

COMPARATIVE STUDY OF THE POLYPEPTIDES OF ZEIN BY THE
METHOD OF PEPTIDE MAPPING

A. N. Vinnichenko, O. A. Livenskaya,
and I. V. Tsurkan

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At the present time, the method of peptide mapping is finding wide use in the study of salt-water-soluble proteins from various materials, but information relative to hydrophobic alcohol-soluble polypeptides is sparse [1]. Since a comparative investigation of the peptide composition of plant proteins permits revelation of the laws of their structural changes, it appeared of interest to perform the peptide mapping of an alcohol-soluble protein - zein, which is obtained from various lines of maize.

The zein fractions were isolated from maize grain of the W 64a, Wf 9, and A204 lines in the phase of complete ripeness by the method of [2]. In view of the low level of arginine and lysine in the zein polypeptide [3], to obtain a well-defined map of differences we used chymotryptic hydrolysis in a ratio of 1:20. The separation of the mixture of peptides was carried out with the aid of two-dimensional thin-layer chromatography on LucefolR plates (Czechoslovakia) in the solvent systems chloroform-methanol-aqueous ammonia (2:2:1) and butanol-acetic acid-pyridine-water (68:14:40:25). The plates were stained with 0.5% ninhydrin solution.

As can be seen from Fig. 1, the zein was fragmented into 17-21 peptides. The peptides were located in the form of three characteristic groups. In spite of the presence of identical peptide spots, the chromatograms differed with respect to the mobilities of a number of peptides the intensities of the coloration of analogous spots, and the presence or absence of unique peptides. The change in mobilities was most pronounced in the region of highly mobile fragments of the chymotryptic hydrolysate of the zein of line A204.

The results obtained are in harmony with those of amino acid analysis with respect to a definite difference in the amino composition of the zein according to the variety of material [3]. The observed differences in the peptide maps of zein from different lines are due to differences in the structure of the zein complex both at the level of the subunit composition of the variety of material [4], and, possibly, to point substitutions in the amino acid sequences of a number of polypeptides [3, 5].

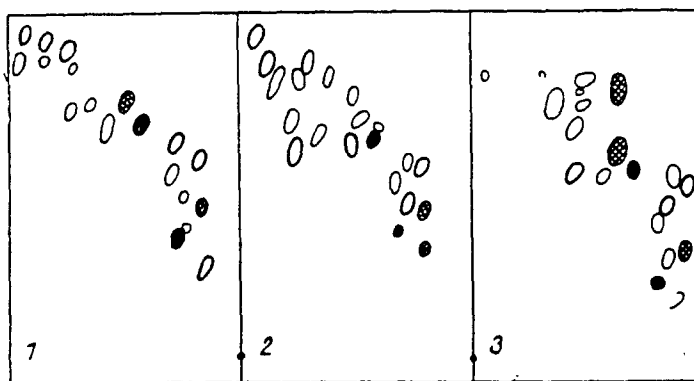


Fig. 1. Peptide maps of the zeins from maize of lines W 64A (1), Wf 9 (2), and A204 (3).

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Thus, peptide mapping permits the performance of a comparative characterization and the revelation of differences in the peptide compositions of complexes of alcohol-soluble peptides obtained from maize seeds with different genotypes.

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