PP-128

Change in the amino acid composition of soluble protein fractions of plants of different tolerance for salinity

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Aim of the study: Quantitative correlation of constitutional and enzyme proteins are definitely arranged due to the strict consistency of genetic systems of an organism. Meanwhile, the decoding of proteins of synthesized fractions in salinity conditions is a problem of current interest moreover due to their genotype peculiarity. The given paper presents investigation results for the amino acid composition of soluble protein fractions (water, salt and alkali-soluble) of plants of different tolerance in standard conditions and under the saline stress.

Materials and Methods: Two different genotypes of pea (*Pisum sativum* L.) – glycophyte, petrosimonia (*Petrosimonia brachiata* L.) – halophyte were investigated. Seeds of test plants were soaked in distilled water and then germinated at 27^0C during 48 hours. Sprouts were transferred into water culture medium containing Knoppe's solution. When the first green leaves appeared, sprouts were divided into two parts. The first part was used as check samples and the second part was was added by NaCI with the final calculation of dead concentrations 2 for pea and 4% for petrosimonia. Protein fractions from solutions were precipitated by trichloroacetic acid with with final concentration 5 at 70^0C. Dried proteins were subjected to the acid hydrolysis and their amino acid composition was determined by AAA-339 analyzer.

Results: The investigation of the amino acid composition has revealed that the saline stress extremely stimulates the synthesis of protein soluble fractions for both genotypes. In this case the main amount of proteingeneous amino acids is concentrated at the glutamine fraction. The sudden decrease of the total content of bound amino acids for all protein fractions of petrosimonia, when the saline stress is absent, is stipulated by a genetically inherited demand of halophyte in the salt excess introducing of which stabilizes immediately this gap. Hydrophobic amino acids of pea growing in standard conditions are concentrated in the albumin fraction and of petrosimonia are concentrated in the globulin fraction. The amount of polar amino acids is increased independently on test versions with exception of water soluble proteins of petrosimonia. The content of salt and alkali-soluble fractions remains unchanged. The process of introduction of sour amino acids into the protein composition is promoted, mainly it refers to glutamic acid for both versions of pea and for petrosimonia in standard conditions. We have revealed that in proteins of both plants growing in standard conditions the methionine content is significantly low. Under the saline stress the methionine content abruptly increases in all protein fractions of both plants. This fact gives an evidence to believe that methionine takes part in the protein structure stabilization under adverse existence regardless of the salt tolerance of plants. Our experiments have established that the saline stress promotes the increase of proteingeneous proline in the composition of the glutamine fraction for the intolerant type and in the composition of the globulin fraction for halophyte. Thus, primary reactions of plants to the stress are identical for both plants but in time rates of catabolic and hydrolytic reactions change differently, i.e. here of significance are peculiarities and properties occurring during the evolution.

Keywords: Different genotypes, Saline stress, Protein fractions, Amino acid, Glycophyte, Halophyte