structural changes of maize proteins.

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